<u>CA Intermediate</u>

Costing Marathon

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EMPLOYEE COST - CONCEPTS

1. **Labour Turnover**

It is the rate of change in labour force of an organisation. It can be calculated by following ways:

(A) Separation Method $= \frac{Number\ of\ Separation}{Average\ No.\ of\ Workers} \times 100$

(B) Replacement Method $= \frac{Number\ of\ Replacement}{Average\ No.\ of\ Workers} \times 100$

(C) New Recruitment Method $= \frac{Number\ of\ Expansion}{Average\ No.\ of\ Workers} \times 100$

(D) Flux Method (with replacement) $= \frac{(No.\ of\ Separation + No.\ of\ acessions)}{Average\ No.\ of\ Workers} \times 100$

(E) Flux Method (without replacement) $= \frac{(No.\ of\ Separation + No.\ of\ replacement)}{Average\ No.\ of\ Workers} \times 100$
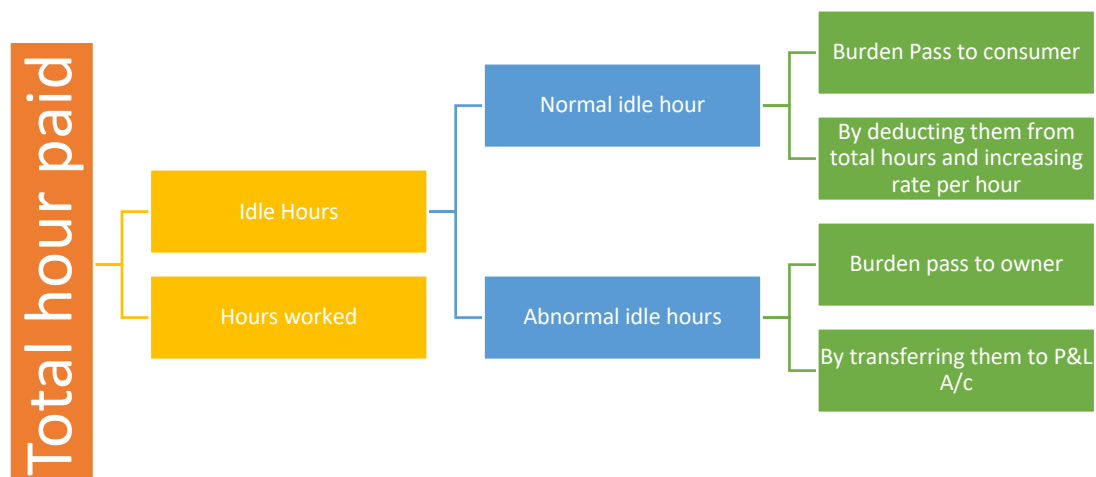
(F) Average worker $= \frac{Opening + Closing}{2}$

(G) Equivalent Annual LTR $= \frac{Labour\ Turnover\ Rate}{No.\ of\ days\ in\ the\ period} \times 365$

2. **Statement of Profit foregone due to labour turnover**

Particulars	Amount
Contribution lost due to loss of productive hours	
Additional rectification cost	
Settlement cost due to leaving	
Recruitment cost	
Training cost	
Profit foregone	

3. **Idle Time**

4. Statement of Wage Rate Calculation

Particulars	Amount (₹)
Basic Wages	--
Dearness Allowance	--
Bonus	--
Commission	--
Perquisite	--
Overtime	--
Any other allowances	--
Employer contribution to PF/ESI etc.	--
Gross Wages	--
Effective Working Hours (Total hours – Normal Idle Hours)	--
Wage rate per hour	--

5. Net Wages or In-hand wages calculation

Particulars	Amount (₹)
Gross Wages	--
(-) Employee contribution to PF/ESI etc.	--
(-) Employer contribution to PF/ESI etc.	--
(-) Tax deducted at source (TDS)	--
(-) Professional Tax	--
(-) Any other deduction	--
Net Wages Payable	--

6. Overtime

➤ It is hours worked over and above the normal working hours.
➤ According to Factories Act of 1948, a worker is entitled for overtime at double the rate of his wages if he works more than 9 hours in a day or more than 48 hours in a week.

Overtime payment = Overtime hours × Overtime Rate

7. Overtime Rate & Overtime Premium

➤ The rate at which overtime hours are paid is known as overtime rate.
➤ Overtime premium is the extra amount of wages paid over the normal rate.
➤ Overtime Rate = Normal wage rate + Overtime Premium

8. **Treatment of Overtime Premium**

Cause of Overtime	Treatment
Resorted at the desire of the customer	Overtime premium to be charged to the specific customer
Resorted due to general pressure of work to increase the output or irregularity in production	Overtime premium to be charged to general overheads
Resorted due to negligence or delay of a particular department	Overtime premium to be charged to the concerned department
Resorted due to abnormal reasons	Overtime premium to be charged to costing profit & loss account
Resorted due to shortage of labour in industry	Inflate the wage rate and charge it to all customers.

9. **Wage Payment System**

(A) Time Rate System

Wages = No. of hours worked × Rate per hour

(B) Piece Rate system

Wages = No. of units produced × Rate per unit (or Piece rate)

10. **Incentive Plans**

(A) Halsey Plan

Total Earnings = (H × R) + [50% × (S – H) × R]

(B) Halsey-wier Plan

Total Earnings = (H × R) + [33.33% × (S – H) × R]

(C) Rowan Plan

Total Earnings = (H × R) + $\left[\left(\frac{S-H}{S}\right) \times H \times R\right]$

Where,   H = Actual hours worked

R = Rate per hour

S = Standard hours or time allowed

(S – H) = Time saved

11. **Effective Hourly Rate of Earning**

Effective hourly rate of earning = $\frac{Total\ Wages}{Actual\ hours\ worked}$

12. Beneficial Plan

Actual hours = 50% of Standard hours	Halsey Bonus = Rowan Bonus
Actual hours > 50% of Standard hours Or Time Saved < 50% of Standard hours	Halsey Bonus < Rowan Bonus
Actual hours < 50% of Standard hours Or Time Saved > 50% of Standard hours	Halsey Bonus > Rowan Bonus

EMPLOYEE COST QUESTIONS

Question – 1

The cost accountant of SK Ltd. has computed labour turnover rates for the quarter ending 31st March as 10%, 5% and 3% respectively under 'Flux Method', 'Replacement Method' and 'Separation Method'. If the number of workers replaced during the quarter is 30, find out the number of:

(a) workers recruited and joined; and

(b) workers left and discharged

(c) equivalent employee turnover rates for the year

(d) number of workers at the beginning of the quarter

Solution

Replacement Method - Labour turnover rate $= \dfrac{No.of\ replacements}{Average\ number\ of\ workers} \times 100$

$$5 = \dfrac{30}{Average\ number\ of\ workers} \times 100$$

Average number of workers = 600

Separation Method - Labour turnover rate $= \dfrac{No.of\ sepearations}{Average\ number\ of\ workers} \times 100$

$$3 = \dfrac{No.of\ sepearations}{600} \times 100$$

Number of separations (left and discharged) = 18

Flux Method - Labour turnover rate $= \dfrac{No.of\ separations + No.of\ recruitments\ \&\ joinee}{Average\ number\ of\ workers} \times 100$

$$10 = \dfrac{18 + No.of\ recruitments\ \&\ joinee}{600} \times 100$$

Number of workers recruited & joined = 60 – 18 = 42

(a) number of workers recruited and joined = 42

(b) number of workers left and discharged = 18

(c) **Equivalent Employee turnover rate**

Flux Method – Labour turnover rate $= \dfrac{16}{3} \times 12 = 64\%$

Replacement Method – Labour turnover rate $= \dfrac{8}{3} \times 12 = 32\%$

Separation Method – Labour turnover rate $= \frac{5}{3} \times 12 = 20\%$

(d) Average workers $= \frac{Opening + Closing}{2}$

$600 = \frac{Opening + Closing}{2}$

Closing = 1200 – Opening

Also, Closing workers = Opening workers + recruited & joined – left & discharged

1200 – Opening = Opening + 42 – 18

Opening workers = 588

Question – 2

SK Ltd. is engaged in BPO industry. One of its trainee executives in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method.

Following is the data provided by the Personnel department for the last year:

Employees	At the beginning	Joined	Left	At the end
Data processor	540	1,080	60	1,560
Payroll Processors	?	20	60	40
Supervisors	?	60	—	?
Voice Agents	?	20	20	?
Assistant Managers	?	20	—	30
Senior Voice Agents	4	—	—	12
Senior Data Processors	8	—	—	34
Team Leaders	?	—	—	?
Employees transferred from the Subsidiary Company				
Senior Voice Agents	—	8	—	—
Senior Data Processors	—	26	—	—
Employees transferred to the Subsidiary Company				
Team Leaders	—	—	60	—
Assistant Managers	—	—	10	—

At the beginning of the year there were total 772 employees on the payroll of the company. The opening strength of the Supervisors, Voice Agents and Assistant Managers were in the ratio of   3 : 3 : 2.

The company has decided to abandon the post of Team Leaders and consequently all the Team Leaders were transferred to the subsidiary company. The company and its subsidiary are maintaining separate set of books of account and separate Personnel Department.

You are required to calculate:

(a) Labour Turnover rate using Replacement method and Separation method.

(b) Verify the Labour turnover rate calculated under Flux method by the trainee executive of the SK Ltd.

Solution

Working Notes:

(i) Calculation of no. of employees at the beginning and end of the year

	At the beg.	Joined	Left	At the end	Replacement	Expansion
Data Processors	540	1,080	60	1,560	60	1,020
	[40 + 60 - 20]					
Payroll Proc.	80	20	60	40	20	-
Supervisors*	30	60	-	90	-	60
				[30 + 60 – 0]		
Voice Agents*	30	20	20	30	20	-
Ast. Managers*	20	20	10	30	10	10
Sr. Voice Agents	4	8	-	12	-	8
Sr. Data Processors	8	26	-	34	-	26
Team Leaders	60	-	60	-	-	-
Total	**772**	**1,234**	**210**	**1,796**	**110**	**1,124**

(*) At the beginning of the year:

Strength of Supervisors, Voice Agents and Asst. Managers =

[772 – {540 + 80 + 4 + 8 + 60} employees] or [772 – 692 = 80 employees]

[{Supervisors- $80 \times \frac{3}{8} = 30$, Voice Agents- $80 \times \frac{3}{8} = 30$ & Asst. Managers- $80 \times \frac{2}{8} = 20$} employees]

At the end of the year:

[Supervisor-(Opening- 30 + 60 Joining) = 90; Voice Agents- (Opening- 30 + 20 Joined – 20 Left) = 30]

(a) **Calculation of Labour Turnover:**

$$\text{Replacement Method} = \frac{No. \ of \ employees \ replaced \ during \ the \ year}{Average \ no.of \ employees \ on \ roll} \times 100$$

$$= \frac{110}{(772+1,796)/2} \times 100 = 8.57\%$$

$$\text{Separation Method} = \frac{No.of \ employees \ separated \ during \ the \ year}{Average \ no.of \ employees \ on \ roll} \times 100$$

$$= \frac{210}{(772+1,796)/2} \times 100 = 16.36\%$$

(b) **Labour Turnover under Flux Method**

$$\text{Flux Method} = \frac{No.of \ employees \ (joined + separated) \ during \ the \ year}{Average \ no.of \ employees \ on \ roll} \times 100$$

$$= \frac{1,234+210}{(772+1,796)/2} \times 100 = 112.46\%$$

Labour Turnover calculated by the executive trainee of the Personnel department is incorrect as it has not taken the No. of new recruitment while calculating the labour turnover under Flux method.

Question – 3	

Following data have been extracted from the books of M/s ABC Private Limited:

Salary (each employee, per month)	₹ 30,000
Bonus	25% of salary
Employer's contribution to PF, ESI etc.	15% of salary
Total cost at employees' welfare activities	₹ 6,61,500 per annum
Total leave permitted during the year	30 days
Number of employees	175
Normal idle time	70 hours per annum
Abnormal idle time (due to failure of power supply)	50 hours
Working days per annum	310 days of 8 hours

You are required to calculate:

1) Annual cost of each employee
2) Employee cost per hour
3) Cost of abnormal idle time, per employee

Solution

Calculation of effective hours

Total working hours (310 × 8)	2,480
Less: Leave days (30 × 8)	240
Available working hours	2,240
Less: Normal loss	70
Effective working hours	2,170

Statement of employee cost per hour

Particulars	Amount (₹)
Salary (30,000 × 12)	3,60,000
Bonus (25% × 3,60,000)	90,000
Employees contribution to PF (15% × 3,60,000)	54,000
Employee welfare (6,61,500 ÷ 175)	3,780
Total Annual Cost (A)	5,07,780
Effective working hours (B)	2,170
Employee cost per hour (A ÷ B)	234

Cost of abnormal idle time per employee = ₹ 234 × 50 hours = ₹ 11,700

Question – 4

A total of 108 labour hours have been put in a particular job card for repair work engaging a semi-skilled and skilled labour (Mr. Deep and Mr. Sam respectively).

The hours devoted by both the workers individually on daily basis for this particular job are given below:

Monday	Tuesday	Wednesday	Thursday	Friday
10.5	8.0	10.5	9.5	10.5

The skilled labour also worked on Saturday for 10 hours.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 5 hours on Saturdays; the workers are however paid full wages for Saturday (8 hours for 5 hours worked).

Semi-skilled and skilled worker is paid ordinary wage @₹ 400 and ₹ 600 respectively per day of 8 hours labour. Further, the workers are also paid dearness allowance @20%. Extra hours worked over and above 8 hours are also paid at ordinary wage rate however, overtime premium of 100% of ordinary wage rate is paid if a worker works for more than 9 hours in a day and 48 hours in a week.

You are required to compute the wages payable to Mr. Deep (semi-skilled) and Mr. Sam (skilled).

Solution

Calculation of total normal hours to be paid for Mr. Deep (Semi-skilled)

Day	Actual hours	Normal hours	Extra Hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours payable
	A	B	C	D = A – B	E = D × 2	F = B + C + E
Monday	10.5	8	1	1.5	3	12
Tuesday	8	8	-	-	-	8
Wednesday	10.5	8	1	1.5	3	12
Thursday	9.5	8	1	0.5	1	10
Friday	10.5	8	1	1.5	3	12
Saturday	-	-	-	-	-	-
Total	**49**	**40**	**4**	**5**	**10**	**54**

Calculation of total normal hours to be paid for Mr. Sam (Skilled)

Day	Actual hours	Normal hours	Extra Hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours payable
	A	B	C	D = A – B	E = D × 2	F = B + C + E
Monday	10.5	8	1	1.5	3	12
Tuesday	8	8	-	-	-	8
Wednesday	10.5	8	1	1.5	3	12
Thursday	9.5	8	1	0.5	1	10
Friday	10.5	8	1	1.5	3	12
Saturday	10	5	3 + 1 = 4	1	2	11
Total	**59**	**45**	**8**	**6**	**12**	**65**

Note: Mr. Sam will be paid for equivalent 8 normal working hours at ordinary wage rate, though 5 hours of working is required on Saturday because in question it is mentioned that both condition of 9 hour per day and 48 hour a week has to be satisfied. Thus, only 1 hour of overtime over 9 hours will be paid at overtime rate.

Wages Payable

Particulars	Mr. Deep	Mr. Sam
Basic wage per hour	400 ÷ 8 = 50	600 ÷ 8 = 75
Dearness allowance per hour @ 20%	10	15
Hourly wage rate	60	90
Total normal hours payable	54	65
Total wages payable	3,240	5,850

Question – 5

Calculate the earnings of S and K from the following particulars for a month and calculate the labour cost to each job A, B and C.

	S	K
Basic Wages	₹ 100	₹ 160
Dearness allowance	50%	50%
Contribution of provident fund (on basis wages)	8%	8%
Contribution of employee's state insurance (on basic wages)	2%	2%
Overtime	10 hours	---

The normal working hours for the month are 200. Overtime is paid as double the total of normal wages and dearness allowance. Employer's contribution to state insurance and provident fund are at equal rates of employee's contribution. The two workers were employed on jobs A, B and C in the following properties:

	A	B	C
Worker S	40%	30%	30%
Worker K	50%	20%	30%

Overtime was done on Job B.

Solution

Statement of wages

Particulars	Worker S	Worker K
Basic Wages	100	160
Dearness Allowance	50	80
Employer contribution to PF	8	12.80
Employer contribution to state insurance	2	3.20
Overtime $\left[\frac{(100+50)\times 2\times 10}{200}\right]$	15	-
Total	**175**	**256**

Statement of cost of Jobs

Particulars	A	B	C
Overtime	-	15	-
Bal. of Worker S's wages (160 in 40:30:30)	64	48	48
Worker K's Wages (256 in 50:20:30)	128	51.20	76.80
Total	**192**	**114.20**	**124.80**

Question – 6	

A skilled worker in SK Ltd. is paid a guaranteed wage rate of ₹ 30 per hour. The standard time per unit for a particular product is 4 hours. S, a machine man, has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of ₹ 37.50 on the manufacture of that particular product. What could have been his total earnings and effective hourly rate, had he been put on Halsey Incentive Scheme (50%)?

Solution

Let actual time taken by the worker S = H

Total wages in Rowan plan = $(H \times 30) + \left(\dfrac{H}{4}\right) \times (4 - H) \times 30$

$(H \times 37.50) = 30H + 30H - 7.5H^2$

$22.5H = 7.5H^2$

$H = 3$ hours

Total wages of workman in Halsey scheme = $(3 \times 30) + \dfrac{50}{100} \times (4 - 3) \times 30 = ₹\,105$

Effective hourly rate of earnings under Halsey Plan = $\dfrac{105}{3\text{ hours}} = ₹\,35$

Question – 7	

Two workers 'S' and 'K' produce the same product using the same material. Their normal wage rate is also the same. 'S' is paid bonus according to Rowan scheme while 'K' is paid bonus according to Halsey scheme. The time allowed to make the product is 50 hours. 'S' takes 30 hours while 'K' takes 40 hours to complete the product. The factory overhead rate is ₹ 5 per person-hour actually worked. The factory cost of product manufactured by 'S' is ₹ 3,490 and for product manufactured by 'K' is ₹ 3,600.

Required:

(a) Compute the normal rate of wages

(b) Compute the material cost

(c) Prepare a statement comparing the factory cost of the product as made by two workers.

Solution

Let x be the cost of material and y be the normal rate of wages per hour

Statement of Factory Cost

Particulars	Worker S	Worker K
	₹	₹
Material	x	x
Wages	30y	40y
Bonus (A = 30y × 20/50) (B = 10y × 50%)	12y	5y
Overheads @ ₹ 5 per person hour worked	150	200
	x + 42y + 150	x + 45y + 200

The following two equations can be made

x + 42y + 150	= ₹ 3,490	….(i)
x + 45y + 200	= ₹ 3,600	….(ii)

On subtracting equation (i) from equation (ii)

3y + 50	= 110
or 3y	= 110 – 50
y	= 60/3 = 20

On substituting the value of y in equation (i)

x + 840 + 150	= 3,490
or x	= 3,490 – 990
or x	= 2,500

Thus:

(a) Normal Wage Rate is ₹ 20 per hour

(b) Cost of material used for the product is ₹ 2,500

(c) **Statement of Cost**

Particulars	Worker S	Worker K
Material	2,500	2,500
Wages	600	800
Bonus	240	100
Overheads @ ₹ 5 per person hour worked	150	200
	3,490	3,600

Question – 8	

Mr. S is working by employing 10 skilled workers. He is considering the introduction of some incentive scheme - either Halsey Scheme (with 50% bonus) or Rowan Scheme - of wage payment for increasing the labour productivity to cope with the increased demand for the product by 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and he has accordingly given this assurance to the workers.

As a result of this assurance, the increase in productivity has been observed as revealed by the following figures for the current month:

Hourly rate of wages (guaranteed)	₹ 2.00
Average time for producing 1 piece by one worker at the previous performance	2 hours
(This may be taken as time allowed)	
No. of working day in the month	25
No. of working hours per day for each worker	8
Actual production during the month	1,250 units

Required:

(a) Calculate effective rate of earnings per hour under Halsey Scheme and Rowan Scheme.

(b) Calculate the savings to Mr. S in terms of direct labour cost per piece under the above schemes.

(c) Advice Mr. S about the selection of the scheme to fulfill his assurance.

Solution

Actual hours = 25 × 8 × 10 = 2000;   Standard hours = 1,250 × 2 = 2,500;   Wage rate = 2

(a) Earning under Halsey scheme = (2,000 × 2) + $\frac{50}{100}$ × (2,500 – 2,000) × 2 = ₹ 4,500

Effective hourly rate of earnings under Halsey Plan = $\frac{4,500}{2,000\,hours}$ = ₹ 2.25

Earnings under Rowan plan = $(2,000 \times 2) + \left(\dfrac{2,000}{2,500}\right) \times (2,500 - 2,000) \times 2 = ₹\,4,800$

Effective hourly rate of earnings under Rowan Plan = $\dfrac{4,800}{2,000\,\text{hours}} = ₹\,2.40$

(b) Labour cost per piece under time wage system = $2 \times 2 = ₹\,4$

Labour cost per piece under Halsey = $\dfrac{4,500}{1,250} = ₹\,3.60$

Savings per piece under Halsey Scheme = $4 - 3.60 = ₹\,0.40$

Labour cost per piece under Rowan = $\dfrac{4,800}{1,250} = ₹\,3.84$

Savings per piece under Rowan Scheme = $4 - 3.84 = ₹\,0.16$

(c) As per above, it is better for Mr. S to adopt Halsey Scheme but since he has assured workers of an average 20% increase over the present earnings, he will have to select Rowan Scheme as is evident from the following:

Increase in earning under Halsey Scheme = $\dfrac{4,500 - 4,000}{4,000} \times 100 = 12.5\%$

Increase in earning under Rowan Scheme = $\dfrac{4,800 - 4,000}{4,000} \times 100 = 20\%$

Question – 9

A Company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three workers. Which are under consideration of the management.

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in ₹)	40	50	60
Production in units:			
- Product S	210	-	600
- Product K	360	-	1350
- Product M	460	250	-
Standard time allowed per unit of each product is:			
	S	K	M
Minutes	15	20	30

For the purpose of piece rate, each minute is valued at ₹ 1/-

You are required to calculate the wages of each worker under:

(a) Guaranteed hourly rate basis

(b) Piece rate earning basis, but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay).

(c) Premium bonus basis where the worker received bonus based on Rowan scheme.

Solution

(a) Computation of wages of each worker under guaranteed hourly rate basis

Worker	Actual hours worked	Hourly wage rate	Wages (₹)
I	380	40	15,200
II	100	50	5,000
III	540	60	32,400

(b) Computation of wages of each worker under piece work earning basis

Product	Piece rate per unit	Worker-I		Worker-II		Worker-III	
		Units	Wages	Units	Wages	Units	Wages
S	15	210	3,150	-	-	600	9,000
K	20	360	7,200	-	-	1,350	27,000
M	30	460	13,800	250	7,500	-	-
Total			24,150		7,500		36,000

Since each worker's earnings are more than 50% of basic pay. Therefore, worker-I, II and III will be paid the wages as computed i.e. ₹ 24,150, ₹ 7,500 and ₹ 36,000 respectively.

(c) Computation of wages of each worker under Rowan scheme

Worker	Time Allowed	Time Taken	Time Saved	Wage rate per hour	Earnings	Bonus	Total Earning
I	402.5	380	22.5	40	15,00	850	16,050
II	125	100	25	50	5,000	1,000	6,000
III	600	540	60	60	32,400	3,240	35,640

Working Notes:

(1) Piece rate per unit

Product	Standard time per unit in minute	Piece rate per minute	Piece rate per unit
S	15	1	15
K	20	1	20
M	30	1	30

(2) Time allowed to each worker

Worker	Product S	Product K	Product M	Total hours
I	210 × 15 = 3,150	360 × 20 = 7,200	460 × 30 = 13,800	24,150÷60 = 402.5
II	-	-	250 × 30 = 7,500	7,500÷60 = 125
III	600 × 15 = 9,000	1,350 × 20 = 27,000	-	36,000÷60 = 600

(3)   Bonus of worker -I under Rowan = $\frac{380}{402.50} \times 22.5 \times 40 = 850$

Bonus of worker -II under Rowan = $\frac{100}{125} \times 25 \times 50 = 1,000$

Bonus of worker -III under Rowan = $\frac{540}{600} \times 60 \times 60 = 3,240$

Question – 10	

SK Ltd. operates a boutique which works for various fashion houses and retail stores. It has employed 26 workers and pays them on time rate basis. On an average an employee is allowed 8 hours for boutique work on a piece of garment. In the month of May 2021, two workers S and K were given 15 pieces and 21 pieces of garments respectively for boutique work. The following are the details of their work:

	S	K
Work Assigned	15 pieces	21 pieces
Time Taken	100 hours	140 hours

Workers are paid bonus as per Halsey System. The existing rate of wages is ₹ 60 per hour. AS per the new wages agreement the workers will be paid ₹ 72 per hour w.e.f. 1st June 2021. At the end of the month May 2021, the accountant of the company has wrongly calculated wages to these two workers taking ₹ 72 per hour.

Required:
(i)   Calculate the loss incurred due to incorrect rate selection.
(ii) Calculate the loss incurred due to incorrect rate selection, had Rowan scheme of bonus payment followed.
(iii) Calculate the loss/savings if Rowan scheme of bonus payment had followed.

Solution

Basic Calculation

Particulars	S	K
Actual hours taken	100 hrs.	140 hrs.
Standard hours	15 × 8 = 120 hrs.	21 × 8 = 168 hrs.
Hours saved	20 hrs.	28 hrs.

(i) Statement of calculation of loss due to incorrect rate selection

Particulars	S	K
Wages due @ ₹ 60 (A)	(100×60) + (20×60×50%) = 6,600	(140×60) + (28×60×50%) = 9,240
Wages paid @ ₹ 72 (B)	(100×72) + (20×72×50%) = 7,920	(140×72) + (28×72×50%) = 11,088
Extra wages paid (B – A)	1,320	1,848

(ii) Statement of calculation of loss due to incorrect rate selection under Rowan system

Particulars	S	K
Wages due @ ₹ 60 (A)	$(100 \times 60) + (20 \times 60 \times \frac{100}{120}) = 7{,}000$	$(140 \times 60) + (28 \times 60 \times \frac{140}{168}) = 9{,}800$
Wages paid @ ₹ 72 (B)	$(100 \times 72) + (20 \times 72 \times \frac{100}{120}) = 8{,}400$	$(140 \times 72) + (28 \times 72 \times \frac{140}{168}) = 11{,}760$
Extra wages paid (B – A)	1,400	1,960

(iii) Statement of calculation of saving due to Rowan system

Particulars	S	K
Extra wages paid under Halsey	1,320	1,848
Extra wages paid under Rowan	1,400	1,960
Difference (loss)	(80)	(112)

Question – 11

In a mutual project, both Raj and Bhuvan are contributing their efforts, using identical materials. Raj receives a bonus based on the Rowan plan, while the Halsey plan determines Bhuvan's bonus. The standard time allocated for the project is 150 hours. Raj completes the project in 90 hours, while Bhuvan finishes it in 120 hours. The normal hourly wage rate for Raj is ₹ 30. The total earnings for both workers are equal. Calculate the normal hourly wage rate to be paid to Bhuvan.

    (a) ₹ 26.50   (b) ₹ 24.00

    (c) ₹ 22.50   (d) ₹ 28.00

Question – 12

The board of the J Ltd. has been appraised by the General Manager (HR) that the employee attrition rate int eh company has increased. The following facts has been presented by the GM (HR):

(1)   Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit.

(2)   20% of the output during training period was defective. Cost of rectification of a defective unit was ₹ 25.

(3)   Potential productive hours lost due to delay in recruitment were 1,00,000 hours.

(4)   Selling price per unit is ₹ 180 and P/V ratio is 20%.

(5)   Settlement cost of the workers leaving the organization was ₹ 1,83,480

(6)   Recruitment cost was ₹ 1,56,340

(7)   Training cost was ₹ 1,13,180

You being an associate finance to GM (HR), has been asked the following questions:

Question – 1

How much quantity of output is lost due to labour turnover?

(a)   10,000 units

(b)   8,000 units

(c)   12,000 units

(d)   12,600 units

Question – 2
How much loss in the form of contribution, the company incurred due to labour turnover?
- (a)   ₹ 4,32,000
- (b)   ₹ 4,20,000
- (c)   ₹ 4,36,000
- (d)   ₹ 4,28,000

Question – 3
What is the cost of repairing defective units.
- (a)   ₹ 75,000
- (b)   ₹ 15,000
- (c)   ₹ 50,00
- (d)   ₹ 25,000

Question – 4
Calculate the profit lost by the company due to increased labour turnover.
- (a)   ₹ 7,50,000
- (b)   ₹ 15,00,000
- (c)   ₹ 5,00,000
- (d)   ₹ 9,00,000

Question – 5
How much quantity of output is lost due to inexperience of the new worker?
- (a)   1,000 units
- (b)   2,600 units
- (c)   2,000 units
- (d)   12,600 units

MATERIAL COST - CONCEPTS

1. Material Cost

It is one of the major element of cost in a manufacturing organisation. Thus, proper care is to be taken for this cost.

2. Components of Material Cost

(A) Purchase Cost = No. of units purchased × Cost per unit

(B) Ordering Cost = No. of orders × Cost per order

$$\text{No. of orders} = \frac{Annual\ requirement}{Order\ Size}$$ [Always round off to the next digit]

$$\text{Frequency of order} = \frac{365\ /52\ /12}{No.\ of\ orders}$$

(C) Carrying cost = Average quantity of goods × Carrying cost per unit per annum

$$\text{Average quantity} = \frac{Order\ size}{2}$$

$$\text{Average quantity with safety stock} = \text{Safety stock} + \frac{Order\ size}{2}$$

3. Determination of Order Size

It should be at the level where material cost is minimum.

Determination of Order Size

- Using Formula — Assume no discount exist — Objective: Minimize - OC + CC
- Using Tabular Format — When Discount exist — Objective: Minimize – PC + OC + CC
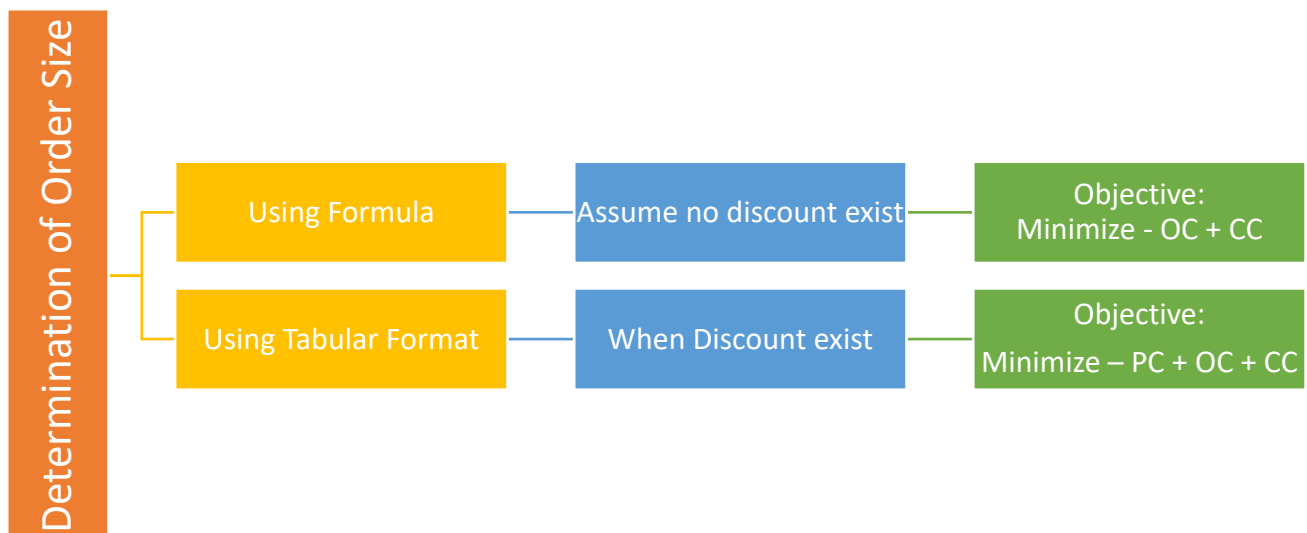
4. Economic Order Quantity (EOQ)

It is that order size at which sum total of ordering cost and carrying cost is minimum.

$$\text{EOQ} = \sqrt{\frac{2 \times A \times O}{C}}$$

Where, A = Annual requirement of raw material

O = Cost per order

C = Carrying cost per unit per annum

5. Important points for Calculation

(A) If carrying cost is given in % than such % is applied on purchase price per unit of material.

(B) If number of order is in decimal than take to the next round off number
e.g. 3.4 to 4, 3.1 to 4, 3.7 to 4 etc.

(C) A = Raw material purchased quantity (Prefer) or Raw material consumed quantity

(I) Production units = Sale units + Closing stock FG – Opening stock FG

(II) Raw material consumption = Production units × Raw material consumption per unit

(III) Raw material purchase = RM consumption + Closing stock RM – Opening stock RM

6. Levels of Inventory

(A) Re-order level (ROL) = Maximum consumption × Maximum lead time

= Safety stock + (Average consumption × Average lead time)

= Minimum stock + (Average cons. × Average lead time)

(B) Maximum level = ROL + ROQ – (Minimum cons. × Minimum lead time)

(C) Minimum level = ROL – (Average consumption × Average lead time)

(D) Average level $= \dfrac{Minimum\ level + Maximum\ level}{2}$

$= Minimum\ level + \dfrac{Re-Order\ quantity}{2}$

(E) Danger level = Average consumption × Emergency lead time

= Minimum consumption × Emergency lead time

7. ABC Analysis

It stands for always better control analysis.

Category	% Quantity	% Value	Control
A	10%	70%	High
B	20%	20%	Moderate
C	70%	10%	Low

8. Inventory Turnover Ratio (ITR)

$$\text{ITR for raw material} = \frac{Raw\ material\ consumed}{Average\ raw\ material\ quantity} = \underline{\quad} \text{ times}$$

$$\text{ITR for finished goods} = \frac{Cost\ of\ goods\ sold}{Average\ finished\ goods\ quantity} = \underline{\quad} \text{ times}$$

$$\text{Frequency or Inventory holding period (days)} = \frac{365\ /52\ /12}{ITR}$$

9. Choice of Substitute Material

Select the material which has lowest cost per unit of finished goods

	Material A	Material B
Cost per kg	₹ 20	₹ 25
Input-output ratio	200%	120%
Cost per unit of output	₹ 40	₹ 30

10. Landing Cost of Material or Valuation of Material

Items	Treatment
Trade Discount	Deduct if not already deducted
Cash Discount	Ignore
Subsidy/Grant/Incentive	Deduct from material cost
Road tax/ Toll tax/	Add to material cost
IGST/CGST/SGST	
(A) If ITC available	Ignore
(B) If ITC not available	Add to material cost
Custom Duty	Add to material cost
Penalty / Fine / Demurrage	Ignore
Insurance	Add to material cost
Commission	Add to material cost
Container Cost	Add to material cost
Return value of container	Deduct from material cost

Shortage	
(A) Normal	Deduct quantity of normal loss from total quantity
(B) Abnormal	Transfer to P&L account

- ➢ **GST is payable on net purchase price** i.e. List price – Trade Discount

- ➢ **Distribution of Freight or similar items** – On the basis of quantity of material

- ➢ **Distribution of GST, Custom duty or similar items** – On the basis of value of material

11. Safety Stock Determination

It is determined at the level where sum total of stock out cost and carrying cost of safety stock is minimum.

Carrying cost of safety stock = Safety stock unit × Carrying cost per unit per annum
Annual Stock out cost = Annual stock out units × Stock out cost per unit

12. Material Records

It can be done in two ways i.e. Perpetual system and Periodic system.

13. Preparation of Stores Ledger

(A) Material return from factory or production to stores
- Show as receipt at the price at which originally issued
- If price not known than at recent issue rate.
- To be issued first in FIFO or LIFO method

(B) Material return by stores to supplier or vendor
- Show as issued in stores ledger at the price at which originally purchased
- If original price not known than at recent issue rate.

(C) Transfer from one job to another
- No entry in stores ledger

(D) **In case of normal loss**, show as issue in quantity column only and thus price of balance quantity increases.

(E) **In case of abnormal loss**, show as issue as per the method prevailing and transfer the same to costing P&L account.

(F) **Material Consumed** = Issue of material

Material consumed = Opening Stock + Purchases – Purchase return – Abnormal loss – Closing stock

MATERIAL COST QUESTIONS

Question – 1

An automobile company purchases 27,000 spare parts for its annual requirements. The cost per order is ₹ 240 and the annual carrying cost of average inventory is 12.5%. Each spare part costs ₹ 50.

At present, the order size is 3,000 spare parts.

(Assume that number of days in a year = 360 days)

Find out:

(i)   How much the company's cost would be saved by opting EOQ model?
(ii)   The Re-order point under EOQ model if lead time is 12 days.
(iii) How frequently should orders for procurement be placed under EOQ model?

Solution

(i)   Annual requirement (A) = 27,000

Cost per order (O) = ₹ 240

Carrying cost per unit p.a. (C) = 50 × 12.5% = ₹ 6.25

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 27,000 \times 240}{6.25}} = 1,440 \text{ units}$$

Statement of Cost

Particulars	Order size = 3,000	Order size = 1,440
Purchase cost	27,000 × 50 = 13,50,000	27,000 × 50 = 13,50,000
Ordering cost	$\frac{27,000}{3,000} \times 240 = 2,160$	$\frac{27,000}{1,440} \, or \, 18.75 \, or \, 19 \times 240 = 4,560$
Carrying cost	$\frac{3,000}{2} \times 6.25 = 9,375$	$\frac{1,440}{2} \times 6.25 = 4,500$
Total cost	13,61,535	13,59,060

Saving due to EOQ = ₹ 13,61,535 - ₹ 13,59,060 = ₹ 2,475

(ii)   Re-order point = Maximum consumption × Maximum time = $\frac{27,000}{360} \times 12 = 900$ units

(iii) Number of orders under EOQ Model = $\frac{27,000}{1,440} = 18.75$ or 19

Frequency of order = $\frac{360}{19} = 18.94$ days

Question – 2

A company manufactures a product from a raw material which is purchased at ₹ 60 per kg. The company incurs a handling cost of ₹ 360 plus freight of ₹ 390 per order. The incremental carrying cost of inventory of raw material is ₹ 0.50 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹ 9 per kg per annum. The annual production of the product is 1,00,000 units and 2.5 units are obtained from one kg of raw material.

Required:

(a)   Calculate the economic order quantity of raw material

(b)   Advise, how frequently should orders for procurement be placed. (Assuming 360days in the year)

(c)   If the company proposes to rationalize placement of orders on quarterly basis, what percentage of discount in the price of raw materials should be negotiated?

Solution

(a) A = 1,00,000 ÷ 2.5 = 40,000 kg

O = 360 + 390 = ₹ 750

C = 9 + (0.5 × 12) = ₹ 15

$$\text{EOQ} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 40,000 \times 750}{15}} = 2,000 \text{ kg}$$

(b) Number of orders to be placed = $\dfrac{\text{Annual requriement of material}}{\text{Order size (EOQ)}} = \dfrac{40,000}{2,000} = 20$ orders

Frequency of order = $\dfrac{360}{No.\ of\ orders} = \dfrac{360}{20} = 18$ days

(c) Desired number of orders = 4

∴ desired order size = $\dfrac{40,000}{4} = 10,000$ kg

Let new price = y

Statement of Cost

Costs	Order Size = 2,000	Order Size = 10,000
Purchase Cost	40,000 × 60 = 24,00,000	40,000 × y = 40,000y
Ordering Cost	$\dfrac{40,000}{2,000} \times 750 = 15,000$	$\dfrac{40,000}{10,000} \times 750 = 3,000$
Carrying Cost	$\dfrac{2,000}{2} \times 15 = 15,000$	$\dfrac{10,000}{2} \times 15 = 75,00$
Total Cost	24,30,000	40,000y + 78,000

Now to rationalize cost of both options, total cost should be same under both options.

∴ 24,30,000 = 40,000y + 78,000

y = ₹ 58.80

∴ Discount per unit = ₹ 60 – ₹ 58.80 = ₹ 1.20

Discount % = $\dfrac{1.20}{60} \times 100 = 2\%$

Question – 3

The annual demand for an item of raw material is 4,000 units and the purchase price is expected to be ₹ 90 per unit. The incremental cost of processing an order is ₹ 135 and the annual cost of storage is estimated to be ₹ 12 per unit. Compute the optimal order quantity and total relevant cost of this order quantity?

Suppose that ₹ 135 as estimated to be the incremental cost of processing an order is incorrect and should have been ₹ 80. All other estimates are correct. Estimate the difference in cost on account of this error?

Assume at the commencement of the period that a supplier offers 4,000 units at a price of ₹ 86. The materials will be delivered immediately and placed in the stores. Assume that the incremental cost of placing the order is zero and original estimate of ₹ 135 for placing an order for the economic batch is correct. Analyze, should the order be accepted?

Solution

$$\text{EOQ} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 4,000 \times 135}{12}} = 300 \text{ units}$$

Number of orders = 4,000 ÷ 300 = 13.33 or 14 orders

Relevant cost of this order quantity:

Ordering cost [14 × 135]	1,890
Carrying cost [(300 ÷ 2) × 12]	1,800
Relevant cost	3,690

$$\text{Revised EOQ} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 4,000 \times 80}{12}} = 231 \text{ units}$$

Number of orders = 4,000 ÷ 231 = 17.31 or 18 orders

Statement of Cost

Costs	Order Size = 300	Order Size = 231
Ordering Cost	14 × 80 = 1,120	18 × 80 = 1,440
Carrying Cost	$\frac{300}{2} \times 12 = 1,800$	$\frac{231}{2} \times 12 = 1,386$
Total Cost	2,920	2,826

Difference in cost on account of this error = 2,920 – 2,826 = ₹ 94

Statement of Evaluation of Offer

Costs	Order Size = 300	Order Size = 4,000
Purchase Cost	4,000 × 90 = 3,60,000	4,000 × 86 = 3,44,000
Ordering Cost	14 × 135 = 1,890	$\frac{4,000}{4,000} \times 0 = 0$
Carrying Cost	$\frac{300}{2} \times 12 = 1,800$	$\frac{4,000}{2} \times 12 = 24,000$
Total Cost	3,63,690	3,68,000

This special offer at ₹ 86 per unit should not be accepted as its total cost is higher as compared to original offer.

Question – 4	

SK Ltd. manufactures a product S which requires two raw materials P and M in a ratio of 1:4. The sales department has estimated a demand of 5,00,000 units for the product for the year. To produce one unit of finished product, 4 units of material P is required.

Stock position at the beginning of the year is as below:

Product SK   12,000 units

Material P   24,000 units

Material M   52,000 units

To place an order the company has to spend ₹ 15,000. The company is financing its working capital using a bank cash credit @ 13% p.a. Product SK is sold at ₹ 1,040 per unit. Material P and M are purchased at ₹ 150 and ₹ 200 respectively.

Required: Compute economic order quantity (EOQ):

(a) If purchase order for both materials is placed separately

(b) If purchase order for both materials is not placed separately

Solution

Annual production of Product SK = Annual demand – Opening stock = 5,00,000 – 12,000 = 4,88,000 units

Annual requirement of raw material = (Annual Production × Material per unit) – Opening stock

Material P = (4,88,000 × 4) – 24,000 = 19,28,000 units

Material M = (4,88,000 × 16) – 52,000 = 77,56,000 units

(a)   EOQ of Material P = $\sqrt{\frac{2\times A\times O}{C}} = \sqrt{\frac{2\times 19,28,000\times 15,000}{13\%\times 150}}$ = 54,462 units

      EOQ of Material M = $\sqrt{\frac{2\times A\times O}{C}} = \sqrt{\frac{2\times 77,56,000\times 15,000}{13\%\times 200}}$ = 94,600 units

(b)   EOQ of Material P & M Combined = $\sqrt{\frac{2\times A\times O}{C}} = \sqrt{\frac{2\times (19,28,000+77,56,000)\times 15,000}{13\%\times 190^{*}}}$ = 1,08,452 units

      Material P quantity = $\frac{1,08,452\times 19,28,000}{96,84,000}$ = 21,592 units

      Material M quantity = $\frac{1,08,452\times 77,56,000}{96,84,000}$ = 86,860 units

      *Price = $\frac{(150\times 19,28,000)+(200\times 77,56,000)}{(19,28,000+77,56,000)}$ = ₹ 190

Question – 5

SK Ltd. has received an offer of quantity discounts on its order of materials as under:

Tons (No.)	Price per tons (₹)
Less than 250	6.00
250 and less than 800	5.90
800 and less than 2,000	5.80
2,000 and less than 4,000	5.70
4,000 and above	5.60

The annual requirement for the materials is 4,000 tons. The ordering cost per order is ₹ 6 and the carrying cost is estimated at 20% per annum. You are required to compute the most Economic Order Quantity presenting the relevant information in a tabular form.

Solution

Tons	Price	Order Size	Purchase Cost	Ordering Cost	Carrying Cost	Total Cost
Less than 250	6	200	4,000×6 = 24,000	$\frac{4000}{200} \times 6 = 120$	$\frac{200}{2} \times 20\% \times 6 = 120$	24,240
250 to 800	5.90	250	4,000×5.90 = 23,600	$\frac{4000}{250} \times 6 = 96$	$\frac{250}{2} \times 20\% \times 5.9 = 148$	23,844
800 to 2,000	5.80	800	4,000×5.80 = 23,200	$\frac{4000}{800} \times 6 = 30$	$\frac{800}{2} \times 20\% \times 5.8 = 464$	23,694
2,000 to 4,000	5.70	2,000	4,000×5.70 = 22,800	$\frac{4000}{2000} \times 6 = 12$	$\frac{2000}{2} \times 20\% \times 5.7 = 1,140$	23,952
4,000 & above	5.60	4,000	4,000×5.60 = 22,400	$\frac{4000}{4000} \times 6 = 6$	$\frac{4000}{2} \times 20\% \times 5.6 = 2,240$	24,646

Total cost is lowest at order size of 800. So, economic order quantity is 800 units.

Question – 6

A company uses three raw materials A, B and C for a particular product for which the following data apply:

Raw material	Usage per unit (Kg)	Reorder Quantity (Kg)	Price per Kg (₹)	Delivery period Min	Delivery period Average	Delivery period Max	Reorder level (Kg)	Minimum level (Kg)
A	10	10,000	0.10	1	2	3	8,000	
B	4	5,000	0.30	3	4	5	4,750	
C	6	10,000	0.15	2	3	4		2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. What would be the following quantities:

(a) Minimum stock of A?

(b) Maximum stock of B?

(c) Re-order level C?

(d) Average stock level of A?

Solution

(a) Minimum stock of A = ROL – (Average lead time × Average consumption)

= 8,000 – (2× 200 × 10) = 4,000 kg

(b) Maximum stock of B = ROL + ROQ – (Min. lead time × Min. consumption)

= 4,750 + 5,000 – (3× 175 × 4) = 7,650 kg

(c) Re-order level of C = Max. lead time × Max. consumption

= 4 × 225 × 6 = 5,400 kg

(d) Average level of A = Minimum level + $\frac{ROQ}{2}$ = 4,000 + $\frac{10,000}{2}$ = 9,000 kg

Question – 7	

M/s SK Ltd. are the manufacturers of picture tubes for T.V. The following are the details of their operation during the year:

Average monthly market demand	2,000 tubes
Ordering cost	₹ 100 per order
Inventory carrying cost	20% per annum
Cost of tubes	₹ 500 per tube
Normal usage	100 tubes per week
Minimum usage	50 tubes per week
Maximum usage	200 tubes per week
Lead time to supply	6-8 weeks

Compute the following from the above information:

(a) Economic order quantity. If the supplier is willing to supply quarterly 1,500 units at a discount of 5%, is it worth accepting?

(b) Maximum level of stock

(c) Minimum level of stock

(d) Reorder level

Solution

(a) A = 100 × 52 = 5,200 (We have to consider only consumption and not monthly demand)

O = ₹ 100

C = 20% × 500 = ₹ 100

EOQ = $\sqrt{\frac{2 \times A \times O}{C}}$ = $\sqrt{\frac{2 \times 5,200 \times 100}{100}}$ = 102 tubes

Statement of Evaluation of Offer

Costs	Order Size = 102	Order Size = 1,500
Purchase Cost	5,200 × 500 = 26,00,000	5,200 × (500-5%) = 24,70,000
Ordering Cost	$\frac{5,200}{102}$ = 50.98 or 51 × 100 = 5,100	$\frac{5,200}{1,500}$ = 3.47 or 4 × 100 = 400
Carrying Cost	$\frac{102}{2}$ × 20% × 500 = 5,100	$\frac{1,500}{2}$ × 20% × 475 = 71,250
Total Cost	26,10,200	25,41,650

Since the total cost is lower at order size of 1,500, thus it is recommended to accept the offer.

(b)   Re-order level = Max. consumption × Max. lead time

$\qquad$ = 200 × 8 = 1,600 tubes

(c)   Minimum level = ROL – (Avg. lead time × Avg. Consumption)

$\qquad$ = 1,600 – (100 × 7) = 900 tubes

(d)   Maximum level = ROL + ROQ – (Minimum consumption × Minimum lead time)

$\qquad$ = 1,600 + 102 – (50 × 6) = 1,402 tubes

Question – 8

A company buys in lots of 6,250 units which is a 3 month's supply. The cost per unit is ₹ 2.40. Each order costs ₹ 45 and inventory carrying cost is 15% of average inventory value.

Required:

(a) What is the total annual cost of existing inventory policy?

(b) How much money could be saved by employing the economic order quantity?

(c) If the company operates 250 days a year, the procurement time is 10 days and safety stock is 500 units. Find the reorder level, maximum level, minimum level and average inventory level.

Solution

$\qquad$ A = 6,250 × 4 = 25,000

$\qquad$ O = ₹ 45

$\qquad$ C = 15% × 2.40 = ₹ 0.36

(a) At present, order size of company is equal to 6,250.

$\qquad$ Total annual cost = Purchase cost + Ordering cost + Carrying cost

$$= (25,000 \times 2.40) + \left(\frac{25,000}{6,250} \times 45\right) + \left(\frac{6,250}{2} \times 0.36\right) = ₹\,61,305$$

(b) EOQ = $\sqrt{\frac{2 \times A \times O}{C}}$ = $\sqrt{\frac{2 \times 25,000 \times 45}{0.36}}$ = 2,500 units

$\qquad$ Total annual cost = Purchase cost + Ordering cost + Carrying cost

$$= (25,000 \times 2.40) + \left(\frac{25,000}{2,500} \times 45\right) + \left(\frac{2,500}{2} \times 0.36\right) = ₹\,60,900$$

$\qquad$ Saving due to EOQ = ₹ 61,305 – ₹ 60,900 = ₹ 405

(c) Re-order level = (Avg. consumption × Avg. lead time) + Safety stock

$$= \left(\frac{25{,}000}{250} \times 10\right) + 500 = 1{,}500 \text{ units}$$

Maximum level = ROL + ROQ – (Min. consumption × Min. lead time)

$$= 1{,}500 + 2{,}500 - \left(\frac{25{,}000}{250} \times 10\right) = 3{,}000 \text{ units}$$

Minimum level = ROL – (Avg. consumption × Avg. lead time)

$$= 1{,}500 - \left(\frac{25{,}000}{250} \times 10\right) = 500 \text{ units}$$

Average level $= \dfrac{Min.\ level + Max.\ level}{2} = \dfrac{500 + 3{,}000}{2} = 1{,}750 \text{ units}$

Question – 9

A company produces a product 'AB' by using two raw materials – 'Material Ae' and 'Material Be' in the ratio of 5:3.

A sales volume of 50,000 kgs is estimated for the month of December by the managers expecting the trend will continue for the entire year. The ratio of input and output is 8:5.

Other information about raw material Ae is as follows:
Purchase price	₹ 150 per kg
Re-order period	2 to 3 days
Carrying cost	12%

Note: Material Ae is perishable in nature and if not used within 3.5 days of purchase if becomes obsolete.

To place an order for material 'Ae' the company has to incur an administrative cost of ₹ 375 per order. At present, material 'Ae' is purchased in a lot of 7,500 kgs to avail the discount on purchase. Company works for 25 days in a month and production is carried out evenly.

You are required to calculate:
(a) Economic order quantity (EOQ) for material Ae
(b) Maximum stock level for Material Ae

Solution

(a) Annual raw material requirement = 50,000 × 12 × (8 ÷ 5) = 9,60,000 kg

Material requirement of Ae = 9,60,000 × (5 ÷ 8) = 6,00,000 kg

$$\text{EOQ} = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 6{,}00{,}000 \times 375}{12\% \times 150}} = 5{,}000 \text{ kg}$$

(b) Maximum level for material Ae = ROL + ROQ – (Min. consumption × Min. lead time)

$$= (\text{Max. consumption} \times \text{Max. time}) + \text{ROQ} - (\text{Avg. consumption} \times \text{Avg. time})$$

$$= \left(\frac{6{,}00{,}000}{25 \times 12} \times 3\right) + 7{,}500 - \left(\frac{6{,}00{,}000}{25 \times 12} \times 2\right) = 9{,}500 \text{ kg}$$

Also, since material Ae is perishable in nature and will become obsolete after 3.5 days,

$\therefore$ Maximum level $= \left(\frac{6,00,000}{25\times12} \times 3.5\right) = 7,000$ kg

So maximum level will be minimum of the two values i.e. 7,000 kg and 9,500 kg.

$\therefore$ Maximum level for material Ae = 7,000 kg

Question – 10	

SK Ltd. produces a product 'SK' using a raw material P. To produce one unit of SK, 2 kg of P is required. As per the sales forecast conducted by the company, it will able to sale 10,000 units of SK in the coming year. The following is the information regarding the raw material P:

 (i)   The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).

 (ii)   Maximum consumption per day is 20 kg. more than the average consumption per day.

(iii)   There is an opening stock of 1,000 kg.

(iv)   Time required to get the raw materials from the suppliers is 4 to 8 days.

 (v)   The purchase price is ₹ 125 per kg.

There is an opening stock of 900 units of the finished product SK.

The rate of interest charged by bank on Cash Credit facility is 13.76%.

To place an order company has to incur ₹ 720 on paper and documentation work.

From the above information find out the followings in relation to raw material P:

(a)   Re-order Quantity

(b)   Maximum Stock level

(c)   Minimum Stock level

(d)   Calculate the impact on the profitability of the company by not ordering the EOQ.

[Take 364 days for a year]

Solution

Working Notes:

(i) Computation of Annual consumption & Annual Demand for raw material 'P':

Sales forecast of the product 'SK'	10,000 units
Less: Opening stock of 'SK'	900 units
Fresh units of 'SK' to be produced	9,100 units
Raw material required to produce 9,100 units of 'SK (9,100 units × 2 kg)	18,200 kg.
Less: Opening Stock of 'P'	1,000 kg.
Annual demand for raw material 'P'	17,200 kg

(ii)   EOQ $= \sqrt{\frac{2\times17,200\times1720}{13.76\% \ of \ 125}} = 1,200$ kg

(iii)   Re- Order level = (Maximum consumption per day × Maximum lead time)

$= \left(\frac{Annual\ Consumption\ of\ S}{364} + 20kg\right) \times 8$ days $= \left(\frac{18,200}{364} + 20kg\right) \times 8days = 560$ kg

(iv)   Minimum consumption per day of raw material 'P':

Average Consumption per day = 50 Kg.

Hence, Maximum Consumption per day = 50 kg. + 20 kg. = 70 kg.

So, minimum consumption per day will be

$$\text{Average Consumption} = \frac{Min.Consumption + Max.Consumption}{2}$$

$$50 \text{ kg} = \frac{Min.Consumption + 70 \text{ kg}}{2}$$

Min. consumption = 100 kg – 70 kg = 30 kg.

(a) Re-order Quantity = EOQ – 200 kg = 1,200 kg – 200 kg = 1,000 kg

(b) Maximum Stock level = ROL + Re-order Quantity – (Min. consumption × Min. lead time)

= 560 kg. + 1,000 kg. – (30 kg. × 4 days) = 1,440 kg.

(c) Minimum Stock level = ROL – (Average consumption per day × Average lead time)

= 560 kg. – (50 kg. × 6 days) = 260 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,000kg	1,200kg
II	No. of orders a year	$\frac{17,200}{1,000}$= 17.2 or 18 orders	$\frac{17,200}{1,200}$= 14.33 or 15 orders
III	Ordering cost	18 orders x ₹ 720 = ₹ 12,960	15 orders x ₹ 720 = ₹ 10,800
IV	Average inventory	$\frac{1,000}{2}$= 500kg	$\frac{1,200}{2}$= 600 kg
V	Carrying cost	500kg x ₹ 17.2 = ₹ 8,600	600kg x ₹ 17.2 = 10,320
VI	Total cost	₹ 21,560	₹ 21,120

Extra Cost incurred due to not ordering EOQ = ₹ 21,560 - ₹ 21,120 = ₹ 440

Question – 11

XYZ Ltd uses two types of raw materials – 'Material A' and 'Material B' in the production process and has provided the following data for the year ended on 31st March, 2021:

Particulars	Material A (₹)	Material B (₹)
Opening stock as on 1.04.2020	30,000	32,000
Purchases during the year	90,000	51,000
Closing stock as on 31.02.2021	20,000	14,000

(i) You are required to calculate:

    a) The inventory turnover ratio of 'Material A' and ' Material B'

    b) The number of days for which the average inventory is held for both materials 'A' and 'B'.

(ii) Based on above calculations, give your comments.

(Assume 360 days in a year)

Solution

(i) Calculation of Inventory Turnover Ratio

Particulars	Material A	Material B
Opening stock	30,000	32,000
Add: Purchases	90,000	51,000
Less: Closing Stock	20,000	14,000
Raw Material Consumed (A)	1,00,000	69,000
Average Stock $\left(\frac{Opening+Closing}{2}\right)$ (B)	$\frac{30,000+20,000}{2} = 25,000$	$\frac{32,000+14,000}{2} = 23,000$
Inventory Turnover Ratio (ITR)	$\frac{1,00,000}{25,000} = 4$ times	$\frac{69,000}{23,000} = 3$ times
Number of days (360 ÷ ITR)	$\frac{360}{4} = 90$ days	$\frac{360}{3} = 120$ days

Question – 12

MM Ltd. has provided the following information about the items in its inventory.

Item Code Number	Units	Unit Cost (₹)
101	25	50
102	300	01
103	50	80
104	75	08
105	225	02
106	75	12

MM ltd. has adopted the policy of classifying the items constituting 15% or above to Total Inventory Cost as "A" category, items constituting 6% or less of Total Inventory Cost as "C" category and the remaining items as "B" category. You are required to:

(i) Rank the items on the basis of % of Total Inventory Cost.

(ii) Classify the items into A, B and C categories as per ABC analysis of Inventory Control adopted by MM Ltd.

Solution   **Statement of Cost**

Item Code Number	Units	Unit Cost (₹)	Total Cost	% of Total Cost	Rank	Category
101	25	50	1,250	16.67%	II	A
102	300	01	300	4%	VI	C
103	50	80	4,000	53.33%	I	A
104	75	08	600	8%	IV	B
105	225	02	450	6%	V	C
106	75	12	900	12%	III	B
	Total		**7,500**	**100%**		

Question – 13

SK & Co., an unregistered supplier under GST, purchased material from PK Ltd. which is registered under GST. The following information is available for one lot of 5,000 units of material purchased:

Listed price of one lot	₹ 2,50,000
Trade discount	@ 10% on listed price
CGST and SGST (Credit Not available)	12% (6% CGST + 6% SGST)
Cash discount	@ 10%
(Will be given only if payment is made within 30 days.)	
Toll Tax paid	₹ 5,000
Freight and Insurance	₹ 17,000
Demurrage paid to transporter	₹ 5,000
Commission and brokerage on purchases	₹ 10,000
Amount deposited for returnable containers	₹ 30,000
Amount of refund on returning the container	₹ 20,000
Other Expenses	@ 2% of total cost

20% of material shortage is due to normal reasons. The payment to the supplier was made within 21 days of the purchases. You are required to calculate cost per unit of material purchased by SK & Co.

Solution

Statement of calculation of cost per unit

Particulars	Amount (₹)
Listed price of materials (on lot)	2,50,000
Less: Trade discount @ 10% on listed price	(25,000)
	2,25,000
Add: CGST @ 6% of 2,25,000	13,500
Add: SGST @ 6% of 2,25,000	13,500
	2,52,000
Add: toll tax	5,000
Add: Freight and insurance	17,000
Add: Commission and brokerage paid	10,000
Add: Cost of refundable containers (30,000 – 20,000)	10,000
	2,94,000
Add: Other expenses (2,94,000 ÷ 98%)	6,000
Total cost of material (A)	3,00,000
Total quantity of material in one lot	5,000 units
Less: Normal loss @20% of 5,000	1,000 units
Net quantity of material (B)	4,000 units
Material cost per unit (A ÷ B)	75

Note:

(a) GST is payable on net price i.e. listed price less trade discount

(b) Cash discounts is treated as interest and finance cost, hence it is ignored.

(c) Demurrage is penalty imposed by the transporter for delay in uploading or off-loading of materials. It is an abnormal cost and thus, not included.

Question – 14

M/s SK Ltd trades in chairs. It stocks sufficient quantity of chairs of almost every variety. In year end, the report of sales manager revealed that M/s SK experienced stock-out of chairs. The stock-out data is as follows:

Stock-out of chairs	No. of times
100	2
80	5
50	10
20	20
10	30
0	33

M/s SK loses ₹ 150 per unit due to stock-out and spends ₹ 50 per unit on carrying of inventory. Determine optimum safest stock level.

Solution

Computation of probability of stock out

Stock-out (units)	100	80	50	20	10	0	Total
No. of times	2	5	10	20	30	33	100
Probability	0.02	0.05	0.10	0.20	0.30	0.33	1.00

Statement showing determination of Optimal Stock

Safety Stock Units	Stock-out units	Prob.	Expected annual stock out units	Expected annual stock out costs	Annual holding cost	Total annual expected cost
100	0	0	0	0	5,000	5,000
80	20	0.02	0.4	60	4,000	4,060
50	50	0.02	1.0	150	2,500	2,875
	30	0.05	1.5	225		
			2.5	375		
20	80	0.02	1.6	240	1,000	2,140
	60	0.05	3	450		
	30	0.10	3	450		
			7.6	1,140		

			1.8	270		
10	90	0.02	3.5	525	500	2,195
	70	0.05	4.0	600		
	40	0.10	2.0	300		
	10	0.20	11.3	1,695		
0	100	0.02	2	300	0	2,700
	80	0.05	4	600		
	50	0.10	5	750		
	20	0.20	4	600		
	10	0.30	3	450		
			18	2,700		

It is recommended to maintain safety stock level of 20 units at which total cost is least i.e. ₹ 2,140.

Question – 15

A Ltd. produces a final product X, which requires two components, A and (b) The following are the information related to both the components: Normal usage 50 per week, Maximum usage 75 per week, Minimum usage 25 per week, Re-order quantity A:300, B:500, RE-order period A: 4 to 6 weeks B: 2 to 4 weeks, Re-order level for the component A is:

    (a) 300 units   (b) 150 units

    (c) 450 units   (d) 200 units

Question – 16

Mr. Vikas, a toy importer has understood the importance of manufacturing in India. He is backed up by the new govt. policies that motivate him to manufacture in India. As per the custom department any import made for the manufacturing under "Made in India", custom duty will be refunded upto 80%. Vikas decided not to import toy from China anymore, instead import raw material from Srilanka, for the manufacturing of toys in India. Under an agreement of Govt. Of India with Srilankan Govt., any import from Srilanka will receive tax benefits.

Vikas ordered material Xendga & material Zenga from Srilanka. Details are given below:

	Srilankan Rupees (SLR)
Material Xendga (12,000 units × 125 SLR)	15,00,000
Material Zenga (8,000 units × 225 SLR)	18,00,000
Factory Cost	33,00,000
Add: Container cost	2,00,000
Add: Freight upto loading shipment on ship (paid by exporter)	50,000
F.O.B.	35,50,000

- Ocean Freight is $2,000
- Insurance is $1,500

When shipment reached India, it was unloaded at Chennai port. Vikas requested to put the goods in custom port's warehouse. Vikas due to cash crunch was not in a position to pay custom duty and

therefore did not file the bill of exchange (B.O.E.). Custom authorities charged a penalty of INR 15,000.

Finally, after a month Vikas filled B.O.E. and paid custom duty of 20% on CIF value of the shipment. IGST was also applicable @ 18% on the combined value of CIF & custom duty paid.

He spent further a sum of INR 12,500 to bring the imported goods to his factory. An inspection was done on the goods and it was found that 5% of the goods were broken. This came to management as a surprise because generally such rate of defects on imports is 8%.

Additional Information:
- Exchange rates:
  1) 1 SLR = 0.25 INR
  2) 1 USD = 75 INR
- IGST credits are available
- Containers were refunded at INR 38,000.
- Indian and Srilankan brokers were paid commission by Vikas on factory cost. Indian broker charged 6% whereas Srilankan broker charged 12%.
- CIF (cost, insurance and Freight) includes F.O.B (Free on Board)., Insurance & Ocean freight.

You are required to answer the following questions:

Question – 1
What is the total cost of shipment to be recorded by Vikas?
(a) INR 13,17,000
(b) INR 13,04,500
(c) INR 13,54,500
(d) INR 13,32,500

Question – 2
What is the absorption rate of total cost per unit of Zenga?
(a) INR 90.28
(b) INR 84.44
(c) INR 93.62
(d) INR 85.77

Question – 3
What is the absorption rate of total cost per unit of Xendga?
(a) INR 52.01
(b) INR 54.24
(c) INR 58.13
(d) INR 68.65

Question – 4
Amount of refundable taxes?

(a) INR 4,13,600
(b) INR 4,57,600
(c) INR 2,20,000
(d) INR 2,37,600

Question – 5

If loss of goods was 9% instead of 5%, what will be the amount that will be charged to statement of profit & loss?
(a) INR 13,045
(b) INR 19,898.4
(c) INR 14,178.4
(d) INR 24,045

1	2	3	4	5
A	A	B	A	C

OVERHEADS - CONCEPTS

1. Overheads

It is the total of indirect material, indirect labour and indirect expenses.

2. Steps for Overheads

    (A) Estimation and Distribution

    (B) Recovery Rate

    (C) Under or Over Recovery

3. Types of Department

    (A) Production Department – Involved in manufacturing of goods or services

    (B) Service Department – Help production department in performing their services

4. Distribution

    (A) Allocation

    (B) Apportionment

5. Overheads Distribution

Overheads Distribution

- **Primary Distribution** → Allocation & Apportionment
- **Secondary Distribution**
  - Direct distribution method or Non-reciprocal method → Distribute on the basis given in question or go by the nature of department
  - Step-Distribution method → (1) Distribute on the basis give in question or (2) First distribute dept. giving maximum service
  - Reciprocal method → method (2) Simultaneous Equation Method

6. Overheads Distribution Statement

Particulars	Basis	Production Department		Service Department	
		A	**B**	**X**	**Y**
Direct Cost	Allocation	NA	NA	✔	✔
Identified OHs	Allocation	✔	✔	✔	✔
Common OHs	Apportion	✔	✔	✔	✔
Total		✔	✔	✔	✔
Cost of Dept. X	Apportion	✔	✔	(✔)	✔
Cost of Dept. Y	Apportion	✔	✔	✔	(✔)
Total		✔	✔	Nil	Nil

7. Overheads Distribution Methods

(A) Direct Distribution Method

Expenses of service department will be distributed only to production departments irrespective of the fact whether they provide service to each other or not.

(B) Step-Distribution Method or Non-Reciprocal Method or Step-Allocation Method

- This method is to be applied only if specifically provided in question.
- Once expenses of a particular department are distributed and becomes '0' then there should not be any other amount shown in that particular department column.
- If way of distribution is provided in question then always follow that e.g. first distribute expenses of A then B, C and D.
- If no way is provided then first distribute the expenses of department which is providing maximum % of service to other service departments and so on.

(C) Reciprocal Method

(i) Repeated Distribution Method – Start with any service department and distribute in all departments. Distribute till the expenses of all service department becomes zero.

(ii) Simultaneous Equation Method – Calculate total expenses of service department using equation and then distribute to all departments.

(iii) Trial and Error Method – Use repeated distribution method only in service department to calculate its total expenses and then apportion to production department.

8. Important Points

➢ If no method is specified for secondary distribution then it is preferred to follow simultaneous equation method.

➢   Fixed expenses are apportioned on the basis of normal capacity.

➢   Variable expenses are apportioned on the basis of actual capacity.

9. Recovery Rate

Rate at which overheads are recovered/absorbed/charged

Recovery Rate = Pre-determined absorption rate = $\dfrac{Budgeted\ overheads}{Budgeted\ recovery\ base}$

10. Type of Recovery Rate

(A) Direct Material Cost % Method = $\dfrac{Budgeted\ Overheads}{Budgeted\ Material\ Cost} \times 100$

(B) Direct Labour Cost % Method = $\dfrac{Budgeted\ Overheads}{Budgeted\ Labour\ Cost} \times 100$

(C) Direct Prime Cost % Method = $\dfrac{Budgeted\ Overheads}{Budgeted\ Prime\ Cost} \times 100$

(D) Unit Cost Method = $\dfrac{Budgeted\ Overheads}{Budgeted\ Production\ Units}$

(E) Labour Hour Rate Method = $\dfrac{Budgeted\ Overheads}{Budgeted\ Labour\ Hours}$

(F) Machine Hour Rate Method = $\dfrac{Budgeted\ Overheads}{Budgeted\ Machine\ Hours}$

11. Machine Hour Rate

It is applied in case of capital intensive units.

All overheads are divided into Fixed/Standing Charges and Variable/Running Charges

Particulars	Amount
Fixed or Standing Expenses	
Rent	
Heat & light	
Insurance	
Wages	
Depreciation (if fixed)	
Total Fixed expenses (A)	
Variable or Running Expenses	
Power	
Consumable stores	
Depreciation (if variable)	
Repair & Maintenance	
Total Variable expenses (B)	
Total Cost (A + B)	

Effective Machine Hours	
Machine Hour Rate	

12. Points to Remember (PTR)

(A)
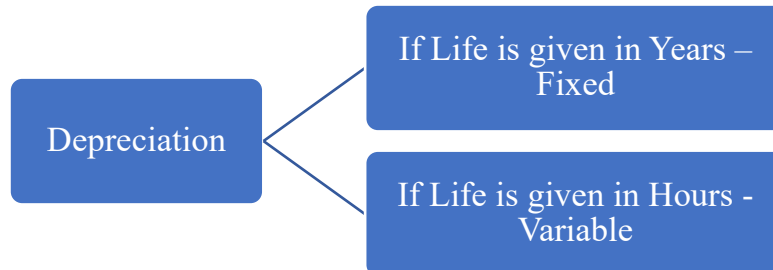
(B) Effective Machine Hours = Total Machine Hours – Idle Hours

(C) Normal Idle Time – Hours during which work is not done e.g. maintenance, setup, lunch etc.

(D) Unless otherwise provided, following points are to be assumed for setup hours:
- No electricity or power is used during set-up hours
- These hours are considered to be un-productive

13. Dual Recovery Rate/ Two-tier Machine Hour Rate

It is to be used in following situation:

(A) When question mention to use

(B) Job charge is for separation and operation separately

In this case set-up hours are considered to be productive

For FC per machine hour – Use total hours (Production + Set-up)

FC per machine hour will remain same for both i.e. operation and set-up

VC will be computed separately for both production and set-up.

14. Type of Recovery Rate

(A) Departmental recovery rate $= \dfrac{Overheads\ of\ department}{Base\ value\ of\ department}$

(B) Blanket or plant-wise recovery rate $= \dfrac{Overheads\ of\ Factory}{Base\ value\ of\ Factory}$

15. Under or Over Recovery of Overheads

Recovered OHs = RR × Actual Base Value
Actual Overheads = data from question

Actual OHs > Recovered OHs	Actual OHs < Recovered OHs
Under Recovered OHs	Over Recovered OHs
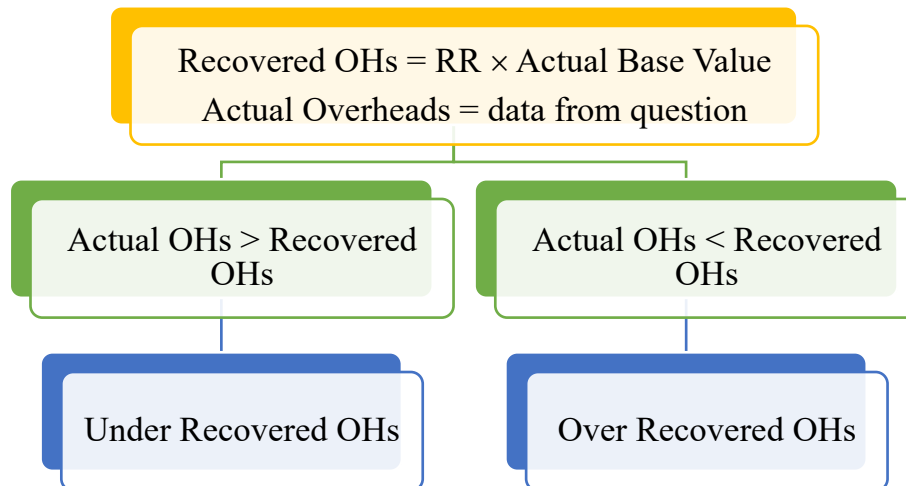
16. Treatment of Over or Under Recovery of Overheads

Treatment of Overheads

Due to defective planning or factory inefficiency

Amount charge to P&L
Under Recovery
Costing P&L A/c   Dr.
To OHs Control A/c
Over Recovery
OHs Control A/c   Dr.
To Costing P&L A/c

Due to seasonal Nature of business

No Entry required

Balances are carried forward to next period

Due to change in price level

Under Recovery
Cost of Sales A/c   Dr.
FG ledger control A/cDr.
WIP ledger control A/ Dr.
To OHs Control A/c

17. Supplementary Rate

$$\text{Supplementary rate} = \frac{Under/OverRecovery}{Equivalent\ units\ of\ FG}$$

OVERHEADS QUESTIONS

Question – 1

SK Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2. The following data are extracted from the records of the Company for the month of October:

	₹
Rent and rates	62,500
General lighting	7,500
Indirect Wages	18,750
Power	25,000
Depreciation on machinery	50,000
Insurance of machinery	20,000

Other information:

	P1	P2	P3	S1	S2
Direct Wages (₹)	37,500	25,000	37,500	18,750	6,250
Horse power of machine used	60	30	50	10	--
Cost of machinery (₹)	3,00,000	4,00,000	5,00,000	25,000	25,000
Floor Space (Sq. Ft.)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	--	--

Expenses of the service departments, S1 and S2 are reapportioned as below:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

Required:

(a) Compute overhead rate per production hour of each production department

(b) Determine the total cost of product X which is processed for manufacture in department P1, P2 and P3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is ₹ 625 and direct labour cost is ₹ 375.

Solution

Overheads Distribution Summary

Item of Cost	Basis of Apportionment	P1 (₹)	P2 (₹)	P3 (₹)	S1 (₹)	S2 (₹)
Direct Wages	Allocation	—	—	—	18,750	6,250
Rent and Rates	Floor Area (4:5:6:4:1)	12,500	15,625	18,750	12,500	3,125
General Lighting	Light Point (2:3:4:2:1)	1,250	1,875	2,500	1,250	625
Indirect Wages	Direct Wages (6:4:6:3:1)	5,625	3,750	5,625	2,812.5	937.5
Power	H.P. of Machines (6:3:5:1)	10,000	5,000	8,333	1,667	-
Dep. of Machine	Value-Machine (12:16:20:1:1)	12,000	16,000	20,000	1,000	1,000
Insurance of Machine	Value-Machine (12:16:20:1:1)	4,800	6,400	8,000	400	400

Item of Cost	Basis of Apportionment	P1 (₹)	P2 (₹)	P3 (₹)	S1 (₹)	S2 (₹)
		46,175	48,650	63,208	38,380	12,338
Cost of Dept. S1	Apportioned	8,003	12,004	16,006	(40,014)	4,001
Cost of Dept. S2	Apportioned	6,536	3,268	4,901	1,634	(16,339)
Total Overheads		60,714	63,922	84,115	-	-
Prod. Hrs. Worked		6,225	4,050	4,100	-	-
Rate per hour (₹)		9.75	15.78	20.52		

Overheads of service cost centres Let S1 be the overhead of service cost centre S1 and S2 be the overheads of service cost centre S2.

$S1 = 38,380 + 0.10\ S2$

$S2 = 12,338 + 0.10\ S1$

Substituting the value of S2 in S1 we get

$S2 = 38,380 + 0.10\ (12,338 + 0.10\ S1)$

$S1 = 38,380 + 1233.8 + 0.01\ S1$

$0.99\ S1 = 39,613.8$

$\therefore\ S1 = ₹\ 40,014$

$\therefore\ S2 = 12,338 + 0.10 \times 40,014 = ₹\ 16339.4$

Cost of Product X   (₹)

Direct Material	625.00
Direct Labour	375.00
Prime Cost	1,000.00
Production on Overheads	
P1 5 hours × ₹ 9.75 = 48.75	
P2 3 hours × ₹ 15.78 = 47.34	
P3 4 hours × ₹ 20.52 = 82.08	178.17
Factory Cost	1,178.17

Question – 2

M/s NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows:

	Production Dept.		Service Dept.	
	A	**B**	**X**	**Y**
	(Horse power hours)			
Needed capacity production	20,000	25,000	15,000	10,000
Used during the month of May	16,000	20,000	12,000	8,000

During the quarter ended September 2018, costs for generating power amounted to ₹ 12.60 lakhs out of which ₹ 4.20 lakhs was considered as fixed cost.

Service Dept. X renders service to A, B and Y in the ratio of 6:4:2 whereas department Y renders service to A and B in the ratio 4:1. The direct labour hours of Department A and B are 67,500 hours and 48,750 hours respectively. Required:

1) Prepare overheads distribution sheet

2) Calculate factory overhead per labour hour for the department A and B

Solution   **Overheads Distribution Sheet**

Particulars	Basis	Total Amount	Production Department		Service Department	
			A	B	X	Y
Fixed Overheads	Needed cap. (20:25:15:10)	4,20,000	1,20,000	1,50,000	90,000	60,000
Variable Overheads	Used capacity (16:20:12:8)	8,40,000	2,40,000	3,00,000	1,80,000	1,20,000
Total		12,60,000	3,60,000	4,50,000	2,70,000	1,80,000
Cost of Dept. X	6 : 4 : 2		1,35,000	90,000	(2,70,000)	45,000
Cost of Dept. Y	4: 1		1,80,000	45,000	-	(2,25,000)
Total			6,75,000	5,85,000	-	-
Labour hours			67,500	48,750		
Fact. OH per hr.			₹ 10	₹ 12		

Question – 3

SNS Trading Company has three Main Departments and two Service Departments. The data for each department is given below:

Departments	Expenses (₹)	Area (in Sq. Mtr.)	Number of employees
Main Department:			
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	1700
Distribution Department	3,50,000	7	700
Service Department:			
Maintenance Department	6,40,000	4	200
Personnel Department	3,20,000	6	250

The cost of Maintenance Department and Personnel Department is distributed on the basis of 'Area in Square Meters' and 'Number of Employees' respectively:

You are required to:

(i) Prepare a statement showing the distribution of expenses of service departments to the main departments using the "Step Ladder Method" of overhead distribution.

(ii) Compute the rate per hour of each Main Department, given that, the Purchase Department, Packing Department and Distribution Department works for 12 hours a day, 24 hours a day and 8 hours a day respectively. Assume that there are 365 days in a year and there are no holidays.

Solution

(i) & (ii)   **Overheads Distribution Sheet**

Particulars	Basis	Main Department			Service Department	
		Purchase	Packing	Distribution	Maintenance	Personnel
Expenses	Allocation	5,00,000	8,00,000	3,50,000	6,40,000	3,20,000
Maintenance Department Expenses	Area (12:15:7:6)	1,92,000	2,40,000	1,12,000	(6,40,000)	96,000
Personnel Department Expenses	No. of Ees (8:17:7)	1,04,000	2,21,000	91,000	-	(4,16,000)
Total		7,96,000	12,61,000	5,53,000	-	-
Total Hours		12 × 365 = 4,380	24 × 365 = 8,760	8 × 365 = 2,920	-	-
Rate per hour		181.74	143.95	189.38	-	-

Working Note - 1

	Main Department			Service Department	
	Purchase	Packing	Distribution	Maintenance	Personnel
Area (in sq. mtr.)	12	15	7	-	6
% of service rendered by Maintenance Department	30%	37.50%	17.50%	-	15%
Number of Employees	800	1700	700	200	-
% of service rendered by Personnel department	23.53%	50%	20.59%	5.88%	

The usual method used for ranking the support departments for Step Down Allocation Method is % of Service rendered by one Service Department to another. Based on this, Maintenance Department provides 15% (highest %) of service to Personnel Department. Thus, first maintenance department expenses should be distributed first.

Question – 4

From the following data, work out the predetermined machine hour rates for Departments A and B of a factory:

Preliminary estimates of expenses

	Total (₹)	Dept. A (₹)	Dept. B (₹)
Power	15,000	--	--
Spare Parts	8,000	3,000	5,000
Consumable stores	5,000	2,000	3,000
Depreciation on machinery	30,000	10,000	20,000

Insurance on machinery	3,000	--	--
Indirect labour	40,000	--	--
Building maintenance	7,000	--	--

The final estimates are to be prepared on the basis of above figures after making into consideration the following factors:

(a) An increase of 10 per cent in price of spare parts.

(b) An increase of 20 per cent in the consumption of spare parts for department B only.

(c) Increase in the straight line method of depreciation from 10 percent on the original value machinery to 12 per cent.

(d) 15 per cent general increase in wage rates.

The following information is available:

	Dept. A	Dept. B
Estimated direct labour hours	80,000	1,20,000
Ratio of K.W. rating	3	2
Estimated machine hours	25,000	30,000
Floor Space (Sq. ft)	15,000	20,000

Solution

Statement of Cost

Particulars	Basis	Dept. A	Dept. B
Power	KW Rating - 3:2	9,000	6,000
Spare Parts	w.n. 1	3,300	6,600
Consumable Stores	Allocation	2,000	3,000
Dep. On machine	w.n. 2	12,000	24,000
Insurance on Machine	Value of machine - 1:2	1,000	2,000
Indirect Labour (40,000 + 15% = 46,000)	DL Hours - 8:12	18,400	27,600
Building Maintenance	Floor space - 15:20	3,000	4,000
Total (A)		**48,700**	**73,200**
Machine Hours (B)		25,000	30,000
Machine Hr. Rate (A÷B)		1.95	2.44

Working note - 1

Particulars	Dept. A	Dept. B
Spare parts	3,000	5,000
(+) Increase in price @10%	300	500
	3,300	5,500
(+) Increase in consumption@20%	-	1,100
Total	3,300	6,600

Working note - 2

Particulars	Dept. A	Dept. B
Existing Depreciation (A)	10,000	20,000
Value of Machine (A ÷ 10%)	1,00,000	2,00,000
New Depreciation @ 12%	12,000	24,000

Question – 5

A manufacturing unit has purchased and installed a new machine at a cost of ₹ 24,90,000 to its fleet of 5 existing machines. The new machine has an estimated life of 12 years and is expected to realize ₹ 90,000 as scrap value at the end of its working life.

Other relevant data are as follows:

(i) Budgeted working hours are 2,496 based on 8 hours per day for 312 days. Plant maintenance work is carried out on weekends when production is totally halted. The estimated maintenance hours are 416. During the production hours machine set-up and change over works are carried out. During the set-up hours no production is done. A total 312 hours are required for machine set-ups and change overs.

(ii) An estimated cost of maintenance of the machine is ₹ 2,40,000 pa.a

(iii) The machine requires a component to be replaced every week at a cost of ₹ 2,400.

(iv) There are three operators to control the operations of all the 6 machines. Each operator is paid ₹ 30,000 per month plus 20% fringe benefits.

(v) Electricity: During the production hours including set-up hours, the machine consumes 60 units per hour. During the maintenance the machine consumes only 10 units per hour. Rate of electricity per unit of consumption is ₹ 6.

(vi) Departmental and general works overhead allocated to the operation during last year was ₹ 5,00,000. During the current year it is estimated to increase by 10%.

Required to compute the machine hour rate.

Solution

Effective machine hours = 2,496 – 312 = 2,184 hours

Statement of Machine Hour Rate

Particulars	Amount (₹)
Fixed Expenses	
Depreciation $\left[\frac{24,90,000 - 90,000}{12}\right]$	2,00,000
Operator's salary [30,000 × 3 × 12 × (1/6)]	1,80,000
Fringe Benefits (1,80,000 × 20%)	36,000
Department & General Overheads [5,00,00 × 110% × (1/6)]	91,667
Fixed expenses (A)	5,07,667
Variable Expenses	

Maintenance	2,40,000
Replacement cost $\left(2,400 \times \frac{312}{6}\right)$	1,24,800
Electricity during production (2,496 ×60 × 6)	8,98,560
Electricity during maintenance (416 × 10 × 6)	24,960
Variable expenses (B)	12,88,320
Total expenses (A + B = C)	17,95,987
Effective machine hours (D)	2,184
Machine hour rate (C ÷ D)	822.34

Question – 6

Calculate Machine Hour Rate from the following particulars:

Cost of Machine	-	₹ 25,00,000
Salvage Value	-	₹ 1,25,000
Estimated life of the machine	-	25,000 Hours
Working Hours (per annum)	-	3,000 Hours
Hours required for maintenance	-	400 Hours
Setting-up time required	-	8% of actual working hours

Additional Information:

(a) Power 25 units @ ₹ 5 per unit per hour.

(b) Cost of repairs and maintenance ₹ 26,000 per annum.

(c) Chemicals required for operating the machine ₹ 2,600 per month.

(d) Overheads chargeable to the machine ₹ 18,000 per month.

(e) Insurance Premium (per annum) 2% of the cost of machine

(f) No. of operators - 02 (looking after three other machines also)

(g) Salary per operator per month ₹ 18,500

Solution

Let effective machine hours = y

∴ set-up time = (0.08)y

Thus, y = 3,000 – 400 – (0.08)y

y = 2,407

Statement of Machine Hour Rate

Particulars	Amount (₹)
Fixed Expenses	
Chemicals (2,600 × 12)	31,200
Overheads (18,000 × 12)	2,16,000
Insurance (25,00,000 × 2%)	50,000

Salary $\left(\frac{18,500 \times 12 \times 2}{4}\right)$	1,11,000
Fixed expenses	4,08,200
Effective machine hours	2,407
Fixed expenses per machine hour	169.59
Variable Expenses per machine hour	
Depreciation $\left(\frac{25,00,000 - 1,25,000}{25,000}\right)$	95
Repair & Maintenance (26,000 ÷ 2,407)	10.80
Power (25 × 5)	125
Machine hour rate	400.39

Question – 7

A machine shop has 8 identical machines manned by 6 operators. The machine cannot work without an operator wholly engaged on it. The original cost of all the 8 machines works out to ₹ 32,00,000. The following particulars are furnished for a six months period:

Normal available hours per month per operator	208
Absenteeism (without pay) hours per operator	18
Leave (with pay) hours per operator	20
Normal unavoidable idle time – hours per operator	10
Average rate of wages per day of 8 hours per operator	₹ 100
Production bonus estimated	10% on wages
Power consumed	₹ 40,250
Supervision and Indirect Labour	₹ 16,500
Lighting and Electricity	₹ 6,000

The following particulars are given for a year:

Insurance	₹ 3,60,000
Sundry work Expenses	₹ 50,000
Management Expenses allocated	₹ 5,00,000
Depreciation	10% on the original cost
Repairs and Maintenance (including consumables)	5% of the value of all the machines

Prepare a statement showing the comprehensive machine hour rate for the machine shop.

Solution

Effective machine hour = (208 × 6 × 6) – [(18 – 20 – 10) × 6] = 7,200

Statement of Machine Hour Rate

Particulars	Amount (₹)
Fixed Expenses	
Wages [{(208 × 6 × 6) – (18 × 6)} × (100/8)]	92,250

Particulars	Amount (₹)
Bonus (92,250 × 10%)	9,225
Supervision	16,500
Lighting and electricity	6,000
Insurance [3,60,000 × (6/12)]	1,80,000
Depreciation [32,00,000 × 10% × (6/12)]	1,60,000
Sundry work expenses [50,000 × (6/12)]	25,000
Management expenses allocated [5,00,000 × (6/12)]	2,50,000
Fixed expenses	7,38,975
Effective machine hours	7,200
Fixed expenses per machine hour	102.64
Variable Expenses per machine hour	
Repair & Maintenance $\left(32,00,000 \times 5\% \times \frac{6}{12} \times \frac{1}{7200}\right)$	11.11
Power $\left(\frac{40,250}{7,200}\right)$	5.59
Machine hour rate	119.34

Question – 8

USP Ltd. is the manufacturer of 'double grip motorcycle tyres'. In the manufacturing process, it undertakes three different jobs namely, Vulcanizing, Brushing and Striping. All of these jobs require the use of a special machine and also the aid of a robot when necessary. The robot is hired from outside and the hire charges paid for every six months is ₹ 2,70,000. An estimate of overhead expenses relating to the special machine is given below:

- Rent for a quarter is ₹ 18,000
- The cost of the special machine is ₹ 19,20,000 and depreciation is charged @10% per annum on straight line basis.
- Other indirect expenses are recovered at 20% of direct wages.

The factory manager has informed that in the coming year, the total direct wages will be ₹ 12,00,000 which will be incurred evenly throughout the year.

During the first month of operation, the following details are available from the job book:

Jobs	Without the aid of the robot	With the aid of the robot
Vulcanizing	500	400
Brushing	1000	400
Striping	-	1200

You are required to:

(i) Compute the Machine Hour Rate for the company as a whole for a month (A) when the robot is used and (B) when the robot is not used.

(ii) Compute the Machine Hour Rate for the individual jobs i.e. Vulcanizing, Brushing and Striping.

Solution

(i)   Total machine hours = 500 + 1,000 + 400 + 400 + 1,200 = 3,500

Total machine hours with the use of robot = 400 + 400 + 1,200 = 2,000

Statement of Machine Hour Rate

Particulars	Amount (₹)
Rent (18,000 ÷ 3)	6,000
Depreciation [(19,20,000 × 10%) ÷ 12]	16,000
Indirect expenses [(12,00,000 × 20%) ÷ 12]	20,000
Total expenses	42,000
Total Machine Hours	3,500
Machine hours rate (42,000 ÷ 3500)	12
Add: Robot charges per machine hour [(2,70,000 ÷ 6) ÷ 2,000]	22.50
Machine hour rate with robot charges	34.50

(ii)   **Computation of Machine Hour Rate for the individual jobs**

Particulars	Vulcanizing	Brushing	Striping
OHs without robot	500 × 12 = 6,000	1,000 × 12 = 12,000	-
OHs with robot	400 × 34.50 = 13,800	400 × 34.50 = 13,800	1,200 × 34.50 = 41,400
Total	19,800	25,800	41,400
Machine hours	900	1,400	1,200
Machine hour rate	22	18.43	34.50

Question – 9	

ABS Enterprises produces a product and adopts the policy to recover factory overheads applying blanket rate based on machine hours. The cost records of the concern reveal following information:

Budgeted production overheads	₹ 10,35,000
Budgeted machine hours	90,000
Actual machine hours worked	45,000
Actual production overheads	₹ 8,80,000

Production overheads (actual) include –

Paid to worker as per court's award	₹ 50,000
Wages paid for strike period	₹ 38,000
Stores written off	₹ 22,000
Expenses of previous year booked in current year	₹ 18,500

Production –

Finished goods	30,000 units
Sale of finished goods	27,000 units

The analysis of cost information reveals that 1/3 of the under absorption of overheads was due to defective production planning and the balance was attributable to increase in costs.

You are required:

(i) To find out the amount of under absorbed production overheads.

(ii) To give the ways of treating it in Cost Accounts

(iii) To apportion the under absorbed overheads over the items.

Solution

(i)		Amount (₹)
Total production overheads actually incurred during the period		8,80,000
Less: Amount paid to worker as per court order	50,000	
Less: Expenses of previous year booked in current year	18,500	
Less: Wages paid for the strike period under reward	38,000	
Less: Obsolete material written off	22,000	(1,28,500)
		7,51,500
Less: Production overheads absorbed (45,000 x ₹ 11.5)		5,17,500
Under recovered overheads		2,34,000

Budgeted machine hour rate $= \dfrac{10,35,000}{90,000\ hours} = ₹\ 11.50$ per hour

(ii) As one third of the under absorbed overheads i.e. ₹ 78,000 (₹ 2,34,000 × 1/3) were due to defective production policies, this being abnormal, hence should be debited to profit and loss account.

(iii) Amount of balance under absorbed overheads = ₹ 2,34,000 – 78,000 = ₹ 1,56,000

Supplementary rate $= \dfrac{1,56,000}{30,000\ units} = ₹\ 5.20$ per equivalent unit

	Amount (₹)
Finished stock (27,000 units × 5.20)	1,40,400
Cost of sales (3,000 units × 5.20)	15,600
Total	1,56,000

Question – 10

SK engineering factory fabricates machine parts to customers. The factory commenced fabrication of 12 Nos. machine parts to customer's specifications and the expenditure incurred on the job for the week ending 21st August, is given below:

	(₹)	(₹)
Direct materials (all items)		78.00
Direct labour (manual) 20 hours @ ₹ 1.50 per hour		30.00
Machine facilities:		
Machine No. I : 4 hours @ ₹ 4.50	18.00	
Machine No. II: 6 hours @ ₹ 6.50	39.00	57.00
Total		165.00
Overheads @ ₹ 0.80 per hour on 20 manual hours		16.00
Total cost		181.00

The overhead rate of ₹ 0.80 per hour is based on 3,000 man hours per week; similarly, the machine hour rates are based on the normal working of Machine Nos. I and II for 40 hours out of 45 hours per week.

After the close of each week, the factory levies a supplementary rate for the recovery of full overhead expenses on the basis of actual hours worked during the week. During the week ending 21st August, the total labour hours worked was 2,400 and machine Nos. I and II had worked for 30 hours and 32½ hours respectively.

Prepare a cost sheet for the job for the fabrication of 12 Nos. machine parts duly levying the supplementary rates.

Solution

Statement of Cost

Particulars	₹	₹
Material		78
Labour 20 hours @ ₹ 1.50		30
Machine facilities:		
Machine No. I: 4 hours @ ₹ 4.50	18	
Machine No. II: 6 hours @ ₹ 6.50	39	57
Overheads 20 hours @ ₹ 0.80 per hour		16
		181
Supplementary Rates		
Overheads 20 hours @ ₹ 0.20 per hour	4	
Machine facilities:		
Machine No. I: 4 hours @ ₹ 1.50	6	
Machine No. II: 6 hours @ ₹ 1.50	9	19
Total Cost		**200**

Working notes:

Overheads budgeted: 3,000 hours @ ₹ 0.80 = ₹ 2,400

Actual hours: 2,400 hours

Actual rate per hour ₹ 2,400/2,400 hours = ₹ 1

Supplementary charge ₹ 0.20 (₹ 1 – 0.80) per hour

Machine facilities:

	Machine No. I	Machine No. II
Budgeted	(40 × ₹ 4.50) = ₹ 180	(40 × ₹ 6.50) = ₹ 260
Actual number of hours	30	32½
Actual rate per hour	₹ 6	₹ 8
Supplementary rate per hour	₹ 6 – ₹ 4.50 = ₹ 1.50	₹ 8 – ₹ 6.50 = ₹ 1.50

Question – 11

The accountant for Brilliant Tools Ltd applies overhead based on machine hours. The budgeted overhead and machine hours for the year are 130,000 and 8,000, respectively. The actual overhead and machine hours incurred were 137,500 and 10,000. The cost of goods sold and inventory data compiled for the year is as follows: Direct Material 25,000 Cost of Goods Sold 225,000 Units: WIP 50,000 and Finished Goods 75,000 What is the amount of over/underapplied overhead for the year?

(a) Overapplied by ₹ 25,000
(b) Underapplied by ₹ 25,000
(c) Overapplied by 32,500
(d) Underapplied by ₹ 32,500

Question – 12

Litto Limited is a manufacturing company which has as a machine shop cost center that contains three machines of equal capacities. To operate these three machines nine operators are required i.e. three operators on each machine. Operators are paid ₹ 20 per hour. The factory works for forty eight hours in a week which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the forty eight hours. In additions they are paid a bonus of 10 percent of productive time. Costs are reported for this company on the basis of thirteen four-weekly period.

The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

- Depreciation 10% per annum on original cost of the machine. Original cos tof each machine is ₹ 52,000.
- Maintenance and repair per week per machine is ₹ 60.
- Consumables stores per week per machine are ₹ 75
- Power: 20 units per hour per machine at the rate of 80 paise per unit. No power is used during the set-up hours.
- Apportionment to the cost centre: Rent per annum ₹ 5,400, Heat and Light per annum ₹ 9,720, foreman's salary per annum ₹ 12,960 and other miscellaneous expenditure per annum ₹ 18,000.

Question – 1
What is the effective machine hour for four-week period?
(a)   170 hours
(b)   176 hours
(c)   189 hours
(d)   192 hours

Question – 2
What is the bonus charges and power expenses for four-week period?
(a)   ₹ 1,056 and ₹ 2,816
(b)   ₹ 1,562 and ₹ 3,560
(c)   ₹ 1,240 and ₹ 3,325
(d)   ₹ 860 and ₹ 2,450

Question – 3

What is the standing charges for four-week period?

(a)   ₹ 12,357

(b)   ₹ 10,450

(c)   ₹ 13,757

(d)   ₹ 14,226

Question – 4

What is the machine expenses for four-week period?

(a)   ₹ 2,500

(b)   ₹ 3,450

(c)   ₹ 3,986

(d)   ₹ 3,756

Question – 5

What is the machine hour rate?

(a)   ₹ 99.51

(b)   ₹ 92.25

(c)   ₹ 105.22

(d)   ₹ 86.90

1	2	3	4	5
B	A	C	D	A

ACTIVITY BASED COSTING - CONCEPTS

1. Background of ABC
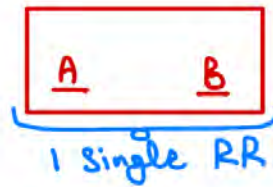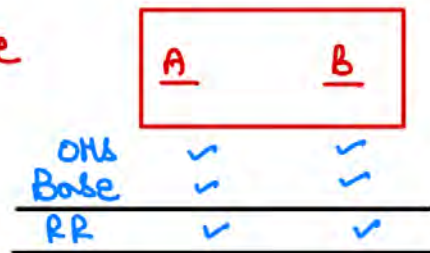
2. Cost Pool

It is the total cost of an activity.

3. Cost Driver

It is the base due to which cost changes

4. Steps in ABC

(A) Identify different activities

(B) Identify overheads related to activities

(C) Identify cost drivers

(D) Calculate activity cost driver rate (ACDR)

$$\text{ACDR} = \frac{Budgeted\ Overheads\ of\ activity}{Budgeted\ Cost\ Driver}$$

(E) Recover overheads based on ACDR

ACTIVITY BASED COSTING QUESTIONS

Question – 1

PQR Pens Ltd. manufactures two products – 'Gel Pen' and 'Ball Pen'. If furnishes the following data for the year 2017:

Product	Annual Output (Units)	Total Machine Hours	Total number of Purchase orders	Total number of set-ups
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

The annual overheads are as under:

Particulars	₹
Volume related activity costs	4,75,020
Set up related costs	5,79,988
Purchase related costs	5,04,992

Calculate the overhead cost per unit of each Product – Gel Pen and Ball Pen on the basis of:

(i) Traditional method of charging overheads

(ii) Activity based costing method and

(iii) Find out the difference in cost per unit between both the methods.

Solution

(i) Calculation of cost under Traditional Approach:

Overheads rate per Machine hour $= \frac{Total\ overheads}{Total\ machine\ hours} = \frac{15,60,000}{24,000+54,000} = $ ₹ 20 per machine hour

Statement of Cost

Particulars	Gel Pen	Ball Pen
Overheads absorbed (A)	20 × 24,000 = 4,80,000	20 × 54,000 = 10,80,000
Units (B)	5,500	24,000
Overheads per unit (A ÷ B)	87.27	45

(ii) Statement showing Activity Based Cost

Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	Gel Pen (₹)	Ball Pen (₹)
Volume Related Activity Costs	Machine Hour	24:54	4,75,020	1,46,160	3,28,860

Set-up Related Costs	No. of Set-ups	30:56	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Costs				5,24,641	10,35,359
Output (Units)				5,500	24,000
Cost per unit				95.39	43.13

(iii) **Statement of Difference in Cost**

Particulars	Gel Pen	Ball Pen
Overheads cost per unit (₹) – Traditional Approach	87.27	45
Overheads Cost per unit (₹) – ABC	95.39	43.13
Difference per unit	-8.12	+1.87

Question – 2

SK Ltd. manufactures three types of products namely P, Q and R. The data relating to a period are as under:

Particulars	P	Q	R
Machine hours per unit	10	18	14
Direct Labour hours per unit	4	12	8
Direct Material per unit (₹)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overhead is ₹ 6 per hour. Direct labour hour rate is ₹ 20 per hour.

The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	P	Q	R
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3

The total production overheads are analyzed as under:

Machine set up costs	20%
Machine operations costs	30%
Inspection costs	40%
Material procurement related costs	10%

Required:

(i) Calculate the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) Calculate the cost per unit of each using activity based costing principles.

Solution

(i) **Statement showing cost per unit – Traditional Method**

Particulars	P	Q	R
Direct material	90	80	120
Direct labour [(4, 12, 8 hours) × ₹ 20]	80	240	160
Production overheads [(10, 18, 14 hours) × ₹ 6]	60	108	84
Cost per unit	230	428	364

(ii) Total machine hours = (3,000 × 10) + (5,000 × 18) + (20,000 × 14) = 4,00,000

Total production overheads = 4,00,000 × ₹ 6 = ₹ 24,00,000

	Particulars	P	Q	R	Total
A	Production (units)	3,000	5,000	20,000	
B	Batch size (units)	150	500	1,000	
C	Number of batches (A ÷ B)	20	10	20	50
D	Number of purchase order per batch	3	10	8	
E	Total purchase order (C × D)	60	100	160	320
F	Number of inspections per batch	5	4	3	
G	Total inspections (C × F)	100	40	60	200

Statement of cost driver rate

Activity	Overhead (₹)	Cost driver quantity	Cost driver rate (₹)
Setup	24,00,000 × 20% = 4,80,000	50 batches	9,600 per batch
Inspection	24,00,000 × 40% = 9,60,000	200 inspections	4,800 per inspection
Purchases	24,00,000 × 10% = 2,40,000	320 purchases	750 per purchase
Machine operations	24,00,000 × 30% = 7,20,000	4,00,000 machine hours	1.80 per machine hour

Statement showing cost per unit – Activity Based Costing Method

Particulars	P	Q	R
Production units	3,000	5,000	20,000
	(₹)	(₹)	(₹)
Direct material (90, 80, 120)	2,70,000	4,00,000	24,00,000

Direct labour (80, 240, 160)	2,40,000	12,00,000	32,00,000
Machine related costs [(30,000, 90,000, 2,80,000) × ₹ 1.80]	54,000	1,62,000	5,04,000
Setup costs [(20, 10, 20) × ₹ 9,600]	1,92,000	96,000	1,92,000
Inspection cost [(100, 40, 60) × ₹ 4,800]	4,80,000	1,92,000	2,88,000
Purchase related costs [(60, 100, 160) × ₹ 750]	45,000	75,000	1,20,000
Total Costs	12,81,000	21,25,000	67,04,000
Cost per unit (Total cost ÷ Units)	427	425	335.20

Question – 3

PQR Ltd. is engaged in the production of three products P, Q and R. The company calculates Activity Cost Rates on the basis of Cost Driver capacity which is provided as below:

Activity	Cost Driver	Cost Driver Capacity	Cost (₹)
Direct Labour Hours	Labour Hours	30,000 Labour Hours	3,00,000
Production runs	No. of Production runs	600 Production runs	1,80,000
Quality Inspections	No. of Inspections	8000 Inspections	2,40,000

The consumption of activities during the period is as under:

Activity/ Products	P	Q	R
Direct Labour hours	10,000	8,000	6,000
Production runs	200	180	160
Quality Inspection	3,000	2,500	1,500

You are required to:

(iv) Compute the cost allocated to each Product from each Activity.

(v) Calculate the cost of unused capacity for each activity

(vi) A potential customer has approached the company for supply of 12,000 units of net product 'S' to be delivered in lots of 1,500 units per quarter. This will involve an initial design cost of ₹ 30,000 and per quarter production will involve the following:

Direct Material	₹ 18,000
Direct Labour hours	1,500 hours
No. of Production runs	15
No. of Quality Inspection	250

Prepare cost sheet segregating direct and indirect cost and compute the sales value per quarter of product 'S' using ABC system considering a markup of 20% on cost.

Solution

(i) <div align="center">**Statement of Cost Driver Rate**</div>

Activity	Amount (A)	Cost driver (B)	Cost Driver Rate (A÷B)
Direct Labour Hours	3,00,000	30,000 Labour Hours	₹ 10 per labour hour
Production runs	1,80,000	600 Production runs	₹ 300 per production run
Quality Inspections	2,40,000	8000 Inspections	₹ 30 per inspection

<div align="center">**Statement of Cost**</div>

Particulars	P	Q	R	Total
Direct labour hour	10 × 10,000 = 1,00,000	10 × 8,000 = 80,000	10 × 6,000 = 60,000	2,40,000
Production run	300 × 200 = 60,000	300 × 180 = 54,000	300 × 160 = 48,000	1,62,000
Quality inspection	30 × 3,000 = 90,000	30 × 2,500 = 75,000	30 × 1,500 = 45,000	2,10,000
Total Cost	**2,50,000**	**2,09,000**	**1,53,000**	**6,12,000**

(ii) <div align="center">**Statement of Cost of Unused Capacity**</div>

Activity	Total Cost	Cost Charged to Products	Unused Cost
Direct Labour Hours	3,00,000	2,40,000	60,000
Production runs	1,80,000	1,62,000	18,000
Quality Inspections	2,40,000	2,10,000	30,000

(iii) <div align="center">**Statement of Cost**</div>

Particulars	Amount (₹)
Direct material	18,000
Direct expenses (design cost) $\left(\frac{30,000}{12,000} \times 1,500\right)$	3,750
Prime Cost	21,750
Add: Overheads	
Direct labour hours (1,500 × 10)	15,000
Production run (15 × 300)	4,500
Quality inspection (250 × 30)	7,500
COS	48,750
Add: Profit (48,750 × 20%)	9,750
Sales	58,500

Question – 4

SK is a global brand created by SK Ltd. The company manufactures three range of beauty soaps i.e. SK-Gold, SK-Pearl, and SK-Diamond. The budgeted costs and production for the month of March, 2021 are as follows:

	SK-Gold		SK-Pearl		SK-Diamond	
Production of soaps (Units)	**4,000**		**3,000**		**2,000**	
Resources per Unit:	**Qty**	**Rate**	**Qty**	**Rate**	**Qty**	**Rate**
- Essential Oils	60 ml	₹ 200 / 100 ml	55 ml	₹ 300 / 100 ml	65 ml	₹ 300 / 100 ml
- Cocoa Butter	20 g	₹ 200 / 100 g	20 g	₹ 200 / 100 g	20 g	₹ 200 / 100 g
- Filtered Water	30 ml	₹ 15 / 100 ml	30 ml	₹ 15 / 100 ml	30 ml	₹ 15 / 100 ml
- Chemicals	10 g	₹ 30 / 100 g	12 g	₹ 50 / 100 g	15 g	₹ 60 / 100 g
- Direct Labour	30 Min.	₹ 10 / hour	40 Min.	₹ 10 / hour	60 Min.	₹ 10 / hour

SK Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct labour hour rate, which were budgeted at ₹ 1,98,000.

Now, SK Ltd. is considering adopting an Activity Based Costing system. For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particulars	(₹)	Cost drivers
Forklifting cost	58,000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
Utilities	80,000	Number of Machine operations

The number of machine operators per unit of production are 5, 5, and 6 for SK-Gold, SK-Pearl, and SK-Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

(i) Prepare a statement showing the unit costs and total costs of each product using the absorption costing method.

(ii) Prepare a statement showing the product costs of each product using the ABC approach.

(iii) State what are the reasons for the different product costs under the two approaches?

Solution

(i)   **Statement of calculation of labour hours**

	SK– Gold	SK– Pearl	SK– Diamond	Total
Prod. of soaps (units) (A)	4,000	3,000	2,000	9,000

Direct labour (min.) (B)	30	40	60	-
Direct labour hours [(A×B)÷60]	2,000	2,000	2,000	6,000

Overhead rate per direct labour hour $= \frac{Budgeted\ overheads}{Budgeted\ labour\ hours} = \frac{1,98,000}{6,000} = ₹ 33$ per direct labour hour

Statement of cost

	SK – Gold	SK – Pearl	SK – Diamond
Essential oils	$\frac{200\times60}{100} = 120$	$\frac{300\times55}{100} = 165$	$\frac{300\times65}{100} = 195$
Cocoa Butter	$\frac{200\times20}{100} = 40$	$\frac{200\times20}{100} = 40$	$\frac{200\times20}{100} = 40$
Filtered water	$\frac{15\times30}{100} = 4.50$	$\frac{15\times30}{100} = 4.50$	$\frac{15\times30}{100} = 4.50$
Chemicals	$\frac{30\times10}{100} = 3$	$\frac{50\times12}{100} = 6$	$\frac{60\times15}{100} = 9$
Material cost per unit	167.50	215.50	248.50
Direct labour per unit	$\frac{10\times30}{60} = 5$	$\frac{10\times40}{60} = 6.67$	$\frac{10\times60}{60} = 10$
Overheads per unit	$\frac{33\times30}{60} = 16.50$	$\frac{33\times40}{60} = 22$	$\frac{33\times60}{60} = 33$
Total cost per unit	189.00	244.17	291.50
Number of units	4,000	3,000	2,000
Total costs	7,56,000	7,32,510	5,83,000

(ii) **Calculation of Cost Driver**

Activity	Amount(₹) (A)	Cost driver quantity (B)	Cost Driver Rate (A ÷ B)
Forklifting	58,000	Gold – [{(60×0.8)+20+30+10}×4,000]=4,32,000 Pearl – [{(55×0.8)+20+30+12}×3,000]=3,18,000 Diamond – [{(65×0.8)+20+30+15}×2,000]=2,34,000 Total weight = 9,84,000	0.06 per gram
Supervising	60,000	Gold - $\frac{4,000\times30}{60} = 2,000$ Pearl - $\frac{3,000\times40}{60} = 2,000$ Diamond - $\frac{2,000\times60}{60} = 2,000$ Total machine hours= 6,000	10 per machine hour
Utilities	80,000	Gold – 5×4,000 = 20,000 Pearl – 5×3,000 = 15,000 Diamond – 6×2,000 = 12,000 Total operations = 47,000	1.70 per machine operation

Statement of cost

	SK – Gold	SK – Pearl	SK – Diamond
Material cost per unit	167.50	215.50	248.50
Direct labour per unit	$\frac{10 \times 30}{60} = 5$	$\frac{10 \times 40}{60} = 6.67$	$\frac{10 \times 60}{60} = 10$
Foklifting cost per unit	0.06×108 = 6.48	0.06×106 = 6.36	0.06×117 = 7.02
Supervising cost per unit	$\frac{10 \times 30}{60} = 5$	$\frac{10 \times 40}{60} = 6.67$	$\frac{10 \times 60}{60} = 10$
Utilities cost per unit	1.705 = 8.50	1.70×5 = 8.50	1.70×6 = 10.20
Total cost per unit	192.48	243.70	285.72
Number of units	4,000	3,000	2,000
Total costs	7,69,920	7,31,100	5,71,440

(iii) Comments: The difference in the total costs under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more precise.

Question – 5

PQR Ltd. has decided to analyze the profitability of its five new customers. It buys soft drink bottles in cases at ₹ 45 per case and sells them to retail customers at a list price of ₹ 54 per case. The data pertaining to five customers are given below:

Particulars	Customers				
	A	**B**	**C**	**D**	**E**
Number of cases sold	9360	14200	62000	38000	9800
List selling price ₹	54	54	54	54	54
Actual selling price	54	53.40	49	50.20	48.60
Number of purchase orders	30	50	60	50	60
Number of customers visits	4	6	12	4	6
Number of deliveries	20	60	120	80	40
Kilometers travelled per delivery	40	12	10	20	60
Number of expediate deliveries	0	0	0	0	2

It's five activities and their cost drivers are:

Activity	Cost Driver
Order taking	₹ 200 per purchase order
Customer visits	₹ 300 per each visit
Deliveries	₹ 4.00 per delivery km travelled
Product Handling	₹ 2.0 per case sold
Expedited deliveries	₹ 100 per each such delivery

You are required to:

(i)   Compute the customer level operating income of each of five retail customers by sing the cost driver rates.

(ii) Examine the results to give your comments on Customer 'D' in comparison with Customer 'C' and on Customer 'E' in comparison with Customer 'A'.

Solution

(i)   **Statement of operating income**

Particulars	Customer A	Customer B	Customer C	Customer D	Customer E
Units	9,360	14,200	62,000	38,000	9,800
Revenue [54 × No. of units]	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
(-) Discount [(List price – Actual price) × No. of units]	-	8,520	3,10,000	1,44,400	52,920
Net revenue	5,05,440	7,58,280	30,38,000	19,07,600	4,76,280
(-) Order taking [200×No. of purch. order]	6,000	10,000	12,000	10,000	12,000
(-) Customer visit [300×No. of visit]	1,200	1,800	3,600	1,200	1,800
(-) Deliveries [4 × km travel × No. of deliveries]	3,200	2,880	4,800	6,400	9,600
(-) Production handling [2 × No. of units]	18,720	28,400	1,24,000	76,000	19,600
(-) Expedited deliveries [100×No. of delivery]	-	-	-	-	200
(-) COGS [45 × No. of units]	4,21,200	6,39,000	27,90,000	17,10,000	4,41,000
Operating Income	55,120	76,200	1,03,600	1,04,000	(7,920)

(ii) Separate disclosure of revenue helps us to identify the relationship between discount and sales quantity.

Customer	Quantity	Discount	Discount %
A	9,360	-	0%
C	62,000	5	5÷54 = 9.25%
D	38,000	3.80	3.80÷54 = 7.03%
E	8,775	5.40	5.40÷54 = 10%

Customer D gets lower discount as compared to Customer C. It may be due to lower quantity purchased by customer D as compared to Customer C.

Customer E gets higher discount as compared to Customer A. Customer E discount is higher in-spite of ordering comparative lower quantity and its reason should be further explored.

Question – 6

A drug store is presently selling three types of drugs namely 'Drug A', 'Drug B' and 'Drug C'. due to some constraints, it has decided to go for only one product line of drugs. It has provided the following data for the year 2020-21 for each product line:

	Drug Types		
	A	**B**	**C**
Revenue (in ₹)	74,50,000	1,11,75,000	1,86,25,000
Cost of goods sold (in ₹)	41,44,500	68,16,750	1,20,63,750
Number of purchase orders placed (in nos)	560	810	630
Number of deliveries received	950	1,000	850
Hours of shelf-stocking time	900	1,250	2,350
Units sold (in nos)	1,75,200	1,50,300	1,44,500

Following additional information is also provided:

Activity	**Description of Activity**	**Total Cost (₹)**	**Cost-allocation base**
Drug License fee	Drug License fee	5,00,000	To be distributed in ratio 2:3:5 between A, B and C
Ordering	Placing of orders for purchases	8,30,000	2,000 purchase orders
Delivery	Physical delivery and receipt of goods	18,20,000	2,800 deliveries
Shelf stocking	Stocking of goods	32,40,000	4,500 hours of shelf-stocking time
Customer Support	Assistance provided to customers	28,20,000	4,70,000 units sold

You are required to:

(i)   Calculate the operating income and operating income as a percentage (%) of revenue of each product line if:

a)   All the support costs (other than cost of goods sold) are allocated in the ratio of cost of goods sold

b)   All the support costs (Other than cost of goods sold) are allocated using activity-based costing system.

(ii)   Give your opinion about choosing the product line on the basis of operating income as a percentage (%) of revenue of each product line under both the situation as above.

Solution

(i) (a)   **Statement of operating income**

Particulars	Drug A	Drug B	Drug C	Total
Revenue (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
COGS	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Gross Margin	33,05,500	43,58,250	65,61,250	1,42,25,000
(-) Operating cost (in COGS Ratio)	16,57,800	27,26,700	48,25,500	92,10,000
Operating Income (B)	16,47,700	16,31,550	17,35,750	50,15,000
Operating income % (B ÷ A)	22.12%	14.60%	9.32%	13.46%

(i) (b)   **Statement of Cost**

Particulars	Cost (₹) (A)	Cost Driver (B)	Cost per cost driver (A÷B)
Ordering	8,30,000	2,000 purchase order	₹ 415 per purchase order
Delivery	18,20,000	2,800 deliveries	₹ 650 per delivery
Shelf stocking	32,40,000	4,500 hours of shelf stocking time	₹ 720 per hour of shelf stocking time
Customer support	28,20,000	4,70,000 units sold	₹ 6 per unit sold

Statement of operating income

Particulars	Drug A	Drug B	Drug C
Revenue (A)	74,50,000	1,11,75,000	1,86,25,000
COGS	41,44,500	68,16,750	1,20,63,750
Gross Margin (B)	33,05,500	43,58,250	65,61,250
Drug License Fee (in 2:3:5)	1,00,000	1,50,000	2,50,000
Ordering cost	415 × 560 = 2,32,400	415 × 810 = 3,36,150	415 × 630 = 2,61,450
Delivery cost	650 × 950 = 6,17,500	650 × 1000 = 6,50,000	650 × 850 = 5,52,500
Shelf Stocking cost	720 × 900 = 6,48,000	720 × 1250 = 9,00,000	720 × 2350 = 16,92,000
Customer support	6 × 175200 = 10,51,200	6 × 150300 = 9,01,800	6 × 144500 = 8,67,000
Operating cost (C)	26,49,100	29,37,950	36,22,950
Operating income (B– C=D)	6,56,400	14,20,300	29,38,300

Operating income % (D÷A)	8.81%	12.71%	15.78%

(ii) When the operating costs are distributed on the basis of cost of goods sold, Drug A has the highest level of operating income percentage because lesser operating cost share is distributed to it.

Activity based costing shows that Drug C uses the large amount of operating cost resources than the other two drugs and simultaneously generates the highest level of revenue and thus operating income percentage is maximum in case of Drug C.

Question – 7

One of Pintu Company's cost pools is parts administration. The budgeted overhead cost for that cost pool was ₹ 4,00,000 and the expected activity was 4,000 part types. The actual overhead cost for the cost pool was ₹ 4,20,000 at an actual activity of 5,000 part types. The activity rate for that cost pool was:

(a) ₹ 80 per part type   (b) ₹ 100 per part type

(c) ₹ 105 per part type   (d) ₹ 84 per part type

Question – 8

'Humara – Apna' bank offers three products, viz. deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing method.

The bank wants to know the product wise total cost per unit for the selected activities, so that price may be fixed accordingly. The following information is made available to formulate the budget:

Activity	Present Cost (₹)	Estimation for the budget period
ATM Services:		
(a) Machine Maintenance	4,00,000	All fixed, no change
(b) Rents	2,00,000	Fully fixed, no change
(c) Currency replenishment cost	1,00,000	Expected to double during budget
	7,00,000	(This activity is driven by no. of ATM transactions)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every, increase of one lakh statement, one lakh rupees is the budgeted increase.

		(This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budgeted period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantities are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM transactions	1,50,000	-	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone Minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts and 14,000 credit card accounts.

Question – 1

The budgeted rate for ATM service activity is:

(a)   ₹ 4

(b)   ₹ 2

(c)   ₹ 1

(d)   ₹ 0.50

Question – 2

The budgeted rate for computer processing activity is:

(a)   ₹ 4

(b)   ₹ 2

(c)   ₹ 1

(d)   ₹ 0.50

Question – 3

The budgeted rate for issuing statement activity is:

(a)   ₹ 4

(b)   ₹ 2

(c)   ₹ 1

(d)   ₹ 0.50

Question – 4

The budgeted rate for computer inquiries activity is:

(a)   ₹ 4

(b)   ₹ 2

(c)   ₹ 1

(d)   ₹ 0.50

Question – 5

Total cost for credit cards as per activity based costing is:

(a)   ₹ 3,90,000

(b)   ₹ 8,40,000

(c)   ₹ 15,60,000

(d)   ₹ 29,30,000

1	2	3	4	5
A	D	A	D	B

COST SHEET - CONCEPTS

1. Cost Sheet

It is a statement which shows the break-up and build-up of costs for a particular period (functional classification).

2. Statement of Cost/Cost Sheet

Particulars	Total Cost (₹)	Cost per unit (₹)
Opening stock of Raw Material		
Add: Purchases		
Less: Closing stock of Raw Material		
Add: Carriage/Freight inward		
Less: Raw material purchase return		
Less: Sale value of scrap of raw material		
Direct Material Consumed		
Add: Direct labour cost ➢ Wages ➢ Bonus ➢ Allowances ➢ Overtime ➢ Employer contribution to PF/ESI/SSS ➢ Any other benefit		
Add: Direct expenses or chargeable expenses ➢ Royalty for production ➢ Cost of utilities such as power & fuel, steam etc. ➢ Fee for technical know-how ➢ Cost of product/service specific design or drawing ➢ Cost of product/service specific software ➢ Amortized cost of moulds, patterns, patents etc. ➢ Job charges paid to job workers ➢ Hire charges paid for hiring specific equipment ➢ Other expenses which are directly related with production		
Prime Cost		
Add: Factory/Work Overheads		
Gross Factory/Work Cost		

Particulars	Total Cost (₹)	Cost per unit (₹)
Add: Opening stock of WIP		
Less: Closing stock of WIP		
Net Factory/Work cost		
Add: Quality control cost		
Add: Research and Development cost		
Add: Administrative overheads (related to production)		
Add: Packing cost (primary)		
Less: Credit for recoveries/Scrap/Defectives/By-Product		
Cost of Production		
Add: Opening stock of finished goods		
Less: Closing stock of finished goods		
Cost of Goods Sold		
Add: Administrative overheads (general)		
Add: Selling and distribution overheads		
Add: Interest on borrowed funds		
Cost of Sales		
Add: Profit		
Sales		

3. **Points to Remember (PTR)**

   (A) Loss or Gain
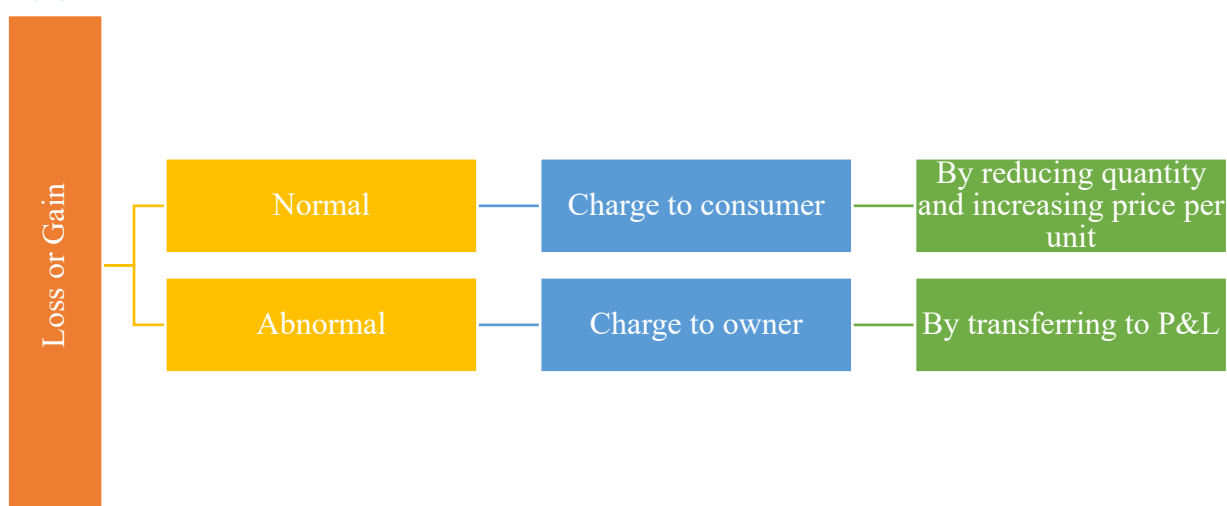
(B) Certain expenses not appear in cost sheet:

- Goodwill or preliminary expenses written off
- Income tax
- Loss on sale of assets or investment
- Cost pertaining to or arising out of a pandemic e.g. COVID-19
- Penalty, fines, damages etc.

(C) Work = Factory

Work Overheads = Factory Overheads

Work Cost = Net Factory Cost

(D) Cost of goods available for sale = Opening stock of FG + Cost of Production (COP)

(E) Cost of goods processed during the period = Opening WIP + GFC

4. Treatment of Expenses

Expenses	Treatment
Haulage	Factory OHs
Stores Related Expenses Stores Consumed = Opening + Purchases – Closing	Factory OHs
Warehouse or Godown Expenses	Selling & Distribution OHs
Loose tools written off	Factory OHs
Bank charges	Administration OHs
Salesmen commission	Selling & Distribution OHs
Cost of Samples	Selling & Distribution OHs
Audit Fee	Administration OHs
General Expenses	Administration OHs
Counting House Salaries	Administration OHs
Production planning expenses in office	Administration OHs related to Prod.
Director's fees	Administration OHs
Fee for exhibition participation	Selling & Distribution OHs
Pollution control expenses	Factory OHs

Carriage on raw material return	Factory OHs
Bad Debts	Ignore
Packaging	
(A) Primary Packaging	Add after NFC
(B) Secondary Packaging	Selling & Distribution OHs
GST	
(A) GST Output	Add after sales value
(B) GST Input	
(C) ITC Available	Ignore
(D) ITC Not Available	Add to the cost of item to which it relates
Custom Duty	Add to the cost of item to which it relates
Discount	
(A) Trade Discount	Deduct if not already deducted
(B) Cash Discount	Ignore
(C) Other discount or discount on sales	Selling & Distribution OHs
Waste/Scrap	
(A) Scrap for which amount is received on sale	
(1) Related to raw material	Deduct from raw material consumed
(2) Arises during production	Deduct after NFC
(B) Scrap for which disposal cost is to be incurred	Add to factory OHs
Defectives	
(a) Sold as it is at discount	Deduct after NFC

(b) Goods are rectified by incurring rectification cost	Add rectification cost to Factory OHs

5. Administration Overheads

If administration overheads is ___% of NFC or If administration overheads is ₹ ___ per unit produce then in both situation consider them as related to production.

6. Conversion Cost

It is the cost to convert raw material into finished goods. It is sum total of direct labour, direct expenses and factory overheads.

7. Valuation of Stock

Stock can be valued either on FIFO basis or LIFO basis or Weighted average method. Unless otherwise provided FIFO method will be used for valuation of stock.

According to FIFO Method,

Value of cl. stock of raw material $= \frac{Amount\ of\ raw\ material\ purchased}{Raw\ material\ purchase\ quantity} \times Cl.stock\ raw\ material\ units$

Value of closing stock of finished goods $= \frac{Cost\ of\ Production}{Units\ produced} \times Closing\ stock\ finished\ goods\ units$

According to Weighted Average Method,

Value of cl. stock of raw material $= \frac{RM\ purchase + Op.\ Stock\ of\ RM}{RM\ purchase\ units + Op.\ stock\ RM\ units} \times Cl.stock\ raw\ mat.units$

Value of closing stock of finished goods $= \frac{Cost\ of\ Production + Op.\ stock\ FG}{Units\ produced + Op.\ stock\ FG\ units} \times Closing\ stock\ FG\ units$

For raw material,

Raw material consumed units = Op. stock RM units + RM Purchase units – Cl. stock RM

For finished goods,

Finished goods units sold = Op. stock FG units + FG units produced – Cl. stock FG units

If there is NIL Opening stock

Cost per unit of finished goods $= \frac{Cost\ of\ Production}{Units\ produced} = \frac{Cost\ of\ Goods\ Sold}{Units\ Sold}$

8. Calculation of per unit data and vice versa

(A) For calculating per unit data
- ➢ Divide all values by Units Produced upto cost of production
- ➢ Divide all values by Units Sold from COGS and onwards

(B) If factory overheads or administration overheads (production related) per unit is given then multiply it with number of units produced to get total value.

(C) If administration overheads (general) and selling and distribution overheads per unit is given then multiply it with number of units sold to get total value.

9. Recovery Rate

It is the rate which is used to recover/absorb/charge overheads from the products being manufactured or services being provided.

Unless otherwise provided, following basis will be used for recovery of overheads:

Factory overheads	Direct Labour
Administration overheads	NFC or work cost
Selling and distribution overheads	NFC or work cost

10. Change in Cost Effects

Total Cost = No. Of units × Cost per unit

	Total VC	Total FC
Quantity Effect	Yes	No
Price Effect	Yes	Yes

Relation between:

(A)	Quantity and Variable cost	: Direct relation
(B)	Price and Variable cost	: Direct relation
(C)	Price and Fixed cost	: Direct relation
(D)	Wages and Efficiency	: Indirect relation

Unless otherwise provided, following points are to be assumed:

(a) VC per unit will remain same

(b) Total FC will remain same

(c) All direct cost are considered to be variable in nature

(d) All overheads are considered to be fixed in nature

COST SHEET QUESTIONS

Question – 1

SK ltd. has the following expenditures for the year ended 31st March:

Particulars	Amount (₹)	Amount (₹)
Raw materials purchased		10,00,00,000
GST paid on the above purchases @18% (eligible for input tax credit)		1,80,00,000
Freight inwards		11,20,600
Wages paid to factory workers		29,20,000
Contribution made towards employees' PF and ESI		3,60,000
Production bonus paid to factory workers		2,90,000
Royalty paid for production		1,72,600
Amount paid for power & fuel		4,62,000
Amount paid for purchase of moulds and patterns (life is equivalent to two years production)		8,96,000
Job charges paid to job workers		8,12,000
Stores and spares consumed		1,12,000
Depreciation on:		
Factory building	84,000	
Office building	56,000	
Plant & Machinery	1,26,000	
Delivery vehicles	86,000	3,52,000
Salary paid to supervisors		1,26,000
Repairs & maintenance paid for:		
Plant & Machinery	48,000	
Sales office building	18,000	
Vehicles used by directors	19,600	85,600
Insurance premium paid for:		
Plant & Machinery	31,200	
Factory building	18,100	
Stock of raw materials & WIP	36,000	85,300
Expenses paid for quality control check activities		19,600
Salary paid to quality control staffs		96,200
Research & development cost paid for improvement in production process		18.200
Expenses paid for pollution control and engineering & maintenance		26,600

Expenses paid for administration of factory work		1,18,600
Salary paid to functional managers:		
Production control	9,60,000	
Finance & accounts	9,18,000	
Sales & Marketing	10,12,000	28,90,000
Salary paid to General Manager		12,56,000
Packaging cost paid for:		
Primary packing necessary to maintain quality	96,000	
For re-distribution of finished goods	1,12,000	2,08,000
Wages of employees engaged in distribution of goods		7,20,000
Fee paid to auditors		1,80,000
Fee paid to legal advisors		1,20,000
Fee paid to independent directors		2,20,000
Performance bonus paid to sales staff		1,80,000
Value of stock as on 1st April of last year		
Raw materials	18,00,000	
Work-in-process	9,20,000	
Finished goods	11,00,000	38,20,000
Value of stock as on 31st March of current year		
Raw materials	9,60,000	
Work-in-process	8,70,000	
Finished goods	18,00,000	36,30,000

Amount realized by selling of scrap and waste generated during manufacturing process is ₹ 86,000. From the above data you are required to prepare statement of cost for the year ended 31st March, showing (i) prime cost, (ii) factory cost, (iii) cost of production, (iv) cost of goods sold and (v) cost of sales.

Solution

Particulars		Amount (₹)
Opening stock of raw material		18,00,000
Add: Raw material purchases		10,00,00,000
Less: Closing stock of raw material		(9,60,000)
Add: Freight inwards		11,20,600
Raw material consumed		10,19,60,600
Direct Labour:		
Wages paid to factory workers	29,20,000	
Contribution to PF & ESI	3,60,000	
Production bonus paid to factory workers	2,90,000	35,70,000
Direct Expenses:		

Royalty paid for production	1,72,600	
Amount paid for power & fuel	4,62,500	
Amortised cost of moulds and patterns	4,48,000	
Job charges paid to job workers	<u>8,12,000</u>	35,70,000
Prime Cost		10,74,25,200
Factory overheads:		
Stores and spares consumed	1,12,000	
Depreciation on factory building	84,000	
Depreciation on plant & machinery	1,26,000	
Repairs & maintenance for plant & machinery	48,000	
Insurance premium paid for plant & machinery	31,200	
Insurance premium paid for factory building	18,100	
Insurance premium paid for stock of raw material	36,000	
Salary paid to supervisors	1,26,000	
Expenses paid for pollution control	<u>26,600</u>	6,07,900
Gross Factory cost		10,83,33,100
Add: Opening WIP		9,20,000
Less: Closing WIP		(8,70,000)
Net Factory cost		10,80,83,100
Quality control cost:		
Expenses paid for quality control check	19,600	
Salary paid to quality control staff	<u>96,200</u>	1,15,800
Research and development cost paid		18,200
Administrative overheads related to production		
Expenses paid for administration	1,18,600	
Salary paid to production control manager	<u>9,60,000</u>	10,78,600
Less: Realisable value on sale of scrap		(86,000)
Add: Primary packaging cost		96,000
Cost of production		10,93,05,700
Add: Opening stock of finished goods		11,00,000
Less: Closing stock of finished goods		(18,000,000)
Cost of goods sold		10,86,05,700
Administrative overheads:		
Depreciation on office building	56,000	
Repairs & maintenance paid for vehicles for directors	19,600	
Salary paid to manager-finance and accounts	9,18,000	
Salary paid to general manager	12,56,000	
Fee paid to auditors	1,80,000	

Fee paid to legal advisors	1,20,000	
Fee paid to independent directors	2,20,000	27,69,600
Selling and distribution overheads		
Repairs & maintenance paid to sales office building	18,000	
Salary paid to manager – sales & marketing	10,12,,000	
Performance bonus paid to sales staffs	1,80,000	
Depreciation on delivery vehicles	86,000	
Packaging cost paid for re-distribution	1,12,000	
Wages of employees engaged in distribution of goods	7,20,000	21,28,000
Cost of Sales		11,35,03,300

Question – 2

From the following particulars, you are required to prepare monthly cost sheet of SK Ltd.:

	Amount (₹)
Opening Inventories	
- Raw materials	12,00,000
- Work-in-process	18,00,000
- Finished goods (10,000 units)	9,60,000
Closing inventories	
- Raw materials	14,00,000
- Work-in-process	16,04,000
- Finished goods	?
Raw material purchased	1,44,00,000
GST paid on raw materials purchased (ITC available)	7,20,000
Wages paid to production workers	36,64,000
Expenses paid for utilities	1,45,600
Office and administration expenses paid	26,52,000
Travelling allowance paid to office staffs	1,21,000
Selling expenses	6,46,000

Machine hours worked – 21,600 hours

Machine hour rate - ₹ 8.00 per hour

Units sold – 1,60,000

Units produced 1,94,000

Desired profit – 15% on sales

Solution

Cost sheet of SK Ltd. for month of …..

Units produced – 1,94,000

Units sold – 1,60,000

Particulars	(₹)	Cost per unit (₹)
Raw materials purchased	1,44,00,000	
Add: Opening value of raw materials	12,00,000	
Less: Closing value of raw materials	(14,00,000)	
Materials consumed	1,42,00,000	73.19
Wages paid to production workers	36,64,000	18.89
Expenses paid for utilities	1,45,600	0.75
Prime Cost	**1,80,09,600**	**92.83**
Factory overheads (₹ 8 × 2,600 hours)	1,72,800	
Add: Opening value of W-I-P	18,00,000	
Less: Closing value of W-I-P	(16,04,000)	
Cost of Production	**1,83,78,400**	**94.73**
Add: Value of opening finished stock	9,60,000	
Less: Value of closing finished stock	(41,68,120)	
(₹ 94.73 × 44,000)		
Cost of Goods Sold	**1,51,70,280**	**94.81**
Office and administration expenses paid	26,52,000	16.58
Travelling allowance paid to office staffs	1,21,000	0.75
Selling expenses	6,46,000	4.04
Cost of Sales	**1,85,89,280**	116.18
Add: Profit	32,80,461	20.50
Sales	**2,18,69,741**	**136.68**

Question – 3

The following data relates to manufacturing of a standard product during the month of the March:

Particulars	Amount (in ₹)
Stock of Raw material as on 01-03	80,000
Work in progress as on 01-03	50,000
Purchase of raw material	2,00,000
Carriage inwards	20,000
Direct wages	1,20,000
Cost of special drawing	30,000
Hire charges paid for Plant	24,000
Return of Raw Material	40,000
Carriage on return	6,000
Expenses for participation in Industrial exhibition	8,000
Legal charges	2,500
Salary to office staff	25,000
Maintenance of office building	2,000
Depreciation on Delivery Van	6,000

Warehousing charges	1,500
Stock of Raw material as on 31-03	30,000
Stock of Work in Progress as on 31-03	24,000

- Store overheads on material are 10% of material consumed.
- Factory overheads are 20% of the prime cost
- 10% of the output was rejected and a sum of ₹ 5,000 was realized on sale of scrap.
- 10% of the finished product was found to be defective and the defective products were rectified at an additional expenditure which is equivalent to 20% of proportionate direct wages.
- The total output was 8,000 units during the month.

You are required to prepare a cost sheet for the above period showing the:

(i) Cost of raw material consumed
(ii) Prime cost
(iii) Work cost
(iv) Cost of production
(v) Cost of sales

Solution   **Cost Sheet**

Particulars		Amount (₹)
Opening stock of raw material		80,000
Add: Raw material purchases		2,00,000
Add: Carriage inward		20,000
Less: Return of raw material		(40,000)
Less: Closing stock of raw material		(30,000)
Raw Material consumed		2,30,000
Direct wages		1,20,000
Direct Expenses: Cost of special drawing	30,000	
Hire charges paid for plant	24,000	54,000
Prime Cost		4,04,000
Stores Overheads (10% × 2,30,000)		23,000
Carriage on return of raw material		6,000
Factory overheads (20% × 4,04,000)		80,800
Rectification cost of defectives (1,20,000 × 90% × 10% × 20%)		2,160
Gross Factory Cost		5,15,960
Add: Opening WIP		50,000
Less: Closing WIP		(24,000)
Net Factory Cost		5,41,960
Less: Scrap sale		(5,000)
Cost of Production/COGS		5,36,960
Administration Overheads:		

Legal charges	2,500	
Salary to office staff	25,000	
Maintenance of office building	2,000	29,500
Selling & Distribution Overheads:		
Expenses for participation in industrial exhibition	8,000	
Warehousing charges	1,500	
Depreciation on Delivery Van	6,000	15,500
Cost of Sales		5,81,960

Question – 4

A fire occurred in the factory premises on October 31. The accounting records have been destroyed. Certain accounting records were kept in another building. They reveal the following for the period September 1 to October 31:

(a) Direct materials purchased ₹ 2,50,000
(b) Work in progress inventory (1 Sep) ₹ 40,000
(c) Direct material inventory (1 Sep) ₹ 20,000
(d) Finished goods inventory (1 Sep) ₹ 37,750
(e) Indirect manufacturing costs 40% of conversion cost
(f) Sales revenue ₹ 7,50,000
(g) Direct Manufacturing labour ₹ 2,22,250
(h) Prime costs ₹ 3,97,750
(i) Gross margin percentage based on revenues 30%
(j) Cost of goods available for sale ₹ 5,55,775

The cost is fully covered by insurance. The insurance company wants to know the historical cost of the inventories as the basis for negotiating a settlement, although the settlement is actually to be based on replacement cost, not historical cost.

Required:
(a) Finished goods inventory 31 October
(b) Work in process inventory 31 October
(c) Direct material inventory 31 October

Solution

Statement of cost and sales

Particulars	Amount
Opening stock of material	20,000
Add: Purchases	2,50,000
Less: Closing stock of material(bal. fig.)	(94,500)
Direct material consumed (bal. fig.)	1,75,500
Add: Direct Labour	2,22,250
Add: Direct Expenses	-
Prime Cost (given)	3,97,750

Particulars		Amount
Add: Factory Overheads (working note-1)		1,48,167
	Gross Factory Cost	5,45,917
Add: Opening WIP		40,000
	Goods Processed during the period	5,85,917
Less: Closing WIP(bal. fig.)		(67,892)
	Net Factory Cost/COP (bal. fig.)	5,18,025
Add: Opening stock of FG		37,750
	Cost of goods available for sale (given)	5,55,775
Less: Closing stock of FG(bal. fig.)		(30,775)
	Cost of goods sold	5,25,000
Add: Administration Overheads		-
Add: Selling & Distribution Overheads		-
	Cost of Sales (Bal. fig.)	5,25,000
Add: Profit (7,50,000 × 30%)		2,25,000
	Sales	7,50,000

Working note - 1

Let factory overheads = x

Thus, $x = 40\% (2,22,250 + 0 + x)$

$x = 1,48,167$

Question – 5

The following figures are available from the books of SK Co. for the year 31st March:

	₹		₹
Materials:		Profit for the year	12,180
Stock on 1st April	2,000	Selling overhead	10,500
Stock on 31st March	4,000	Factory overhead	9,000
Purchases	20,000	Administration overhead	8,400
Wages	15,000		

(a) Prepare a cost sheet showing prime cost, work cost, cost of production, cost of sales and sales.

(b) In April, the factory receives an order for a job which will require materials ₹ 2,400 and wages ₹ 1,500. Ascertain the sale price of the job if the factory intends to earn a profit 10% higher than the percentage of profit earned in year ending on 31st March. Assume that the factory overhead has gone up by 16(2/3)% and selling overhead has gone down by 20% after 31st March. Further assume that factory overhead is recovered as a percentage of the wages and administration and selling overhead as a percentage of works cost.

Solution

Statement of Cost and Profit

Particulars	Amount (₹)
Opening stock of material	2,000
Add: Purchases	20,000
Less: Closing stock of material	(4,000)
Direct material consumed	18,000
Add: Direct wages	15,000
Prime cost	33,000
Add: Factory overhead	9,000
GFC/NFC/COP/COGS	42,000
Add: Administration overhead	8,400
Add: Selling overhead	10,500
Cost of Sales	60,900
Add: Profit	12,180
Sales	73,080

Calculation of Recovery Rates

Factory overheads as % of direct wages $= \dfrac{(9,000+16.6666666\%)}{15,000} \times 100 = 70\%$ of direct wags

Administration overheads as % of NFC $= \dfrac{8,400}{42,000} \times 100 = 20\%$ of NFC

Selling overheads as % of NFC $= \dfrac{(10,500-20\%)}{42,000} \times 100 = 20\%$ of NFC

Profit as % of Cost of sales $= \dfrac{(12,180+10\%)}{60,900} \times 100 = 22\%$ of Cost of sales

Statement of calculation of selling price of Job

Particulars	Amount (₹)
Direct Material	2,400
Direct wages	1,500
Prime Cost	3,900
Add: Factory overheads (70% × 1,500)	1,050
GFC/NFC/COP/COGS	4,950
Add: Administration overheads (20% × 4,950)	990
Add: Selling overheads (20% × 4,950)	990
Cost of sales	6,930
Add: Profit (22% × 4,950)	1,525
Sales	8,455

Question – 6

A factory incurred the following expenditure during the year:

		₹
Direct material consumed		12,00,000
Manufacturing wages		7,00,000
Manufacturing overheads:		
Fixed	3,60,000	
Variable	2,50,000	6,10,000
		25,10,000

In the next year, following changes are expected in production and cost of production.

(a) Production will increase due to recruitment of 60% more workers in the factory.

(b) Overall efficiency will decline by 10% on account of recruitment of new workers.

(c) There will be an increase of 20% in fixed overhead and 60% in variable overhead.

(d) The cost of direct material will be decreased by 6%.

(e) The company desire to earn a profit of 10% on selling price.

Ascertain the cost of production and selling price.

Solution

Let existing production units	100
Add: Increase due to recruitment of worker(100 × 60%)	60
	160
Less: Decline due to efficiency (160 × 10%)	16
New Production units	144

Statement of cost and sale

Particulars	Working	Amount (₹)
Direct material	$\left(12,00,000 \times \dfrac{144}{100} \times \dfrac{94}{100}\right)$	16,24,320
Direct wages	$\left(7,00,000 \times \dfrac{144}{100} \times \dfrac{100}{90}\right)$	11,20,000
Prime Cost		**27,44,320**
(+) Fixed manufacturing overheads	$\left(3,60,000 \times \dfrac{120}{100}\right)$	4,32,000
(+) Variable manufacturing overheads	$\left(2,50,000 \times \dfrac{144}{100} \times \dfrac{160}{100}\right)$	5,76,000
Cost of Sales		**37,52320**
(+) Profit	(Bal. fig.)	4,16,924
Sales	(37,52,320 ÷ 90%)	**41,69,244**

Question – 7

A factory's normal capacity is 1,20,000 units per annum. The estimated costs of production are as under:

(a) Direct material ₹ 3 per unit; direct labour ₹ 2 per unit (Subject to a minimum of ₹ 12,000 p.m.)

(b) Indirect expenses—Fixed ₹ 1,60,000 per annum: Variable ₹ 2 per unit; Semi-variable ₹ 60,000 upto 50% capacity and additional ₹ 20,000 for every 20% increase in capacity.

(c) Each unit of raw material yields scrap which is sold at the rate of 20 paise per unit.

The factory worked at 50% capacity for the first three months but it was expected that it would work @ 80% capacity for the remaining 9 months. During the first three months, the selling price per unit was ₹ 12. What should be the price in the remaining nine months to produce a total profit of ₹ 2,18,000?

Solution   **Statement of Cost**

Particulars	First 3 months	Bal. 9 months
Level of operation	50%	80%
Units	$1,20,000 \times \frac{50}{100} \times \frac{3}{12} =$ 15,000	$1,20,000 \times \frac{80}{100} \times \frac{9}{12} = 72,000$
Direct material @ ₹ 3 p.u.	45,000	2,16,000
Direct wages	$\begin{Bmatrix}15,000 \times 2 \\ or \\ 12,000 \times 3\end{Bmatrix}$ 36,000	$\begin{Bmatrix}72,000 \times 2 \\ or \\ 12,000 \times 9\end{Bmatrix}$ 1,44,000
Fixed expenses	$1,60,000 \times \frac{3}{12} = 40,000$	$1,60,000 \times \frac{9}{12} = 1,20,000$
Variable expenses @ ₹ 2 p.u.	30,000	1,44,000
Semi-variable expenses	$60,000 \times \frac{3}{12} = 15,000$	$(60,000 + 20,000 + 20,000) \times \frac{3}{12}$ $= 75,000$
(-) Scrap @ ₹ 0.20 p.u.	(3,000)	(14,400)
Total Cost	**1,63,000**	**6,84,600**

Statement of Calculation of Selling Price for Remaining 9 Months

Sales for first 3 months (15,000 × 12)	1,80,000
Less: Cost for first 3 months	1,63,000
Profit for first 3 months	17,000
Annual Target profit	2,18,000
Profit require from remaining 9 months	2,01,000
Add: Cost for remaining 9 months	6,84,600
Sales for remaining 9 months	8,85,600
Units for remaining 9 months	72,000
Selling price for remaining 9 months	12.30

Question – 8	

PNME Ltd. manufactures two types of masks – 'disposal Masks' and 'Cloth Masks'. The cost data for the year ended 31st March, 2022 is as follows:

	₹
Direct materials	12,50,000
Direct wages	7,00,000
Production Overhead	4,00,000
Total	23,50,000

It is further ascertained that:

- Direct material cost per unit of cloth Mask was twice as much of direct material cost per unit od disposal Mask
- Direct wages per unit for Disposal Mask were 60% of those for Cloth Mask
- Production overhead per unit was at same rate for both the types of the masks
- Administration overhead was 50% of Production overhead for each type of mask
- Selling cost was ₹ 2 per cloth mask
- Selling price was ₹ 35 per unit of cloth mask
- No. of units of cloth masks sold – 45,000
- No. of units of Production of
  - o Cloth Masks   :   50,000
  - o Disposal Masks   :   1,50,000

You are required to prepare a cost sheet for cloth masks showing:

(i)   Cost per unit and total cost

(ii)   Profit per unit and total profit

Solution

Preparation of Cost Sheet for Cloth Masks

No. of units produced = 50,000 units

No. of units sold = 45,000 units

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note (ii))	10.00	5,00,000
Direct wages (Working note (ii))	5.00	2,50,000
Prime cost	15.00	7,50,000
Production overhead (Working note (iii))	2.00	1,00,000
Factory Cost	17.00	8,50,000
Administration Overhead* (50% of Production Overhead)	1.00	50,000
Cost of production	18.00	9,00,000
Less: Closing stock (50,000 units – 45,000 units)	–	(90,000)
Cost of goods solid i.e. 45,000 units	18.00	8,10,00
Selling cost	2.00	90,000
Cost of sales/Total cost	20.00	9,00,000

Profit		15.00	6,75,000
Sales value (₹ 35 × 45,000 units)		35.00	15,75,000

Working Notes:

(i)   Direct material cost per unit of Disposable Mask = M

Direct material cost per unit of Cloth Mask = 2M

Total direct material cost = (2M × 50,000) + (M × 1,50,000)

12,50,000 = M × 2,50,000

M = 12,50,000 ÷ 2,50,000 = ₹ 5

Thus, direct material cost per unit of cloth mask = 2 × 5 = ₹ 10

(ii)   Direct wages per unit of Cloth Mask = W

Direct wages per unit Disposable Mask = 0.6W

So, (W × 50,000) + (0.6W × 1,50,000) = ₹ 7,00,000

W = ₹ 5 per unit

Therefore, Direct material Cost per unit of Cloth Mask = ₹ 5

(iii) Production overhead per unit = $\frac{4,00,000}{(50,000+1,50,000)}$ = ₹ 5

Production overhead for Cloth Mask = ₹ 2 × 50,000 units = ₹ 1,00,000

*Administration overhead is related to production overhead in the question and hence to be considered in cost of production only.

Question – 9	

The following details are given to you:

Raw material consumed	₹ 2,40,000
Factory overheads	¾ of direct wages
Quality control cost and research and development cost	20% of factory cost
Cost of production	₹ 7,50,000

The amount of direct wages will be:

(a) ₹ 2,50,000   (b) ₹ 2,20,000

(c) ₹ 2,00,000   (d) ₹ 3,00,000

Question – 10	

M Ltd. is producing a single product and may expand into product diversification in next one to two years. M Ltd. is amongst a labour-intensive company where majority of processes are done manually. Employee cost is a major cost element in the total cost of the company. The company conventionally uses performance parameters Earnings per manshift (EMS) to measure cost paid to an employee for a shift of 8 hours, and Output per manshift (OMS) to measure an employee's output in a shift of 8 hours.

The Chief Manager (Finance) of the company has emailed you few information related to the last month. The email contains the following data related to the last month:

During the last month, the company has produced 2,34,000 tonnes of output. Expenditures for the last months are:

(i)   Raw materials consumed ₹ 50,00,000

(ii)   Power consumed 13,000 Kwh @ ₹ 8 per Kwh to run the machines for production.

(iii)   Diesels consumed 2,000 litres @ ₹ 93 per litre to run power generator used as alternative or backup for power cuts.

(iv)   Wages & salary paid – ₹ 6,40,00,000

(v)   Gratuity & leave encashment paid – ₹ 64,20,000

(vi)   Hiring charges paid for HEMM- ₹ 30,00,000. HEMM are directly used in production.

(vii)   Hiring charges paid for cars used for official purpose – ₹ 66,000

(viii) Reimbursement of diesel cost for the cars – ₹ 22,000

(ix)   The hiring of cars attracts GST under RCM @5% without credit.

(x)   Maintenance cost paid for weighing bridge (used for weighing of final goods at the time of dispatch) – ₹ 12,000

(xi)   AMC cost of CCTV installed at weighing bridge (used for weighing of final goods at the time of dispatch) and factory premises is ₹ 8,000 and ₹ 18,000 per month respectively.

(xii)   TA/ DA and hotel bill paid for sales manager- ₹ 36,000

(xiii) The company has 1,800 employees works for 26 days in a month.

You are asked to calculate the followings:

Question – 1
What is the amount of prime cost incurred during the last month:
- (a)   ₹ 7,54,20,000
- (b)   ₹ 7,57,10,000
- (c)   ₹ 7,56,06,000
- (d)   ₹ 7,87,10,000

Question – 2
What is the total and per shift cost of production for last month:
- (a) ₹ 7,87,10,000 and ₹ 336.37 respectively
- (b)   ₹ 7,87,10,000 and ₹ 1,681.84 respectively
- (c)   ₹ 7,87,28,000 and ₹ 1,682.22 respectively
- (d)   ₹ 7,87,28,000 and ₹ 336.44 respectively

Question – 3
What is the value of administrative cost incurred during the last month:
- (a)   ₹ 92,400
- (b)   ₹ 88,000
- (c)   ₹ 1,48,400
- (d)   ₹ 1,44,000

Question – 4
What is the value of selling and distribution cost and total cost of sales:
- (a)   ₹ 36,000 & ₹ 7,88,76,400 respectively

(b)   ₹ 56,000 & ₹ 7,88,76,400 respectively

(c)   ₹ 36,000 & ₹ 7,88,72,000 respectively

(d)   ₹ 56,000 & ₹ 7,88,72,000 respectively

Question – 5

What is the value EMS and OMS for the last month:

(a)   ₹ 1,504.70 & 5 tonnes respectively

(b)   ₹ 1,367.52 & 5 tonnes respectively

(c)   ₹ 1,504.70 & 4.37 tonnes respectively

(d)   ₹ 1,367.52 & 4.37 tonnes respectively

1	2	3	4	5
D	C	A	B	A

JOB & BATCH COSTING - CONCEPTS

1. **Job Costing**
   - It is that form of specific order costing under which each job is treated as a cost unit and costs are accumulated and ascertained separately for each job.
   - In other words, it is that form of specific order costing which applies where work is undertaken according to customer's requirement.
   - It is generally used in industries where production is not on continuous basis, rather it is only when order from customers are received according to their specifications e.g. printing press, repair shop, etc.
   - In this method cost of each job is computed by preparing the Job Cost Sheet.

2. **Batch Costing**
   - It is that form of specific order costing which applies where similar articles are manufactured in batches either for sale or use within the undertaking.
   - Each batch of output is a cost unit and is costed separately.
   - The total batch cost divided by number of units produced in a batch gives cost per unit.
   - It is generally undertaken in case of pharmaceutical production, shoes, garments, etc.

3. **Economic Batch Quantity (EOQ)**

   It is that batch size at which sum total of ordering cost and carrying cost is minimum.

   $$EOQ = \sqrt{\frac{2 \times A \times S}{C}}$$

   Where, A = Annual requirement of raw material

   S = Set-up cost per batch

   C = Carrying cost per unit per annum

   Number of set-up = $\frac{A}{Batch\ Quantity}$ (Always round off to next complete value)

   Total Set-up cost = No. of setup × Cost per set-up

   Average quantity = $\frac{Batch\ quantity}{2}$

   Total carrying cost = Average quantity × Carrying cost per unit per annum

JOB & BATCH COSTING QUESTIONS

Question – 1

The following data presented by the supervisor of a factory for a Job.

	₹ per unit
Direct material	120
Direct wages @ ₹ 4 per hour	60
(Department A-4 hrs., B-7hrs, C-2hrs & D-2hrs)	
Chargeable Expenses	20
Total	200

Analysis of the Profit and Loss Account for the year ended 31st March 2019

	₹	₹		₹
Material used		2,00,000	Sales	4,30,000
Direct Wages:				
Dept. A	12,000			
Dept. B	8,000			
Dept. C	10,000			
Dept. D	20,000	50,000		
Special Stores Items		6,000		
Overheads:				
Dept. A	12,000			
Dept. B	6,000			
Dept. C	9,000			
Dept. D	17,000	44,000		
Gross Profit c/d		1,30,000		
		4,30,000		4,30,000
Selling Expenses		90,000	Gross Profit b/d	1,30,000
Net Profit		40,000		
		1,30,000		1,30,000

It is also to be noted that average hourly rates for all the four departments are similar. Required:

(i) Prepare a Job Cost Sheet
(ii) Calculate the entire revised cost using the above figures as the base.
(iii) Add 20% profit on selling price to determine the selling price.

Solution

Working Notes:

Overhead recovery rate on overall basis:

Overhead recovery rate $= \dfrac{44,000}{\left(\frac{50,000}{4}\right)} = ₹ \, 3.52$

Statement of calculation of recovery rates

Particulars	Working	Recovery Rate
Dept. A	$\dfrac{12,000}{\left(\frac{12,000}{4}\right)}$	₹ 4 per direct labour hour
Dept. B	$\dfrac{6,000}{\left(\frac{8,000}{4}\right)}$	₹ 3 per direct labour hour
Dept. C	$\dfrac{9,000}{\left(\frac{10,000}{4}\right)}$	₹ 3.60 per direct labour hour
Dept. D	$\dfrac{17,000}{\left(\frac{20,000}{4}\right)}$	₹ 3.40 per direct labour hour
Selling exp. As % of NFC	$\dfrac{90,000}{2,00,000 + 50,000 + 6,000 + 44,000} \times 100$	30% of NFC

Statement of calculation of cost and selling price of Job

Particulars	Working	Amount (₹)
Material		120
Wages		60
Chargeable expenses		20
Prime Cost		200
(+) Overheads	Dept. A = 4 × 4.00 = 16	
	Dept. B = 7 × 3.00 = 21	
	Dept. C = 2 × 3.60 = 7.20	
	Dept. D = 2 × 3.40 = 6.80	51
GFC\NFC		251
(+) Selling expenses	30% × 251	75.30
Total Cost		326.30
Add: Profit	407.88 × 20%	81.58
Selling price	326.30 ÷ 80%	407.88

Question – 2

In a manufacturing company, factory overheads are charged as fixed percentage basis on direct labour and office overheads are charged on the basis of percentage of factory cost. The following information are available related to the year ending 31st March:

	Product A	Product B
Direct materials	₹ 19,000	₹ 15,000
Direct Labour	₹ 15,000	₹ 25,000
Sales	₹ 60,000	₹ 80,000
Profit	25% on cost	25% on sales price

You are required to find out:

(a) The percentage of factory overheads on direct labour

(b) The percentage of office overheads on factory cost

Solution

Let factory OH % on Direct labour = x

Let administration OH % on net factory cost = y

Statement of Cost

	Product A	Product B
Sales	60,000	80,000
Profit	12,000 [(60,000 × (25/125)]	20,000 (80,000 × 25%)
Total Cost	48,000	60,000

Statement of Cost

	Product A	Product B
Direct Material	19,000	15,000
Direct labour	15,000	25,000
Prime cost	34,000	40,000
Factory OHs	150x	250x
NFC/COP/COGS	34,000 + 150x	40,000 + 250x
(+) Admin. OH	340y + 1.5xy	400y + 2.5xy
COS	34,000 + 150x +340y + 1.5xy	40,000 + 250x + 400y + 2.5xy

$\therefore$ 34,000 + 150x + 340y + 1.5xy = 48,000 _____(1)

& 40,000 + 250x + 400y + 2.5xy = 60,000 _____(2)

Multiply equation (1) by 2.5 and equation (2) by 1.5 and subtract them, we get

   85,000 + 375x + 850y + 3.75xy = 1,20,000

±60,000 ± 375x ± 600y ± 3.75xy = ±90,000

We get,

25,000 + 250y = 30,000

y = 20

Put value of y = 20 in equation (1),

$34,000 + 150x + 340(20) + 1.5x(20) = 48,000$

$x = 40$

Thus, Factory OH % on direct labour = 40% and administration OH % on factory cost = 20%

Question – 3	

In a factory following the Job Costing Method, an abstract from the work-in-progress as at 30th June was prepared as under:

Job No.	Materials ₹	Direct Labour Hours	Labour ₹	Factory overheads applied
115	1,325	400 hrs	800	640
118	810	250 hrs	500	400
120	765	237.5 hrs	475	380
	₹ 2,900		₹ 1,775	₹ 1,420

Materials used in July were as follows:

Material requisition no.	Job No.	Cost (₹)
54	118	300
55	118	425
56	118	515
57	120	665
58	121	910
59	124	720
		3,535

A summary of labour hours deployed during July is as under:

Job No.	Number of hours Shop A	Shop B
115	25	25
118	90	30
120	75	10
121	65	--
124	20	10
	275	75
Indirect labour: Waiting for material	20	10
Machine Breakdown	10	5
Idle Time	5	6
Overtime Premium	6	5
	316	101

A shop credit slip was issued in July that material issued under Requisition No. 54 was returned back to stores as being not suitable. A material transfer note issued in July indicated that material issued under Requisition No. 55 for Job 118 was directed to Job 124.

The hourly rate in shop A per labour hour is ₹ 3 per hour while at shop B, it is ₹ 2 per hour. The factory overhead is supplied at the same rate as in June. Job 115, 118 and 120 were completed in July.

You are asked to compute the factory cost of the completed jobs. It is the practice of the management to put a 10% on the factory cost to cover administration and selling overheads and invoice the job to the customer on a total cost plus 20% basis. What would be the invoice price of these jobs?

Solution

Factory cost statement for completed jobs

Month	Job No.	Material	Direct labour	Factory OHs	Factory cost
September	115	1,325	800	640	2,765
October	115	-	125	100	225
Total		1,325	925	740	2,990
September	118	810	500	400	1,710
October	118	515	330	264	1,109
Total		1,325	830	664	2,819
September	120	765	475	380	1,620
October	120	665	245	196	1,106
Total		1,430	720	576	2,726

Invoice price of job

Job No.	115 (₹)	118 (₹)	120 (₹)
Factory cost	2,990.00	2,819.00	2,726.00
Administration and selling OHs @ 10% of factory cost	299.00	281.90	272.60
Total cost	3,289.00	3,100.90	2,998.60
Profit (20% of total cost)	657.80	620.18	599.72
Invoice Price	3,946.80	3,721.08	3,598.32

Indirect labour costs have been included in the factory overhead which has been recovered as 80% of the labour cost.

Question – 4	

AUX ltd. has an annual demand from a single customer for 60,000 Covid-19 Vaccines. The customer prefers to order in the lot of 15,000 vaccines per order. The production cost of vaccine is ₹ 5,000 per vaccine. The set-up cost per production run of Covid-19 vaccines is ₹ 4,800. The carrying cost is ₹ 12 per vaccine per month.

You are required to:

(i)   Find the most Economical Production Run

(ii)   Calculate the extra cost that company incurs due to production of 15,000 vaccines in a batch.

Solution

(i) Annual demand = A = 60,000 vaccines

   Set-up cost per run = S = ₹ 4,800

   Carrying cost per unit per annum = C = ₹ 12 × 12 = ₹ 144

   Economic Batch Quantity = $\sqrt{\frac{2 \times A \times S}{C}}$ = $\sqrt{\frac{2 \times 60,000 \times 4,800}{144}}$ = 2,000 vaccines

(ii)   **Statement of Cost**

Particulars	Batch size = 2,000 vaccines	Batch size = 15,000 vaccines
Set-up cost	$\frac{60,000}{2,000}$ × 4,800 = 1,44,000	$\frac{60,000}{15,000}$ × 4,800 = 19,200
Carrying cost	$\frac{2,000}{2}$ × 144 = 1,44,000	$\frac{15,000}{2}$ × 144 = 10,80,000
Total Cost	2,88,000	10,99,200

Extra cost = ₹ 10,99,200 – ₹ 2,88,000 = ₹ 8,11,200

Question – 5

A jobbing factory has undertaken to supply 300 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is ₹ 8 per piece. From the following data calculate the cost and profit per piece of each batch order and overall position of the order for 1,800 pieces.

Month	Batch output	Material cost (₹)	Direct wages (₹)	Direct labour hours
January	310	1150	120	240
February	300	1140	140	280
March	320	1180	150	280
April	280	1130	140	270
May	300	1200	150	300
June	320	1220	160	320

The other details are:

Month	Chargeable expenses (₹)	Direct labour hours
January	12,000	4,800
February	10,560	4,400
March	12,000	5,000
April	10,580	4,600
May	13,000	5,000
June	12,000	4,800

Solution

Statement of Cost and Profit per batch

Particulars	Jan.	Feb.	March	April	May	June	Total
Batch output (in units)	310	300	320	280	300	320	1,830
Sale value (₹)	2,480	2,400	2,560	2,240	2,400	2,560	14,640
Material cost (₹)	1,150	1,140	1,180	1,130	1,200	1,220	7,020
Direct wages (₹)	120	140	150	140	150	160	860
Chargeable expenses* (₹)	589	687	687	662	736	785	4,146
Total cost (₹)	1,859	1,967	2,017	1,932	2,086	2,165	12,026
Profit per batch (₹)	621	433	543	308	314	395	2,614
Total cost per unit (₹)	6.00	6.56	6.30	6.90	6.95	6.77	6.57
Profit per unit (₹)	2.00	1.44	1.697	1.10	1.05	1.23	1.43

Overall position of the order for 1,200 units

Sales value of 1,800 units @ ₹ 8 per unit	₹ 14,400
Total cost of 1,800 units @ ₹ 6.57 per unit	₹ 11,826
Profit	₹ 2,574

*Chargeable Expenses Rate $= \dfrac{Total\ Chargeable\ Expenses}{Total\ direct\ labour\ hours} = \dfrac{70,140}{28,600} = $ ₹ 2.452448 per labour hour

It is assumed that recovery rate is based on overall 6 months period. Other way is to compute recovery rate for each month and then compute the cost.

Question – 6	

Language Achievers, a renowned institute specializing in TOEFL preparation, has secured a spacious hall for 20,000 on weekly basis with a seating capacity of 250 students. The instructor, highly qualified and experienced, is compensated generously with an honorarium of 1,500 per lecture. Additionally, he receives reimbursement for travel expenses of ₹200 per day along with refreshments costing 1,500 per week to ensure his comfort and focus during teaching sessions. Administrative and miscellaneous expenses, covering essential utilities and materials are, 500 per week. Language Achievers has meticulously planned its curriculum, scheduling batches of 2 lectures per day, 5 days a week for 30 weeks, ensuring comprehensive coverage of the TOEFL syllabus.

Required:

(i)   Calculate the total cost per batch.

(ii)   Determine the minimum fee per student in a batch to cover costs, if the batch is fully occupied.

(iii)   Calculate the fee to be charged from each student if batch is 80% filled and institute aims to achieve a profit margin of 25% on the fee.

Solution

(i)   Calculation of Total cost per batch

Particulars	Amount (₹)
Hall Charges (₹20,000 × 30)	6,00,000

Honorarium of instructor (₹1,500 × 2 × 5 × 30)	4,50,000
Reimbursement of travel expenses (₹200 × 5 × 30)	30,000
Refreshment (₹1,500 × 30)	45,000
Administrative and miscellaneous expenses (₹500 × 30)	15,000
Total Cost	11,40,000
No. of Batches	1
Total cost per batch	11,40,000

(ii) Minimum fee per student in a batch to cover costs

$$= \frac{\text{Total cost per batch}}{\text{Students per batch}} = \frac{11,40,000}{250} = ₹4,560$$

(iii) Number of Students if batch is 80% filled

= 250 students × 80% = 200 students

Total Fee to be recovered to achieve 25% profit margin on the fee

= ₹11,40,000 + (₹11,40,000 × 1/4th of sales or 1/3rd of the cost) = ₹15,20,000

$$\text{Fee per student} = \frac{\text{Total Fee per batch}}{\text{Students per batch}} = \frac{15,20,000}{200} = ₹7,600$$

Question – 7

A FMCG company has an annual demand of 50,000 units for its specific product whose setting up cost per batch is ₹ 10,000 and carrying cost per unit per month is ₹ 1. What is the Economic Batch Quantity?

    (a) 7,071 units   (b) 10,000 units

    (c) 12,641 units   (d) 9,129 units

Question – 8

ABC Manufacturing allocates its factory overhead costs based on machine hours. The total estimated overhead cost for the year is ₹ 6,00,000, and the company expects to use 30,000 machine hours. During the year, job A used 300 machine hours. What amount of overhead costs should be allocated to this job?

    (a) ₹ 4,000   (b) ₹ 6,000

    (c) ₹ 10,000   (d) ₹ 8,000

COST ACCOUNTING SYSTEM - CONCEPTS

1. Cost Accounting System

Cost Accounting System

| Integrated System | → | Both Cost and Financial Accounts are prepared together | → | Only 1 P&L Account |

| Non-Integrated System | → | Cost & Financial Accounts are prepared separately | → | Cost Accounts (Costing P&L A/c) |
| | | | | Financial Accounts (P&L A/c) |
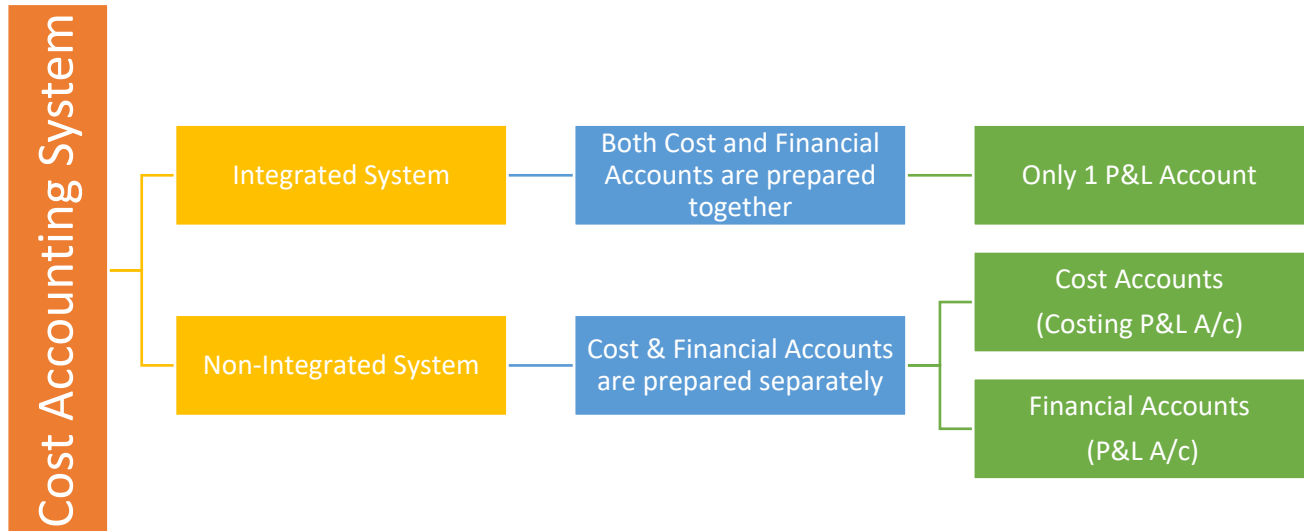
2. Various ledgers to be prepared:

Stores Ledger Control Account			
Particulars	**₹**	**Particulars**	**₹**
To Balance b/d (opening stock)	-	By CLC A/c (Purchase return)	-
To CLC A/c (Purchase)	-	By WIP LC A/c (Mat. Issued)	-
To CLC A/c (Carriage inward)	-	By Prod. OH Control A/c (IM)	-
To WIP LC A/c (Material Return)	-	By Admin. OH Control A/c (IM)	-
To Costing P&L A/c (Ab. Gain)	-	BY S&D OH Control A/c (IM)	-
		By Costing P&L A/c (Ab. Loss)	-
		By Balance c/d (Closing stock)	-
	-		-

Wages Control Account			
Particulars	**₹**	**Particulars**	**₹**
To CLC A/c (wages incurred)	-	By WIP LC A/c (DW)	-
		By Prod. OH Control A/c (IW)	-
		By Admin. OH Control A/c (IW)	-
		BY S&D OH Control A/c (IW)	-
		By Costing P&L A/c (Ab. Idle time)	-
	-		-

OHs Control Account			
Particulars	**₹**	**Particulars**	**₹**
To CLC A/c (OHs incurred)	-	By WIP LC/FGLC/COS A/c	-
To SLC A/c (IM)	-	(OHs recovered)	-
To Wages Control A/c (IW)	-	By Bal. C/d or Costing P&L A/c	-
To Bal. C/d or Costing P&L A/c	-	(Under recovered)	
(Over Recovered)			
	-		-

Work-in-Progress Ledger Control Account			
Particulars	**₹**	**Particulars**	**₹**
To Bal. b/d (Opening WIP)	-	By FGLC A/c (NFC)	-
To SLC A/c (RM consumed)	-	By Costing P&L A/c (Ab. Loss)	-
To Wages control A/c (DW)	-	By Bal. S/c (Cl. WIP)	-
To Prod. OH Control A/c	-		
(OHs recovered)	-		
To FGLC A/c (FG Return)			
	-		-

Finished Goods Ledger Control Account			
Particulars	**₹**	**Particulars**	**₹**
To Balance b/d (Opening FG)	-	By COS A/c (COGS)	-
To WIP LC A/c (NFC)	-	By Costing P&L A/c (Ab. Loss)	-
To Admin. OH Control A/c	-	By WIP LC A/c (FG Return)	-
(Admin. OH related to Production)		By Balance C/d (Closing FG)	-
	-		-

Cost of Sales Account			
Particulars	**₹**	**Particulars**	**₹**
To FGLC A/c (COGS)	-	By Costing P&L A/c (COS)	-
To Admin. OH Control A/c	-	By FGLC A/c (Goods return)	-
To S&D OH Control A/c	-		
	-		-

Costing P&L Account			
Particulars	**₹**	**Particulars**	**₹**
To Cost of Sales A/c (COS)	-	By CLC A/c (Sales)	-
To CLS A/c (Sales return)	-	By Abnormal profit	-
To Abnormal loss	-	By CLC A/c (Loss)	-
To CLC A/c (Profit)	-		
	-		-

3. Reasons for Reconciliation

(A) Items shown only in financial accounts

(B) Items shown only in cost accounts

(C) Under or over recovery of overheads in cost accounts

(D) Different basis for valuation of stock

(E) Basis of Depreciation

Format of reconciliation statement
(When starting point is taken as profit as per P&L accounts)

Particulars	(+) Amount	(-) Amount
Profit as per P&L Accounts	✓	-
(+) Expenses in P&L only	✓	-
(-) Income in P&L only	-	✓
(+) Appropriations in P&L only	✓	-
(+) Under recovered OHs in cost accounts	✓	-
(-) Over recovered OHs in cost accounts	-	✓
(+) Under valued opening stock in cost accounts	✓	-
(-) Over valued opening stock in cost accounts	-	✓
(+) Over valued closing stock in cost accounts	✓	-
(-) Under valued closing stock in cost accounts	-	✓
(-) Expenses in cost accounts only	-	✓
Total	✓	✓
Profit as per P&L Account	✓	-

*In case of loss, the amount will appear in minus column

4. Points to Remember (PTR)

(A) In case of no information then use non-integrated method

(B) Treatment of Overheads

Transfer to P&L A/c – If due to factory inefficiency

Show as Balance c/d - If seasonal nature

(C) Normal loss is transferred to Production OH control A/c

(D) If question asked to prepare reconciliation and there is no additional item then under-over recovery of overhead is carried forward to prepare reconciliation.

(E) Administration overheads is assumed to be related to production if question is silent.

COST ACCOUNTING SYSTEM QUESTIONS

Question – 1

Journalize the following transactions assuming the cost and financial accounts are integrated:

Particulars	Amount (₹)
Direct Materials issued to production	₹ 5,58,000
Allocation of Wages (Indirect)	₹ 7,50,000
Factory Overheads (Over absorbed)	₹ 2,25,000
Administrative Overheads (Under absorbed)	₹ 1,55,000
Deficiency found in stock of Raw material (Normal)	₹ 2,00,000

Solution

Journal Entries

	Particular		Dr. (₹)	Cr. (₹)
(i)	WIP Ledger Control A/c	Dr.	5,88,000	
	To Stores Ledger Control A/c			5,88,000
(ii)	Factory Overhead Control A/c	Dr.	7,50,000	
	To Wages Control A/c			7,50,000
(iii)	Factory Overheads Control A/c	Dr.	2,25,000	
	To Costing P&L A/c			2,25,000
(iv)	Costing P&L A/c	Dr.	1,55,000	
	To Administrative Overheads Control A/c			1,55,000
(v)	Factory Overheads Control A/c	Dr.	2,00,000	
	To Stores Ledger Control A/c			2,00,000

Question – 2

The following balances were extracted from a Company's ledger as on 30th June, 2018

	Debit (₹)	Credit (₹)
Raw material control A/c	2,82,450	
Work-in-progress control A/c	2,38,300	
Finished stock control A/c	3,92,500	
General ledger adjustment A/c		9,13,250
	9,13,250	9,13,250

The following transactions took place during the quarter ended 30th September, 2018:

	₹
Factory overheads – allocated to work-in-progress	1,36,350
Goods finished – at cost	13,76,200
Raw material purchased	12,43,810

Direct wages – allocated to work-in-progress	2,56,800
Cost of goods sold	14,56,500
Raw materials – issued to production	13,60,430
Raw materials – credited by suppliers	27,200
Raw materials losses – inventory audit	6,000
Work-in-progress rejected (with no scrap value)	12,300
Customer's returns (at cost) of finished goods	45,900

You are required to prepare:

(i) Raw material control a/c
(ii) Work-in-progress control a/c
(iii) Finished stock control a/c
(iv) General ledger adjustment a/c

Solution

Raw Material Control A/c

To Balance B/d	2,82,450	By General Ledger Adj. A/c	27,200
To General Ledger Adj. A/c	12,43,810	By Work in Progress Control A/c	13,60,430
		By Costing P&L A/c (Loss)	6,000
		By Balance c/d (Balance figure)	1,32,630
	15,26,260		15,26,260

Work in Progress Control A/c

To Balance b/d	2,38,300	By Finished goods Control A/c	13,76,200
To Raw material control A/c	13,60,430	By Costing P&L A/c	12,300
To Wages control A/c	2,56,800	By Balance c/d (Balancing	6,03,380
To Factory OH control A/c	1,36,350	Figure)	
	19,91,880		19,91,880

Finished Stock Ledger Control A/c

To Balance b/d	3,92,500	By Cost of Sales A/c	14,56,500
To Work in Progress Control A/c	13,76,200	By Balance c/d (Bal. Fig.)	3,58,100
To General Ledger Adjustment A/c	45,900		
	18,14,600		18,14,600

General Ledger Adjustment A/c

To Costing P&L (Sales) (Bal. fig.)	25,68,910	By Balance B/d	9,13,250
To Raw material control A/c	27,200	By Raw material control a/c	12,43,810
		By Wages control A/c	2,56,800
		By Factory OH control A/c	1,36,350
		By Finished Goods Control A/c	45,900
	9,55,000		25,96,110

Question – 3

A company operates on historic job cost accounting system, which is not integrated with the financial accounts. At the beginning of a month, the opening balances in cost ledger were:

	₹ (in lakhs)
Stores Ledger Control Account	80
Work-in-progress Control Account	20
Finished goods Control Account	430
Building Construction Account	10
Cost Ledger Control Account	540

During the month, the following transactions took place:

Materials	-	Purchased	40
		Issued to production	50
		Issued to maintenance	6
		Issued to building construction	4
Wages	-	Gross wages paid	150
		Indirect wages	40
		For building construction	10
Works Overheads	-	Actual amount incurred (excluding items shown above)	160
		Absorbed in building construction	20
		Under absorbed	8
Royalty paid			5
Selling, distribution and administration overheads			25
Sales			450

At the end of the month, the stock of raw material and work-in-progress was ₹ 55 lakhs and ₹ 25 lakhs respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the month. Company's gross profit margin is 20% on sales. Prepare the relevant control accounts to record the above transactions in the cost ledger of the company.

Solution

Stores Ledger Control A/c (SLC)

To Balance b/d	80	By Work-in-progress	50
To Cost Ledger Control (Purchased)	40	By Works Overhead	6
		By Building Construction	4
		By Factory Overhead (B/F)	5
		By Balance c/d	55
	120		120

Work in Progress Control A/c (WIP)

To Balance b/d	20	By Finished Goods Ledger Control	333
To Stores Ledger Control	50	(B/F)	

To Wages Control	100	By Balance c/d	25
To Factory Overhead	183		
To Cost Ledger Control (Royalty) (Note 2)	5		
	358		358

Finished Goods Control A/c (FGC)

To Balance b/d	430	By Cost of Sales (Note 3)	360
To WIP (Finished Goods Produced in the Month)	333	By Balance c/d	403
	763		763

Building Construction A/c

To Balance b/d	10	By Cost Ledger Control (Capitalized as Building)	44
To Stores Ledger Control	4		
To Wages Control	10		
To Works Overheads	20		
	44		44

Cost Ledger Control A/c (CLC)

To Building Construction	44	By Balance b/d	540
To Costing P & L A/c	450	By Stores Ledger Control	40
To Balance c/d	483	By Wages Control A/c	150
		By Work Overhead	160
		By WIP (Royalty)	5
		By SDA Overheads	25
		By Costing P & L A/c	57
	977		977

Factory/Works Overhead A/c

To Stores Ledger Control	5	By Building Construction	20
To Wages Control	40	By WIP (B/F)	183
To Cost Ledger Control	160	By Costing P & L A/c – Under Absorption (Note – 1)	8
To Stores Ledger Control	6		
	211		211

Wages Control A/c

To Cost Leger Control (Gross Wages)	150	By WIP (Direct Wages) (B/F)	100
		By Factory Overheads (Indirect Wages)	40
		By Building Construction A/c	10
	150		150

S & D Admin. Overheads Control A/c

To Cost Ledger Control	25	By Cost of Sales	25
	25		25

Cost of Sales A/c

To Finished Goods Ledger Control	360	By Costing P & L A/c	385
To SDA Overheads	25		
	385		385

Costing P & L A/c

To Cost of Sales	385	By Cost Ledger Control Sales	450
To Factory Overhead	8		
To Cost Ledger Control Net Profit	57		
	450		450

Trial Balance at the End of the Month

Stores Ledger Control	55	
Work in Progress	25	
Finished Goods Ledger Control	403	
Cost Ledger Control		483
Total	483	483

Note:

1. **Work Overhead Under-Absorbed**: There are 3 methods of treatment of under-absorption of works overheads. There was no opening balance in works overheads Ac Under-absorption of ₹ 8 lakhs is 4% of ₹ 205 lakhs total. It is a negligible amount. Adoption of supplementary rate is not required. Hence, it has been transferred to the debit of costing P & L A/c.

2. **Royalty Paid ₹ 5 Lakhs**: Assumed that it has been paid on the basis of production. Then it is a direct expense which is port of prime cost. Hence, it has been debited to WIP control A/c.

3. **Sales**   450

   Less: G. P. 20% on sales   <u>90</u>

   Cost of sales   <u>360</u>

Question – 4

A fire destroyed some accounting records of a company. You have been able to collect the following from the spoilt papers/records and as a result of consultation with accounting staff in respect of January:

(i) Incomplete Ledger Entries

Raw Material A/c			
	₹		₹
Beginning Inventory	32,000		

Work in Progress A/c			
	₹		₹
Beginning Inventory	9,200	Finished Stock	151000

Creditors A/c			
	₹		₹
Closing Balance	19,200	Opening Balance	16400

Manufacturing Overheads A/c			
	₹		₹
Amount Spent	29,600		

Finished Goods A/c			
	₹		₹
Opening Inventory	24,000	Closing Inventory	30000

(ii) Additional Information:

(a) The cash book showed that ₹ 89,200 have been paid to creditors for raw material

(b) Ending inventory of work in progress included material ₹ 5,000 on which 300 direct labour hours have been booked against wages and overheads

(c) The job card showed that workers have worked for 7,000 hours. The wage rate is ₹ 10 per labour hour.

(d) Overhead recovery rate was ₹ 4 per direct labour hour.

You are required to complete the above accounts in the cost ledger of the company.

Solution

Raw Material Control A/c

To Balance b/d	32,000	By Work-in-progress	53,000
To Creditors	92,000	By Balance c/d (B/F)	71,000
	1,24,000		1,24,000

Work in Progress Control A/c (WIP)

To Balance b/d	9,200	By Finished Goods Ledger Control		1,51,000
To Raw Material Control (B/F)	53,000	By Balance c/d		
To Wages Control (7,000 × 10)	70,000	Material	5,000	
To Manufacturing Overhead	28,000	Wages (300×10)	3,000	
		Overheads (300×4)	1,200	9,200
	1,60,200			1,60,200

Creditors A/c

To Bank	89,200	By Balance b/d	16,400
To Balance c/d	19,200	By Material (Purchase) (B/F)	92,000
	1,08,400		1,08,400

Manufacturing Overheads A/c

To Amount Spent	29,600	By Work-in-progress (7,000×4)	28,000
		By P&L (B/F)	1,600
	29,600		29,600

Finished Goods A/c

To Opening inventory	24,000	By Cost of Sales (B/F)	1,45,000
To Work-in-progress	1,51,000	By Closing Inventory	30,000
	1,75,000		1,75,000

Question – 5

R Ltd. showed a Net profit of ₹ 3,60,740 as per their cost accounts for the year ended 31st March, 2021. The following information was revealed as a result of scrutiny of the figures from the both sets of accounts.

Sr. No.	Particulars	(₹)
i.	Over recovery of selling overheads in cost accounts	10,250
ii.	Over valuation of closing stock in cost accounts	7,300
iii.	Rent received credited in financial accounts	5,450
iv.	Bad debts provided in financial accounts	3,250
v.	Income tax provided in financial accounts	15,900
vi.	Loss on sale of capital asset debited in financial accounts	5,800
vii.	Under recovery of administration overheads in cost accounts	3,600

Required to prepare a reconciliation statement showing the profit as per financial records.

Solution

Reconciliation Statement

Particulars	+ (₹)	- (₹)
Profit as per cost accounts	3,60,740	-
Add: Over recovered selling OHs	10,250	-
Less: Over valued closing stock in cost accounts	-	7,300
Add: Rent received credited in financial accounts	5,450	-
Less: Bad Debts provided in financial accounts	-	3,250
Less: Income tax provided in financial accounts	-	15,900
Less: Loss on sale of capital assets in financial accounts	-	5,800
Less: Under recovered administration overheads in cost	-	3,600
	3,76,440	35,850

Loss as per financial account		-	3,40,590

Question – 6

The following information has been obtained from financial accounting and cost accounting records.

	Financial Accounting (₹)	Cost Accounting (₹)
(i) Factory overhead	94,750	90,000
(ii) Administrative overhead	60,000	57,000
(iii) Selling overhead	55,000	61,000
(iv) Opening stock	17,500	22,500
(v) Closing stock	12,500	15,000

Required: Indicate under-recovery and over-recovery and their effects on cost accounting profit.

[Note: You are not required to prepare reconciliation statement]

Solution

	Financial Accounting (₹)	Cost Accounting (₹)	Difference (₹)	Under/Over recovery	Effect on cost accounting profit	Net effect on cost accounting profit*
Factory overheads	94,750	90,000	4,750	Under-recovery	Increased	To be reduced or deducted
Administrative overheads	60,000	57,000	3,000	Under-recovery	Increased	To be reduced or deducted
Selling overheads	55,000	61,500	-6,500	Over-recovery	Decreased	To be added
Opening stock	17,500	22,500	-5,000	Over valuation	Decreased	To be added
Closing stock	12,500	15,000	-2,500	Over valuation	Increased	To be reduced or deducted

*Taking cost accounting profit as base

Question – 7

The profit and loss account of ABC Ltd. for the year ended 31st March, 2021 is given below:

Profit and Loss Account

(for the year ended 31st March, 2021)

To Direct Material	6,50,000	By Sales	15,00,000
To Direct Wages	3,50,000	(15,000 units)	
To Factory overheads	2,60,000	By Dividend received	9,000
To Administrative overheads	1,05,000		

To Selling overheads	85,000		
To loss on sale of investments	2,000		
To Net Profit	57,000		
	15,09,000		**15,09,000**

- Factory overheads are 50% fixed and 50% variable
- Administrative overheads are 100% fixed
- Selling overheads are completely variable
- Normal production capacity of ABC Ltd. is 20,000 units
- Indirect expenses are absorbed in the cost accounts on the basis of normal production capacity.
- Notional rent of own premises charged in cost accounts is amounting to ₹ 12,000.

You are required to:

(i) Prepare a cost sheet and ascertain the Profit as per cost Records for the year ended 31st March, 2021.

(ii) Reconcile the profit as per Financial records with Profit as per Cost Records.

Solution

(i)   **Cost Sheet**

Particulars		Amount
Raw material consumed		6,50,000
Direct wages		3,50,000
Prime Cost		10,00,000
Add: Fixed factory overheads $\left(\frac{2,60,000\times50\%}{20,000}\times 15,000\right)$	97,500	
Add: Variable factory overheads (2,60,000 × 50%)	1,30,000	2,27,500
Add: Notional rent of own premises		12,000
GFC/NFC/COP/COGS		12,39,500
Add: Administrative overheads $\left(\frac{1,05,000}{20,000}\times 15,000\right)$		78,750
Add: selling & Distribution overheads		85,000
Cost of Sales		14,03,250
Add: Profit (Balancing figure)		96,750
Sales		15,00,000

(ii)   **Reconciliation Statement**

Particulars	+ (₹)	- (₹)
Profit as per P&L Account	57,000	-
Add: Under recovered factory overheads (2,60,000 – 2,27,500)	32,500	-
Less: Notional rent of own premises	-	12,000

Add: Under recovered administrative overheads (1,05,000 – 78,750)	26,250	-
Add: Loss on sale of investment	2,000	-
Less: Dividend received	-	9,000
Total	1,17,750	21,000
Profit as per Cost Account	96,750	-

Question – 8

The financial books of a company reveal the following data for the year ended 31st March, 2021:

Particulars	₹
Opening Stock:	
Finished goods 625 units	53,125
Work-in-process	46,000
01.04.2020 to 31.03.2021	
Raw materials consumed	8,40,000
Direct labour	6,10,000
Factory overheads	4,22,000
Administration overheads (production related)	1,98,000
Dividend paid	1,22,000
Bad Debts	18,000
Selling and Distribution Overheads	72,000
Interest received	38,000
Rent received	46,000
Sales 12,615 units	22,80,000
Closing stock: Finished goods 415 units	45,650
Work-in-process	41,200

The cost records provide as under:

➢ Factory overheads are absorbed at 70% of direct wages

➢ Administration overheads are recovered at 15% of factory cost

➢ Selling and distribution overheads are charged at ₹ 3 per unit

➢ Opening stock of finished goods is valued at ₹ 120 per unit

➢ The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

(a) Prepare a statement for the year ended 31st March, 2021. Show
   ➢ The profit as per financial records
   ➢ The profit as per costing records

(b) Prepare a statement reconciling the profit as per costing records with the profit as per Financial Records.

Solution

(a) **Statement of Profit as per Financial Records**

Particulars	₹	Particulars	₹
To Opening stock of Finished goods	53,125	By Sales	22,80,000
To work-in-process	46,000	By Closing stock of Finished Goods	45,650
To Raw materials consumed	8,40,000	By Work-in-process	41,200
To Direct labour	6,10,000	By Rent received	46,000
To Factory overheads	4,22,000	By Interest received	38,000
To Administration overheads	1,98,000		
To Selling & Distribution overheads	72,000		
To Dividends paid	1,22,000		
To Bad Debts	18,000		
To Profit	69,725		
	24,50,850		24,50,850

Units produced = Units sold + Closing stock – opening stock = 12,615 + 415 – 625 = 12,405

Statement of Profit as per Costing Records

Particulars	₹
Raw material consumed	8,40,000
Direct labour	6,10,000
Prime cost	14,50,000
Factory overheads (6,10,000×70%)	4,27,000
Factory cost	18,77,000
Add: Opening WIP	46,000
Less: Closing WIP	(41,200)
Factory cost of goods purchased	18,81,800
Add: Administration overheads (15% × 18,81,800)	2,82,270
Cost of Production	21,64,070
Add: Opening stock (625 × 120)	75,000
Less: Closing stock $\left(\frac{21,64,070}{12,405} \times 415\right)$	(72,397)
Cost of goods sold	21,66,673
Selling and distribution overheads (12,615 × 3)	37,845
Cost of sales	22,04,518
Profit (Bal. fig.)	75,482
Sales	22,80,000

(b) Reconciliation Statement

Particulars	+ (₹)	- (₹)
Profit as per cost accounts	75,482	-
Add: Over absorbed administration overheads	84,270	-
Add: Over-valued opening stock of finished goods	21,875	-
Add: Interest received	38,000	-
Add: Rent received	46,000	-
Add: Factory overheads over absorbed	5,000	-
Less: Selling & distribution overheads under recovered	-	34,155
Less: closing stock overvalued	-	26,747
Less: Dividend	-	1,22,000
Less: Bad debts	-	18,000
	2,70,627	2,00,902
Profit as per financial accounts	69,725	-

Note – It is assumed that administration overheads are related to production.

SERVICE COSTING - CONCEPTS

1. **Service Costing**

   It can be internally or externally.

   Industries will have high fixed cost than variable cost

   Requires huge investment and comparatively less variable cost

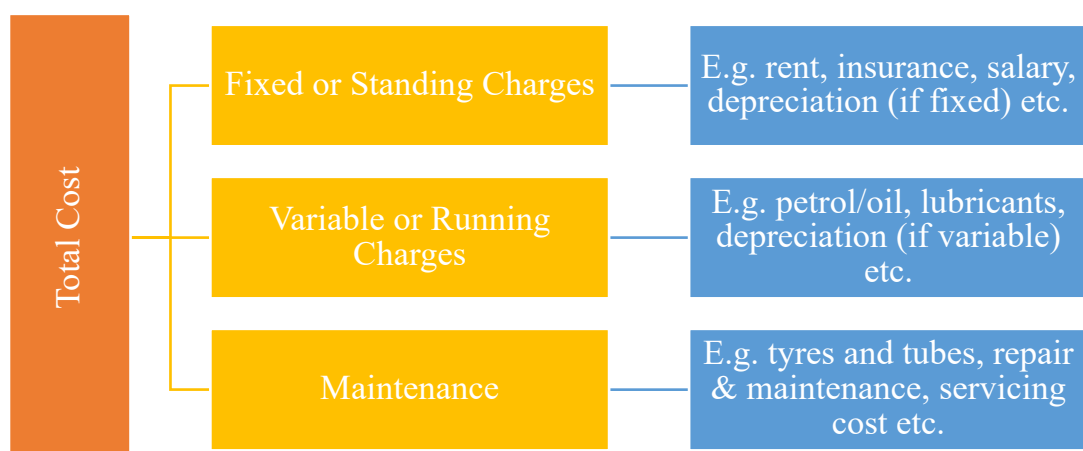2. **Cost Unit**

   The terms in which costs are expressed.

Cost Unit	Single Cost Unit	Where only one unit is involved e.g. kg, dozen etc.
	Multiple or Composite Cost Unit	Where more than 1 units are involved e.g. passenger-km, ton-km etc.
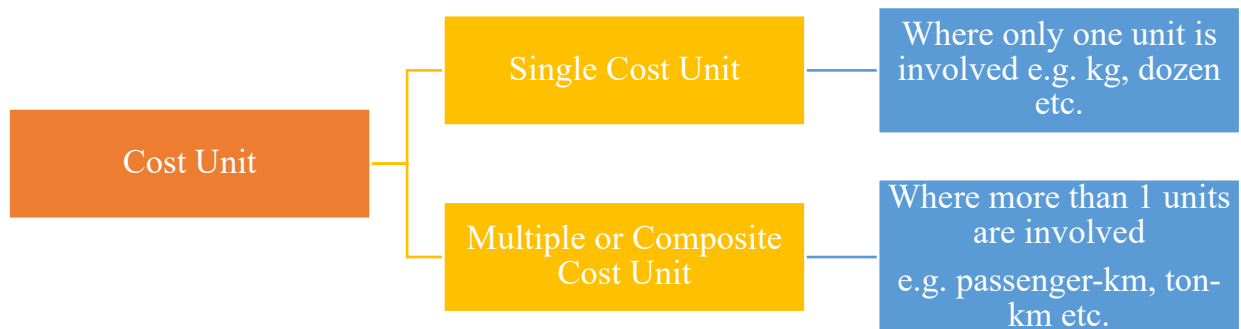
3. **Cost Unit**

   (A) **Absolute Ton-km** = Actual kms × Actual tons

   (B) **Commercial Ton-km** = Actual kms × Average tons

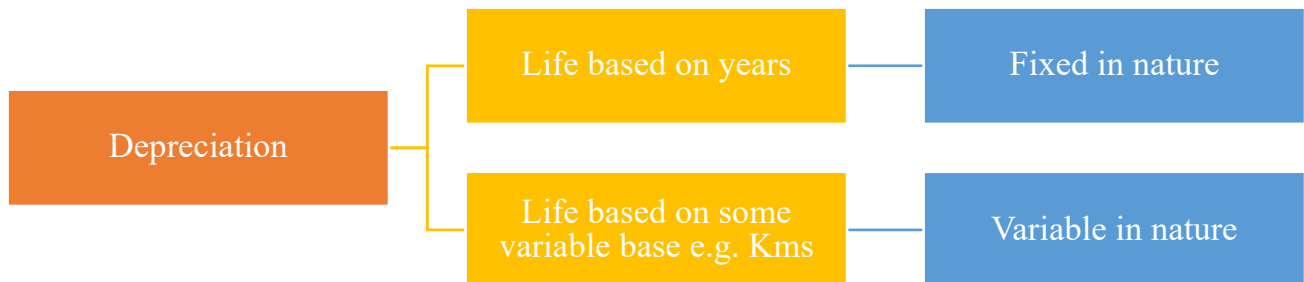4. **Effective Cost Unit** = Total units – Normal loss units

5. **Total Cost**

Total Cost	Fixed or Standing Charges	E.g. rent, insurance, salary, depreciation (if fixed) etc.
	Variable or Running Charges	E.g. petrol/oil, lubricants, depreciation (if variable) etc.
	Maintenance	E.g. tyres and tubes, repair & maintenance, servicing cost etc.

6. Cost Per Unit $= \dfrac{Total\ cost}{Effective\ cost\ unit}$

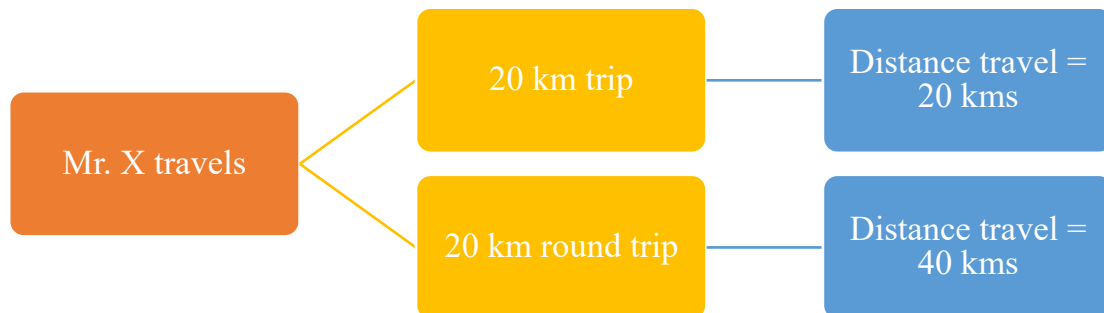**7. Points To Remember (PTRs)**

(A) Petrol, oil and similar charges are always on the basis of actual km travel

(B) Treatment of Depreciation

Depreciation	Life based on years	Fixed in nature
	Life based on some variable base e.g. Kms	Variable in nature

(C) Treatment of Distance

Mr. X travels	20 km trip	Distance travel = 20 kms
	20 km round trip	Distance travel = 40 kms

(D) Calculation of Service Cost

Service cost of Rs. 4,000 after every 3000 kms.

If actual kms travel; = 3,500;	If actual kms travel; = 8,500;
No. of service = 3500/3000 = 1.17 or 1	No. of service = 8500/3000 = 2.83 or 2
Cost = 4000 × 1 = 4,000	Cost = 4000 × 2 = 8,000

(E) In case of different charges for different categories of service, use the concept of equivalent unit of services.

SERVICE COSTING – QUESTIONS

Question – 1

Mr. S owns a bus which runs according to the following schedule:

(a) Delhi to Panchkula and back, the same day

Distance covered: 150 kms one way

Number of days run each month: 8

Seating capacity occupied 90%

(b) Delhi to Mathura and back, the same day

Distance covered: 120 kms one way

Number of days run each month: 10

Seating capacity occupied 85%

(c) Delhi to Alwar and back, the same day

Distance covered: 270 kms one way

Number of days run each month: 6

Seating capacity occupied 100%

(d) Following are the other details:

Cost of the bus	₹ 6,00,000
Salary of the driver	₹ 2,800 p.m.
Salary of the conductor	₹ 2,200 p.m.
Salary of the part-time accountant	₹ 200 p.m.
Insurance of the bus	₹ 4,800 p.a.
Diesel consumption 4 kms per litre	₹ 6 per litre
Road tax	₹ 1,500 p.a.
Lubricant oil	₹ 10 per 100 kms
Permit fee	₹ 315 p.m.
Repairs and maintenance	₹ 1,000 p.m.
Depreciation of the bus	@ 20%p.a.
Seating capacity of the bus	50 persons

Passenger tax is 20% of the total takings. Calculate the bus fare to be charges from each passenger to earn a profit of 30% on total takings. The fares are to be indicated per passenger for the journeys:

(i) Delhi to Panchkula; (ii) Delhi to Mathura; and (iii) Delhi to Alwar

Solution

Calculation of Passenger Kms

	No.	×	Kms	×	Passenger	=	Passenger Kms
Delhi – Panchkula	1	×	150 × 2 × 8	×	50 × 90%	=	1,08,000
Delhi – Mathura	1	×	120 × 2 × 10	×	50 × 85%	=	1,02,000

Delhi – Alwar	1	×	270 × 2 × 6	×	50 × 100%	=	1,62,000
					Total		3,72,000

Kms travel = (1 × 150 × 2 × 8) + (1 × 120 × 2 × 10) + (1 × 270 × 2 × 6) = 8,040 kms

Statement of Operating Cost

Particulars	Amount (₹)
Fixed Cost:	
Depreciation (6,00,000 × 20% × 1/12)	10,000
Driver salary	2,800
Conductor Salary	2,200
Accountant salary	200
Insurance (4,800 × 1/12)	400
Road Tax (1,500 × 1/12)	125
Permit Fee	315
Total Fixed Cost (A)	16,040
Variable Cost:	
Diesel [8,040 × (6/4)]	12,060
Lubricating oil [8,040 × (10/100)]	804
Total Variable Cost (B)	12,864
Maintenance Cost:	
Repair & Maintenance	1,000
Total Maintenance Cost (B)	1,000
Total Cost (A + B + C)	29,904
(+) Passenger tax (59,808 × 20%)	11,962
(+) Profit (59,808 × 30%)	17,942
Total Takings (29,904 ÷ 50%)	59,808
Effective Passenger km	3,72,000
Takings per effective passenger km	**0.16**

Fares per passenger for the journey

Delhi to Panchkula = 150 × 0.16 = ₹ 24

Delhi to Mathura = 120 × 0.16 = ₹ 19.20

Delhi to Alwar = 270 × 0.16 = ₹ 43.20

Question – 2

SK is a public school having five buses each plying on different directions for the transport of its school students. In view of a large number of students available of the bus service the buses work two shifts daily both in the morning and in afternoon. The buses are garaged in the school. The work load of the students has been so arranged that in the morning the first trip picks up the senior students and the second trip plying an hour later picks up the junior students. Similarly, in the afternoon the first trip picks the junior students and an hour later the second trip takes the senior student home.

The distance travelled by each bus one way is 8 kms. The school works 25 days in a month and remains closed for the vacation in May, June and December. Bus fee however is payable by the students for all the 12 months of the year.

The details of expenses for a year are as under:

Drivers' salary	₹ 450 per month per driver
Cleaners' salary	₹ 350 per month

(Salary payable for 12 months and one cleaner employed for all the five buses)

License fee, taxes etc.	₹ 860 per bus per annum
Insurance	₹ 1,000 per bus p.a.
Repairs and maintenance	₹ 3,500 per bus p.a.
Purchase price of bus (life 12 years)	₹ 1,50,000 each
Scrap value	₹ 30,000
Diesel cost	₹ 2.00 per litre

Each bus gives an average mileage of 4 km per liter of diesel.

Seating capacity of each bus is 50 students. The seating capacity is fully occupied during the whole year. Students picked up and dropped within a range upto 4 km of distance from the school are charged half fare and fifty percent of students travelling in each trip are in this category. Ignore interest since the charges are to be based on average cost.

You are required to:

(a) Prepare a statement showing the expenses of operating a single bus and the fleet of five buses for a year.

(b) Work out the average cost per student per month in respect of

(i) Students coming from a distance of upto 4 km from the school and

(ii) Students coming from a distance of beyond 4 km from the school

Solution

(a) Statement of Cost

Particulars	1 bus	5 buses
Driver salary	450 × 12 = 5,400	5,400 × 5 = 27,000
Cleaner salary	4,200 ÷ 5 = 840	350 × 12 = 4,200
License etc.	860	860 × 5 = 4,300
Insurance	1,000	1,000 × 5 = 5,000
Repair & Maintenance	3,500	3,500 × 5 = 17,500
Depreciation	(1,50,000 – 30,000)÷12 = 10,000	10,000 × 5 = 50,000
Diesel (w.n. – 1)	7,200	7,200 × 5 = 36,000
Total	**28,800**	**1,44,000**

Working note 1

Number of round trips in a day = 8

Total kms in a day = 8 × 8 = 64

Total kms per annum = 64 × 25 × 9 = 14,400

Diesel cost per annum per bus = 14,400 × (2/4) = ₹ 7,200

(b) Number of students from whom bus fee is receivable = 100

Half fee students per bus = 100 × 50% = 50

Full fee students per bus = 100 × 50% = 50

Full fee students equivalent to half fee students = 50 × 2 = 100

Total equivalent half fee students = 50 + 100 = 150

Total cost per bus per annum = ₹ 28,800

Total cost per bus per month = 28,800 ÷ 12 = ₹ 2,400

Total cost per month per half fee students = 2,400 ÷ 150 = ₹ 16

Total cost per month per full fee students = 16 × 2 = ₹ 32

Question – 3	

A company is considering three alternative proposals for conveyance facilities for its sales personnel who have to do considerable travelling, approximately 20,000 kms every year. The proposal are as follows:

   (i)   Purchase and maintain its own fleet of cars. The average cost of a car is ₹ 1,00,000

  (ii)   Allow the executive use his own car and reimburse expenses at the rate of ₹ 1.60 paise per kilometer and also bear insurance costs.

 (iii)   Hire cars from an agency at ₹ 20,000 per year per car. The company will have to bear costs of petrol, taxes and tyres.

The following further details are available:

Petrol ₹ 0.60 per km

Repairs and maintenance ₹ 0.20 per km

Tyre ₹ 0.12 per km

Insurance ₹ 1,200 per car per annum;

Taxes ₹ 800 per car per annum

Life of the car: 5 years with annual mileage of 20,000 kms

Resale value: ₹ 20,000 at the end of the fifth year

Work out the relative costs of three proposals and rank them.

Solution

Particulars	Own car	Executive car	Hire car
Fixed Cost:			
Depreciation [(1,00,000 – 20,000) ÷ 5]	16,000	-	-
Insurance	1,200	1,200	-
Taxes	800	-	800
Hire charges	-	-	20,000
Total Fixed cost	18,000	1,200	20,800

Particulars	Own car	Executive car	Hire car
Kms travel	20,000	20,000	20,000
Fixed cost per km (A)	0.90	0.06	1.04
Variable Cost per km:			
Petrol	0.60	-	0.60
Repair & Maint.	0.20	-	-
Tyres	0.12	-	0.12
Reimbursement	-	1.60	-
Total variable cost per km (B)			
Total cost per km (A + B)	**1.82**	**1.66**	**1.76**
Rank	**III**	**I**	**II**

Question – 4

Mr. SK now spends ₹ 0.90 per km on taxi for his clients' work. He is considering two other alternatives, the purchase of a new nano car or an old innova car. The estimated cost figures are:

Items	New Car	Old Car
Purchase price	35,000	20,000
Sale price, after 5 years	19,000	12,000
Repairing and servicing, per annum	1,000	1,200
Taxes and Insurance per annum	1,700	700
Petrol consumption per litre	10 km	7 km
Petrol price per litre	3.50	3.50

He estimates that he goes 10,000 km annually. Which of the three alternatives will be cheaper? If his practice expands and he has to go 19,000 km per annum, what should be his decision? At how many kms per annum will the cost of the two cars break even and why? Assume petrol only as variable cost. Ignore interest and income tax.

Solution

Statement of operating cost

Particulars	New Car	Old Car	Taxi
Fixed cost:			
Depreciation	(35,000–19,000)÷5 = 3,200	(20,000–12,000)÷5 = 1,600	-
Repairs	1,000	1,200	-
Taxes and Insurance	1,700	700	-
Total Fixed cost (A)	5,900	3,500	-
Variable Cost:			
Petrol	10,000 × (3.50/10) = 3,500	10,000 × (3.50/7) = 5,000	-
Fare	-	-	0.90×10,000 = 9,000

Total Variable cost (B)	3,500	5,000	9,000
Total cost (A + B)	9,400	5,000	9,000

∴ Recommended to purchase old Innova car for travel upto 10,000 kms.

Statement of operating cost

Particulars	New Car	Old Car	Taxi
Total Fixed cost	5,900	3,500	-
Total variable cost	19,000 × (3.50/10)=6,650	19,000 × (3.50/7)=9,500	0.90×19,000 = 17,100
Total cost	12,550	13,000	17,100

∴ Recommended to purchase New car for travel upto 19,000 kms.

Let at 'y' kms, cost of the two options will become equal.

Total cost of New car = Total cost of Old car

$5,900 + (y)(3.5/10) = 3,500 + (y)(3.5/7)$

y = 16,000 kms

Question – 5

Coal is transported from two mines X & Y and unloaded at plots in a railway station. X is at distance of 15 kms and Y is at a distance of 20 kms from the rail head plots. A fleet of lorries having carrying capacity of 4 tonnes is used to transport coal from the mines. Records reveal that average speed of the lorries is 40 kms per hour when running and regularly take 15 minutes to unload at the rail hear. At Mine X average loading time is 30 minutes per load, while at mine Y average loading time is 25 minutes per load.

Additional information:

Drivers' wages, depreciation, insurance and taxes, etc. ₹ 12 per hour

Operated Fuel, oil tyres, repairs and maintenance, etc. ₹ 1.60 per km

You are required to prepare a statement showing the cost per tonne kilometer of carrying coal from each mine 'X and 'Y'.

Solution

Calculation of Ton Kms

	No.	×	Kms	×	Ton	=	Ton Kms
Plot to X	1	×	15	×	0	=	0
X to plot	1	×	15	×	4	=	60
					Total	=	60

Kms travel = (1 ×1 5) + (1 × 15) = 30

Calculation of Ton Kms

	No.	×	Kms	×	Ton	=	Ton Kms
Plot to Y	1	×	20	×	0	=	0

Y to Plot	1	×	20	×	4	= 80
					Total	= 80

Kms travel = (1 × 20) + (1 × 20) = 40

Statement to time (in minutes)

Particulars	X	Y
Travel time	30×(60/40) = 45	40×(60/40) = 60
Loading time	30	25
Unloading time	15	15
Total time	90	100

Statement of operating cost

Particulars	X	Y
Fixed cost	90×(12/60) = 18	100×(12/60) = 20
Variable cost	1.60×30 = 48	1.60×40 = 64
Total Cost	66	84
Ton-Kms	60	80
Total cost per ton-km	1.10	1.05

Question – 6

SK Transport Ltd. charges ₹ 90 per ton for its 6 tons truck lorry load from city 'A' to city 'B'. The charges for the return journey are ₹ 84 per ton. No concession or reduction in these rates is made for any delivery of goods at intermediate station 'C'. In January, the truck made 12 outward journeys for city 'B' with full load out of which 2 ton were unloaded twice in the way at city 'C'. The truck carried a load of 8 tons in its return journey for 5 times but once caught by police and ₹ 1,200 was paid as fine. For the remaining trips the truck carried full load out of which all the goods on load were unloaded once at city 'C'.

The distance from city 'A' to city 'C' and city 'B' are 140 kms and 300 kms respectively. Annual fixed cost and maintenance charges are ₹ 60,000 and ₹ 12,000 respectively. Running charges spent during January, are ₹ 2,944. You are required to find out the cost per absolute ton-km and the profit for January.

Solution

Calculation of Ton Kms

	No.	×	Kms	×	Ton	=	Ton Kms
A to B	10	×	300	×	6	=	18,000
A to C	2	×	140	×	6	=	1,680
C to B	2	×	160	×	4	=	1,280
B to A	5	×	300	×	8	=	12,000
B to C	1	×	160	×	6	=	960

C to A	1	×	140	×	0	=	0	
B to A	6	×	300	×	6	=	10,800	
				Total		=	44,720	

Statement of operating cost

Particulars	Amount (₹)
Fixed charges (60,000 ÷ 12)	5,000
Maintenance charges (12,000 ÷ 12)	1,000
Running charges	2,944
Total Cost	8,944
Ton-Km	44,720
Total cost per ton-km	0.20

Statement of Profit

Particulars		Amount (₹)
Revenue:		
Outward	10 × 6 × 90 = 5,400	
	2 × 6 × 90 = 1,080	
Return	5 × 8 × 84 = 3,360	
	1 × 6 × 84 = 504	
	6 × 6 × 84 = 3,024	13,368
Less: Total cost		(8,944)
Less: Fine & Penalties		(1,200)
	Profit	3,224

Question – 7

A transport company has a fleet of three trucks of 10 tonnes, capacity each plying in different directions for transport of customer goods. The trucks run loaded with goods and return empty. The distance travelled, number trips made and the load carried per day by each truck are as under:

Truck No.	One way distance (Km)	No. of trips per day	Load carried per trip per day (tonnes)
1	16	4	6
2	40	2	9
3	30	3	8

The analysis of maintenance cost and the total distance traveled during the last two years is as under:

Year	Total distance traveled	Maintenance cost ₹
1	1,60,200	46,050
2	1,56,700	45,175

The following are the details of expenses for the last year under review:

Diesel : ₹ 10 per litre. Each liter gives 4 km per litre of diesel on average

Driver Salary	:	₹ 2,000 per month
License and taxes	:	₹ 5,000 per annum per truck
Insurance	:	₹ 5,000 per annum for all 3 vehicles
Purchase price per truck	:	₹ 3,00,000, Life 10 years, Scrap value at the end of life \ is ₹ 10,000
Oil and sundries	:	₹ 25 per 100 km run
General overhead	:	₹ 11,084 per annum

The vehicles operate 24 days per month on an average

Required:

(a) Prepare an Annual Cost Statement covering the fleet of three vehicles

(b) Calculate the cost per Km run

(c) Determine the freight rate per tonne km to yield a profit of 10% on freight

Solution

Calculation of Ton Kms

Truck No.	No.	×	Kms	×	Ton	=	Ton Kms
1	1	×	16 × 4 × 24 × 12	×	6	=	1,10,592
1	1	×	16 × 4 × 24 × 12	×	0	=	0
2	1	×	40 × 2 × 24 × 12	×	9	=	2,07,360
2	1	×	40 × 2 × 24 × 12	×	0	=	0
3	1	×	30 × 3 × 24 × 12	×	8	=	2,07,360
3	1	×	30 × 3 × 24 × 12	×	0	=	0
					Total	=	5,25,312

Total kms travelled = 1,34,784 kms

(a)   **Statement of Operating Cost**

Particulars	Amount (₹)
Fixed Cost:	
Driver salary (2,000 × 12 × 3)	72,000
License and tax (5,000 × 3)	15,000
Insurance	5,000
Depreciation $\left[\frac{(3,00,000-10,000)}{10} \times 3\right]$	87,000
General overheads	11,084
Total Fixed Cost (A)	1,90,084
Variable Cost:	
Diesel [1,34,784 × (10/4)]	3,36,960
Oil & Sundries [1,34,784 × (25/100)]	33,696
Total Variable Cost (B)	3,70,656
Maintenance Cost:	

Particulars	Amount (₹)
Maintenance Cost (working note – 1)	39,696
Total Maintenance Cost (B)	39,696
Total Cost (A + B + C)	6,00436

Working Note 1

Variable maintenance cost per km = $\frac{Difference\ in\ total\ cost}{Difference\ in\ kms} = \frac{46,050-45,175}{1,60,200-1,56,700} = ₹\ 0.25$

Fixed maintenance cost = Total cost – Variable cost = 45,175 – (1,56,700)(0.25) = ₹ 6,000

Maintenance cost = Fixed cost + variable cost = 6,000 + (1,34,784)(0.25) = ₹ 39,696

(b) Total cost per km = $\frac{Total\ cost}{Kms} = \frac{6,00,436}{1,34,784} = ₹\ 4.45$

(c) Cost per ton-km $\left(\frac{6,00,436}{1,34,784}\right)$ = 1.143

Profit per ton-km (1.27 × 10%) = 0.127

Freight per ton-km (1.143 ÷ 90%) = 1.270

Question – 8	

SK Hospital runs a Critical Care Unit (CCU) in a hired building. CCU consists of 35 beds and 5 more beds can be added, if required.

Rent per month	-	₹ 75,000
Supervisors (2 persons)	-	₹ 25,000 per month – each
Nurse (4 persons)	-	₹ 20,000 per month – each
Ward Boys (4 persons)	-	₹ 5,000 per month – each

Doctors paid ₹ 2,50,000 per month – paid on the basis of number of patients attended and the time spent by them.

Other expenses for the year are as follows:

Repair (Fixed)	-	₹ 81,000
Food to patients (variable)	-	₹ 8,80,000
Other services to patients (variable)	-	₹ 3,00,000
Laundry charges (variable)	-	₹ 6,00,000
Medicines (variable)	-	₹ 7,50,000
Other fixed expenses	-	₹ 10,80,000
Administration expenses allocated	-	₹ 10,00,000

It was estimated that for 150 days in a year 35 beds are occupied and for 80 days only 25 beds are occupied.

The hospital hired 750 beds at a charge of ₹ 100 per bed per day, to accommodate the flow of patients. However, this does not exceed more than 5 extra beds over and above the normal capacity of 35 beds on any day.

You are required to:

(a) Calculate profit per paitent day, if the hospital recovers on an average ₹ 2,000 per day from each patient.

(b) Find out breakeven point for the hospital.

Solution

(a) Effective bed days = (150 × 35) + (80 × 25) + 750 = 8,000

Statement of Profit

Particulars	Amount (₹)
Variable Cost:	
Doctor cost (2,50,000 × 12)	30,00,000
Food to patients	8,80,000
Other services to patients	3,00,000
Laundry charges	6,00,000
Medicines	7,50,000
Bed Charges (750 × 100)	75,000
Total Fixed Cost (A)	56,05,000
Fixed Cost:	
Rent (75,000 × 12)	9,00,000
Supervisor (25,000 × 12 × 2)	6,00,000
Nurse (20,000 × 12 × 4)	9,60,000
Ward boys (5,000 × 12 × 4)	2,40,000
Repair	81,000
Other fixed expenses	10,80,000
Administration expenses	10,00,000
Total Variable Cost (B)	48,61,000
Total Cost (A + B)	1,04,66,000
Revenue (8,000 × 2,000)	1,60,00,000
Profit	55,34,000

Profit per patient day $= \dfrac{55,34,000}{8,000} = ₹\ 691.75$

(b) Contribution = Revenue – Variable cost = ₹ 1,60,00,000 – ₹ 56,05,000 = ₹ 1,03,95,000

Contribution per patient day $= \dfrac{1,03,95,000}{8,000} = ₹\ 1,299.375$

Break-even point $= \dfrac{Fixed\ cost}{Contribution\ per\ patient\ day} = \dfrac{48,61,000}{1,299.375} = 3,741$ patient days

Question – 9	

RST Toll Plaza Limited built an 80-kilometer-long highway between two cities and operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that 50,000 light weight, 12,000 medium weight and 10,000 heavy weight vehicles will be using the highway in one month in outward journey and the same number for return journey.

As per government notification, vehicles used for medical emergencies, Members of Parliament, and essential services are exempt from toll charges. It is estimated that 10% of light weight vehicles will pass the highway for such use.

It is the policy of the company that if vehicles return within 24 hours of their outward journey, the toll fare will be reduced by 25 percent automatically. It is estimated that 30% of chargeable light weight vehicles return within the specified time frame.

The toll charges for medium weight vehicles is to be fixed as 2.5 times of the light weight vehicles and that of heavy weight vehicles as 2 times of the medium weight vehicles.

The toll and maintenance cost for a month is ₹ 59,09,090. The company requires a profit of 10% over the total cost to cover interest and other costs.

Required:

(i)   Calculate the toll rate for each type of vehicle if concession facilities are not available on the return journey.

(ii) Calculate the toll rate that will be charged from light weight vehicles if a return journey concession facility is available, assuming that the revenue earned from light weight vehicles calculated in option (i) remains the same.

Solution
Working Notes:

(1) Calculation of equivalent number of light vehicles

Type of vehicles	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A+B)×C]
Light weight	45,000*	45,000	1	90,000
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,50,000

*50,000 light vehicles less 10% exempted vehicles.

(2) Calculation of equivalent number of light weight vehicles

Type of vehicles	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A+B)×C]
Light weight	45,000*	41,625 (45,000 – [45,000 × 30% × 25%)]	1	86,625
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,46,625

(i) Toll rate per vehicle $= \frac{Total\ cost\ to\ cover}{Equivalent\ type\ of\ vehicles} = \frac{(59,09,090+10\%)}{2,50,000} = \frac{65,00,000}{2,50,000} = ₹ 26$

Toll rate for light weight vehicle = ₹ 26

Toll rate for medium weight vehicle = ₹ 26 × 2.5 = ₹ 65

Toll rate for heavy weight vehicle = ₹ 26 × 5 = ₹ 130

(ii) Revenue from light weight vehicle in (i) above = 90,000 vehicles × ₹ 26 = ₹ 23,40,000

New toll rate to maintain the same revenue from Light weight vehicle $= \frac{23,40,000}{86,625} = ₹ 27.01$

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = ₹ 20.26

Toll to be charged from light weight vehicles if concession applicable

Revenue share in light vehicles = 90,000 × 26 = ₹ 23,40,000

Suppose rate is x,

then outward journey 45,000 x;

return journey (45,000 – 30% of 45,000) + 13,500(x – 0.25)

45,000x + 31,500x + 13,500(0.75x) = 23,40,000

Toll rate to be charged from light weight vehicles: 86,625x = 23,40,000

X = ₹ 27.01

Rate to be charged from 76,500 light weight vehicles @ ₹ 27.01; revenue will be ₹ 20,66,494

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26

Revenue will be ₹ 2,73,506

Question – 10	

Following are the data pertaining to SK Pvt. Ltd. for the year:

Particulars	Amount (₹)
Salary to Software Engineers (5 persons)	15,00,000
Salary to Project Leader (2 persons)	9,00,000
Salary to Project Manager	6,00,000
Repairs & Maintenance	3,00,000
Administration Overheads	12,00,000

The company executes a Project PK, the details of the same are as follows:

Project duration – 6 months

One Project Leader and three Software Engineers were involved for the entire duration of the project, whereas Project Manager spends 2 months' efforts, during the execution of the Project.

Travel expenses incurred for the project – ₹ 1,87,500

Two laptops were purchased at a cost of ₹ 50,000 each, for use in the project and the life of the same is estimated to be 2 years.

Prepare project cost sheet.

Solution

Project Cost Sheet

Particulars	Amount
Salary of software engineer (15,00,000 × 3/5 × 6/12)	4,50,000
Salary of project leader (9,00,000 × ½ × 6/12)	2,25,000
Salary of project manager (6,00,000 × 2/12)	1,00,000
Total salary	7,75,000
Travel expenses	1,87,500
Depreciation (50,000 × 2 × ½ × 6/12)	25,000
Overheads (50% × 7,75,000)	3,87,500
Total Project cost	13,75,000

Working Note:

Total overheads = 3,00,000 + 12,00,000 = ₹ 15,00,000

Total Salary = 15,00,000 + 9,00,000 + 6,00,000 = ₹ 30,00,000

Overheads recovery rate = $\frac{Overheads}{Salary} \times 100 = \frac{15,00,000}{30,00,000} \times 100 = 50\%$ of salary

Question – 11	

A lodging home is being run in a small hill station with 50 single rooms. The home offers concessional rates during six off-season months in a year. During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending 31st March, (assume a month to be of 30 days):

(a) Occupancy during the season is 80%, while in the off season is 40% only:

(b) Expenses: ₹

   (1) Staff Salary (excluding room attendants)   2,75,000

   (2) Repairs to Buildings   1,30,500

   (3) Laundry & Linen   40,000

   (4) Interior and Tapestry   87,500

   (5) Sundry Expenses   95,400

(c) Annual depreciation is to be provided for buildings at 5% and on furniture and equipments at 15% on straight line basis:

(d) Room attendants are paid ₹ 5 per room day on the basis of occupancy of the rooms in a month

(e) Monthly lighting charges are ₹ 120 per room, except in four months of winter when it is ₹ 30 per room and this cost is on the basis of full occupancy for a month, and

(f) Total investment in the home is ₹ 100 lakhs of which ₹ 80 lakhs relate to buildings and balance for furniture and equipments.

You are required to compute the room rent per day both during the season and off season.

Solution

Computation of Effective room days

Season = (50 rooms × 80 / 100) × (6 × 30) days	=	7,200
Off-season = (50 rooms × 40 / 100) × (6 × 30) days	=	3,600
		10,800

Computation of Total Cost		₹
(1) Salary		2,75,000
(2) Repairs		1,30,500
(3) Laundry and Linen		40,000
(4) Interior Decoration		87,500
(5) Depreciation		
-Building (5% of 80,00,000)	4,00,000	
-Furniture & equipment (15% of 20,00,000)	3,00,000	7,00,000
Sundry Expenses		95,400
(6) Attendant's Salary (10,800 × 5)		54,000
(7) Lighting Charges		
- Season (7,200 days × ₹ 4) [₹ 120 p.m. means ₹ 4 per day]		28,800
- Off-Season		
Winter [3,600 × 4/6] × ₹ 1 [₹ 30 p.m. means Re.1 per day] (4 months)		2,400
Balance (3,600 × 2/6) × ₹ 4 (2 months)		4,800
Total Cost		14,18,400

Computation of Total Revenue	₹
Total Cost	14,18,400
(+) Profit (20% of revenue) (14,18,400 × 20/80) -	3,54,600
Total Revenue	17,73,000

Assume Rent per room per day during Season is ₹ X & during off season is ₹ X/2

Hence, total annual revenue = 7,200 X + 3,600 [X/2]   = 9,000 X

Now, 9,000 X = ₹ 17,73,000

X = 197 Hence, Rent per room per day

During Season = X = ₹ 197

During off-season = [X/2] = ₹ [197/2] = ₹ 98.50

Question – 12

ABC Bank is having a branch which is engaged in processing of 'Vehicle Loan' and 'Education Loan' applications in addition to other services to customers. 30% of the overhead costs for the branch are estimated to be applicable to the processing of 'Vehicle Loan' applications and 'Education Loan' applications each.

Branch is having four employees at a monthly salary of ₹ 50,000 each, exclusively for processing of Vehicle Loan applications and two employees at a monthly salary of ₹ 70,000 each, exclusively for processing of Education Loan applications.

In addition to above, following expenses are incurred by the Branch:

- Branch Manager who supervises all the activities of branch, is paid at ₹ 90,000 per month.
- Legal charges, Printing & stationery and advertising expenses are incurred at ₹ 30,000, ₹ 12,000 and ₹ 18,000 respectively for a month.
- Other expenses are ₹ 10,000 per month.

You are required to:

(a) Compute the cost of processing a Vehicle Loan application on the assumption that 496 Vehicle Loan applications are processed each month.

(b) Find out the number of Education Loan applications if the total processing cost per Education Loan Application is sale as in the Vehicle loan Application as computed in (i) above.

Solution

Particulars	Vehicle Loan Applications (₹)	Education Loan Applications (₹)	Total (₹)
Employee Cost	50,000 × 4 = 2,00,000	70,000 × 2 = 1,40,000	3,40,000
Apportionment of branch manager's salary	27,000	27,000	54,000
Legal charges, printing & stationary and advertising	18,000	18,000	36,000
Other expenses	3,000	3,000	6,000
Total cost	**2,48,000**	**1,88,000**	**4,36,000**

(a) Cost of processing vehicle loan application = $\frac{Total\ cost}{No.of\ applications} = \frac{2,48,000}{496} = ₹ 500$

(b) Cost of processing education loan application = $\frac{Total\ cost}{No.of\ applications}$

$500 = \frac{1,88,000}{No.of\ applications}$

No. of applications = $\frac{1,88,000}{500} = 376$

Question – 13

Parth Ltd. operates in insurance business. Previous year, the company launched a new term insurance policy called 'Max Jivan' and incurred the following expenditure throughout the year:

Particulars	Amount (₹)
Claim management cost	52,82,000
Facilities cost	6,49,82,000
Employees cost	2,25,18,000
Cost of marketing the policy	19,30,71,000
Policy development cost	4,86,50,000
Policy issuance cost	4,10,05,000
Policy servicing cost	13,40,65,500
Sales support expenses	4,44,80,000
Office administration cost	6,67,20,000
IT Cost	30,71,90,000
Postage and logistics	4,50,36,000

You are required to ascertain the cost of the policy 'Max Jivan' segregated into four main activities namely (a) Marketing and Sales support (b) Operations (c) I.T. Cost and (d) Support functions.

(a) Marketing and Sales support- ₹ 23,75,51,000, Operations - ₹ 22,90,02,500, I.T. Cost- ₹ 30,71,90,000 and Support functions- ₹ 19,92,56,500

(b) Marketing and Sales support- ₹ 28,62,01,000, Operations- ₹ 22,53,88,500, I.T. Cost- ₹ 30,71,90,000 and Support functions- ₹ 15,42,20,500

(c) Marketing and Sales support- ₹ 28,62,01,000, Operations- ₹ 18,03,52,500, I.T. Cost- ₹ 30,71,90,000 and Support functions- ₹ 19,92,56,500

(d) Marketing and Sales support- ₹ 24,17,21,000, Operations- ₹ 22,48,32,500, I.T. Cost- ₹ 30,71,90,000 and Support functions- ₹ 19,92,56,500

Question – 14

A LMV Pvt. Ltd., operates cab/car rental service in Delhi/NCR. It provides its service to the offices of Noida, Gurugram and Faridabad. At present it operates CNG fueled cars but it is also considering to upgrade these into Electric vehicles (EV). The details related with the owning of CNG & EV propelled cars are as tabulated below:

Particulars	CNG Car	EV Car
Car purchase price (₹)	9,20,000	15,20,000
Govt. subsidy on purchase of car (₹)	-	1,50,000
Life of the car	15 years	10 years
Residual value (₹)	95,000	1,70,000
Mileage	20 km/kg	240 km per charge
Electricity consumption per full charged	-	30 Kwh
CNG cost per Kg (₹)	60	-
Power cost per Kwh (₹)	-	7.60
Annual Maintenance cost (₹)	8,000	5,200

Annual insurance cost (₹)	7,600	14,600
Tyre replacement cost in every 5 year (₹)	16,000	16,000
Battery replacement cost in every 8 years (₹)	12,000	5,40,000

Apart from the above, the following are the additional information:

Particulars	
Average distance covered by a car in a month	1,500 km
Driver's salary (₹)	20,000 p.m.
Garage rent per car (₹)	4,500 p.m.
Share of office and administration cost per car (₹)	1,500 p.m.

You have been approached by the management of A LMV Pvt. Ltd. for consultation on the two options of operating the cab service. The expected questions that may be asked by the management are as follows:

Question - 1
What would be the depreciable value of CNG car and EV car respectively?
(a)   ₹ 13,50,000 and ₹ 14,40,000
(b)   ₹ 15,20,000 and ₹ 8,25,000
(c)   ₹ 8,25,000 and ₹ 14,40,000
(d)   ₹ 8,25,000 and ₹ 12,00,000

Question – 2
What would be the monthly cost of fuel and electricity for an CNG and EV care respectively?
(a)   ₹ 4,500 and ₹ 1,425
(b)   ₹ 1,500 and ₹ 4,500
(c)   ₹ 1,525 and ₹ 1,450
(d)   ₹ 1,525 and ₹ 1,425

Question – 3
What would be the total cost to be incurred for replacement of tyres for CNG and EV care respectively?
(a)   ₹ 32,000 and ₹ 24,000
(b)   ₹ 12,000 and ₹ 32,000
(c)   ₹ 32,000 and ₹ 16,000
(d)   ₹ 16,000 and ₹ 12,000

Question – 4
What would be the total cost to be incurred for replacement of battery for CNG and EV car respectively?
(a)   ₹ 5,40,000 and ₹ 12,000
(b)   ₹ 12,000 and ₹ 5,40,000
(c)   ₹ 2,00,000 and ₹ 12,000
(d)   ₹ 1,00,000 and ₹ 2,00,000

Question – 5

What would be the operating cost of vehicle per month per car for both CNG and EV options?

(a)   ₹ 36,627.78 and ₹ 43,708.33

(b)   ₹ 36,627.78 and ₹ 48,523.26

(c)   ₹ 48,523.26 and ₹ 28,150.29

(d)   ₹ 48,523.26 and ₹ 28,510.29

1	2	3	4	5
D	A	C	B	A

PROCESS COSTING - CONCEPTS

1. Process Costing

It is used in case of industries where output is obtained by passing through multiple process i.e. output of one process becomes the input for subsequent process until finished goods are obtained.

2. Normal Loss

It is a loss which is unavoidable in nature.

Units of such loss are shown on the credit side of process account at scrap value.

Draft Normal Loss Account

Particulars	Units	Amount	Particulars	Units	Amount
To Process I A/c	-	-	By Cash A/c (Process – I)*	-	-
To Process II A/c	-	-	By Cash A/c (Process – II)	-	-
			By Abnormal Gain A/c**	-	-
	-	-		-	-

3. Abnormal Loss

It is a loss which is avoidable in nature.

Units of such loss are shown on the credit side of process account at NCPU.

Draft Abnormal Loss Account

Particulars	Units	Amount	Particulars	Units	Amount
To Process I A/c	-	-	By Cash A/c (Process – I)*	-	-
To Process II A/c	-	-	By Cash A/c (Process – II)	-	-
			By Costing P&L A/c	-	-
	-	-	(Balancing Figure)	-	-

* Units will be sold at scrap value only being a damaged unit.

4. Abnormal Gain

It is unexpected production during normal conditions.

Units of such gain are shown on the debit side of process account at NCPU.

Draft Abnormal Gain Account

Particulars	Units	Amount	Particulars	Units	Amount
To Normal Loss A/c*	-	-	By Process I A/c	-	-
To Costing P&L A/c	-	-			
(Balancing Figure)					
	-	-		-	-

* The abnormal gain units valued at scrap will be shown here since only the actual profit is to be taken to costing P&L account.

5. Process Account

Draft Process Account

Particulars	Units	Amount	Particulars	Units	Amount
To Previous Process A/c	-	-	By Normal Loss A/c (weight loss)	-	
To Material	-	-	By Normal loss A/c (having scrap value)	-	-
To Labour		-	By Normal loss A/c (requiring cost to be incurred)	-	
To Factory OHs		-			
To Toxic Waste A/c		-	By Abnormal loss A/c	-	-
To Abnormal Gain A/c	-	-	By Next Process A/c (Tfd.)	-	-
			By Costing P&L A/c (sold)	-	-
			By Finished Goods A/c	-	-

$$\text{Normal cost per unit (NCPU)} = \frac{Total\ cost - Scrap\ value\ of\ Normal\ loss}{Total\ units - Normal\ loss\ units}$$

6. Treatment of Royalty

- Debit the amount of royalty on the basis of normal production units
- Excess or less payment of royalty will be adjusted in abnormal loss or gain account
- In Royalty account only final amount on actual units produced will be payable.

7. Process Account with raw material stock

(a) Opening units of raw material stock along with its value will be debited to the process account.

(b) Closing units of raw material stock along with its value will be credited to the process account.

(c) Opening and closing stock of raw material should be adjusted while computing normal cost per unit of the process.

Normal cost per unit =

$$\frac{Total\ Cost(includes\ op.\ raw\ mat.) - Closing\ raw\ mat.\ cost - Scrap\ value\ of\ Nr.\ loss\ units}{Total\ Units(includes\ op.\ raw\ mat.) - Closing\ raw\ mat.\ units - Normal\ loss\ units}$$

8. Process Account with finished goods stock

    (a) A separate process account is prepared for each process.

    (b) Opening units of finished goods along with its value will be debited to the process stock account.

    (c) Closing units of finished goods stock along with its value will be credited to the process stock account.

    (d) All the goods produced by the process will be transferred to process stock account.

9. Process Account with WIP stock

    (a) Opening units of WIP along with its value will be debited to the process account.

    (b) Closing units of WIP along with its value will be credited to the process account.

10. Valuation of WIP

    (a) Calculate equivalent units of production for each element of cost i.e. material, labour and overheads by preparing statement of equivalent units.

    (b) Calculate cost per equivalent unit for each element of cost i.e. material, labour and overheads.

    (c) Calculate the value of WIP by multiplying the equivalent units of WIP along with cost per equivalent unit.

11. Methods of WIP Stock Valuation

	FIFO Method	**W. Average Method**
Ist Process		
Opening WIP		
Introduced & Complete		
Normal Loss		
Abnormal Loss		
Closing WIP		
	FIFO Method	**W. Average Method**
Subsequent Process or Double Material Questions		
Opening WIP		
Introduced & Complete		
Normal Loss		
Abnormal loss		
Closing WIP		

12. Inter Process Profit

Transfer goods from one process to other on cost plus profit basis.

PROCESS COSTING – QUESTIONS

Question – 1

SK Ltd. produces a product-X, which passes through three processes, I, II and III. In Process-III a by-product arises, which after further processing at a cost of ₹ 85 per unit, product Z is produced. The information related for the month of April 2021 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Other materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is ₹ 2,88,000, which is absorbed as a percentage of direct wages.

The scrapes are sold at ₹ 10 per unit

Product-Z can be sold at ₹ 135 per unit with a selling cost of ₹ 15 per unit

No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600

There is not stock at the beginning and end of the month.

You are required to prepare accounts for:

(i)   Process-I, II and III

(ii)   By-product process.

Solution

(i)   **Process- I Account**

Particulars	Units	Amount(₹)	Particulars	Units	Amount(₹)
To Material	7,000	1,40,000	By Normal loss (7,000 × 5% × ₹ 10)	350	3,500
To Other Material	--	62,000	By Abnormal loss A/c (50 × ₹ 50.9022)	50	2,545
To Direct Wages	--	42,000	By Process II A/c (6,600 × ₹ 50.9022)	6,600	3,35,955
To Direct Exp.	--	14,000			
To Prod. OHs (200% × ₹ 42,000)	--	84,000			
	7,000	3,42,000		7,000	3,42,000

Cost per unit $= \dfrac{3,42,000-3,500}{7,000-350} = \dfrac{3,38,500}{6,650} = ₹\ 50.9022$

Process- II Account

Particulars	Units	Amount(₹)	Particulars	Units	Amount(₹)
To Process-I A/c	6,600	3,35,955	By Normal loss (6,600 × 10% × ₹ 10)	660	6,600
To Other Material	--	1,36,000	By Abnormal loss A/c (740 × ₹ 108.3089)	740	80,149
To Direct Wages	--	54,000	By Process III A/c (5,200 × ₹ 108.3089)	5,200	5,63,206
To Direct Exp.	--	16,000			
To Prod. OHs (200% × ₹ 54,000)	--	1,08,000			
	6,600	6,49,955		6,600	6,49,955

Cost per unit $= \frac{6,49,955 - 6,600}{6,600 - 660} = \frac{6,43,355}{5,940} = ₹ 108.3089$

Process- III Account

Particulars	Units	Amount(₹)	Particulars	Units	Amount(₹)
To Process-II A/c	5,200	5,63,206	By Normal loss (5,200 × 5% × ₹ 10)	260	2,600
To Other Material	--	84,200	By Product X A/c (4,800 × ₹ 180.1396)	4,800	8,64,870
To Direct Wages	--	48,000	By By-Product Z A/c [600 × (135-85-15)]	600	21,000
To Direct Exp.	--	14,000			
To Prod. OHs (200% × ₹ 48,000)	--	96,000			
To Ab. Gain (460 × ₹ 180.1396)					
	5,660	8,88,270		5,660	8,88,270

Cost per unit $= \frac{8,05,406 - 2,600 - 21,000}{5,200 - 260 - 600} = \frac{7,81,806}{4,340} = ₹ 180.1396$

(ii)   **By-Product Process Account**

Particulars	Units	Amount(₹)	Particulars	Units	Amount(₹)
To Process-III A/c	600	21,000	By Product Z A/c	600	81,000
To Processing cost	--	51,000			

To Selling exp.	--	9,000			
	600	81,000		600	81,000

Question – 2

A Manufacturing unit manufactures a product 'XYZ' which passes through three distinct Processes – X, Y and Z. The following data is given:

	Process X	Process Y	Process Z
Material consumed (in ₹)	2,600	2,250	2,000
Direct wages (in ₹)	4,000	3,500	3,000

- The total production overhead of ₹ 15,750 was recovered @ 150% of direct wages.
- 15,000 units at ₹ 2 each were introduced to process 'X'.
- The output of each process passes to the next process and finally, 12,000 units were transferred to Finished Stock Account from Process 'Z'.
- No stock of materials or work in progress was left at the end.

The following additional information is given:

Process	% of wastage to normal output	Value of Scrap per unit (₹)
X	6%	1.10
Y	?	2.00
Z	5%	1.00

You are required to:

(i) Find out the percentage of wastage in process 'Y', given that the output of process 'Y' is transferred to Process 'Z' at ₹ 4 per unit.

(ii) Prepare Process accounts for the three processes X, Y and Z.

Solution

(i) Let normal loss units in process Y = y

Normal cost per unit of Process Y $= \frac{Total\ Cost - Scrap\ value\ of\ normal\ loss}{Total\ units - Normal\ loss\ unit}$

$4 = \frac{52,610 - 2y}{14,100 - y}$

56,400 – 4y = 52,610 – 2y

2y = 3,790

y = 1,895

Thus, Normal loss % of process Y $= \frac{1,895}{14,100} \times 100 = 13.44\%$

(ii) **Process X Account**

Particulars	Units	Amount	Particulars	Units	Amount
To Units Introduced	15,000	30,000	By Normal loss A/c	900	990

To Material consumed	-	2,600	(15,000 × 6% × 1.10)		
To Labour	-	4,000	By Process Y A/c	14,100	41,610
To Overheads	-	6,000			
(4,000 × 150%)	15,000	42,600		15,000	42,600

Normal cost per unit $= \dfrac{42,600-990}{15,000-900} = \dfrac{41,610}{14,100} = ₹\ 2.95106$

Process Y Account

Particulars	Units	Amount	Particulars	Units	Amount
To Process X A/c	14,100	41,610	By Normal loss A/c	1,895	3,790
To Material consumed	-	2,250	(Part (i))		
To Labour	-	3,500	By Process Z A/c	12,205	48,820
To Overheads	-	5,250			
(3,500 × 150%)	14,100	52,610		14,100	52,610

Process Z Account

Particulars	Units	Amount	Particulars	Units	Amount
To Process Y A/c	12,205	48,820	By Normal loss A/c	610	610
To Material consumed	-	2,000	(12,205 × 5% × 1)		
To Labour	-	3,000	By Finished Stock A/c	12,000	59,725
To Overheads	-	4,500	(12,000 × 4.97715		
(3,000 × 150%)					
To Abnormal Gain A/c	405	2,015			
(405 × 4.97715)	12,610	60,335		12,610	60,335

Normal cost per unit $= \dfrac{58,320-610}{12,205-610} = \dfrac{57,710}{11,595} = ₹\ 4.97715$

Question – 3

Meta Company Ltd. is engaged in the production of product 'Trio' which passes through two different processes Process P and Process Q. Other information obtained from books of account for the year is as follows:

Particulars	Process P	Process Q
Raw material used	10,000	-
Raw material cost per unit	₹ 80	-
Direct wages	₹ 52,000	₹ 78,000
Direct expenses	₹ 8,600	₹ 11,100
Selling price per unit of output	₹ 130	₹ 190

Production overheads of ₹ 3,00,000 are recovered as percentage of direct wages.

Actual output of the two processes was:
P-9,200 units and Q-6,400 units. 3/4thof the output of Process P was passed on to the Process Q and the balance was sold. The entire output of process Q was sold.

Management & Selling expenses during the year were ₹ 1,70,000. These are not allocable to the processes.

The normal loss of the two processes, calculated on the input of every process was:
Process P- 6% and Process Q-10%

The Loss of Process P was sold at ₹ 5 per unit and that of Q at ₹ 8 per unit. Assume that Process P and Process Q are not the responsibility centres.

You are required to prepare:
(i)   Process P Account
(ii)   Process Q Account
(iii)   Abnormal Loss and Abnormal Gain Account
(iv)   Costing Profit & Loss Account

Solution

(i)   **Process P Account**

Particulars	Units	Amount	Particulars	Units	Amount
To Material	10,000	8,00,000	By Normal loss	600	3,000
To Wages		52,000	By Process Q (9,200 × ¾)	6,900	7,17,600
To Direct expenses		8,600	By Costing Profit & Loss (9,200 × ¼)	2,300	2,39,200
To Production Overheads (3,00,000 × 2/5)		1,20,000	By Abnormal loss	200	20,800
	10,000	9,80,600		10,000	9,80,600

Cost per unit $= \frac{9,80,600 - 3,000}{10,000 - 600} = ₹$ 104 per unit

(ii)   **Process Q Account**

Particulars	Units	Amount	Particulars	Units	Amount
To Material	6,900	7,17,600	By Normal loss	690	5,520
To Wages		78,000	By Costing P&L	6,400	10,11,200
To Direct expenses		11,100			

To Production Overheads (3,00,000 × 3/5)		1,80,000			
To Abnormal gain	190	30,020			
	7,090	10,16,720		7,090	10,16,720

Cost per unit $= \dfrac{9,86,700-5,520}{6900-690} = $ ₹ 158 per unit

(iii) **Abnormal Loss Account**

Particulars	Units	Amount	Particulars	Units	Amount
To Process P	200	20,800	By Bank	200	1,000
			By Costing P&L	6,400	19,800
	200	20,800		200	20,800

Abnormal Gain Account

Particulars	Units	Amount	Particulars	Units	Amount
To Normal loss	190	1,520	By Process Q	190	30,020
To Costing P&L		28,500			
	190	30,020		190	30,020

(iv) **Costing P&L Account**

Particulars	Amount	Particulars	Amount
To Process P	2,39,200	By Sales	
To Process Q	10,11,200	P = 2,300 × 130	2,99,000
To Abnormal loss	19,800	Q = 6,400 × 190	12,16,000
To Selling expenses	1,70,000	By Abnormal gain	28,500
To Net profit	1,03,300		
	15,43,500		15,43,500

Question – 4

SK Ltd. processes product Z through two distinct processes – Process I and process II. On completion, it is transferred to finished stock. From the following information for the current year, prepare Process I and Process II and Finished Stock A/c.

Particulars	Process – I	Process - II
Raw materials used	7,500 units	-
Raw materials cost per unit	₹ 60	-
Transfer to next process/finished stock	7,050 units	6,525 units
Normal loss (on inputs)	5%	10%
Direct wages	₹ 1,35,750	₹ ,129,250
Direct expenses	60% of direct wages	65% of direct wages
Manufacturing overheads	20% of direct wages	15% of direct wages

| Realisable value of scrap per unit | ₹ 12.50 | ₹ 37.50 |

6,000 units of finished goods were sold at a profit of 15% on cost. Assume that there was no opening or closing stock of work-in-process.

Solution

Process I Account

	Qty.	Amount		Qty.	Amount
To Raw material	7,500	4,50,000	By Normal Loss	375	4.688
To Direct wages		1,35,750	(5%×7,500×12.5)		
To Direct expenses		81,450	By Abnormal Loss	75	7,259
(60% of direct wages)			(75 × 96.7947)		
To Manufacturing OHs		27,150	By Process II A/c	7,050	6,82,403
(20% of direct wages)			(7,050 × 96.7947)		
	7,500	6,94,350		7,500	6,94,350

Planned output – Process I = 7,500 – 375 = 7,125 units

Actual output = 7,050 units

Abnormal loss = (7,125 units – 7,050 units) 75 units.

Cost per unit = $\frac{6,94,350 - 4,688}{7,125}$ = ₹ 96.7947

Process II Account

	Qty.	Amount		Qty.	Amount
To Process I	7,050	6,82,403	By Normal loss (10%)	705	26,438
To Direct wages		1,29,250	(7,050 × 10% × 37.5)		
To Direct Expenses		84,013	By Finished Stock A/c	6,525	9,13,824
(65% of direct wages)			(6,525 × 140.096		
To Manufacturing OHs		19,387			
To Abnormal gain	180	25,209			
(180 × 140.096)	7,230	9,40,262		7,230	9,40,262

Planned output of Process II = 7,050 – 705 = 6,345 units

Cost per unit = $\frac{9,15,053 - 26,438}{6,345}$ = ₹ 140.096

Abnormal gain = Actual output – Planned output = 6,525 – 6,345 = 180 units

Finished Stock Account

	Qty.	Amount		Qty.	Amount
To Process II	6,525	9,13,824	By Cost of Sales A/c	6,000	8,40,298
			By Balance c/d	525	73,526
	6,525	9,13,824		6,525	9,13,824

Income Statement

	Amount		Amount
To Cost of Sales	8,40,298	By Abnormal Gain	18,459
(6,000 × 140.096)		[180 × (140.0496 – 37.5)]	
To Abnormal loss	6,322	By Sales	9,66,343
[75 × (96.7947 – 12.50)]		(8,40,298 × 115%)	
To Net Profit	1,38,182		
	9,84,802		9,84,802

Question – 5

With the help of the following information, prepare Process Account, giving full working notes:

Opening stock of work in progress: 1,000 units at ₹ 10,000

Degree of completion: Material 100%, Labour 50%, Overhead 40%

Introduced during the process: 10,000 units at ₹ 37,800

Wages: ₹ 17,840

Overheads: ₹ 8,840

Scrap 1,500 units

Degree of Completion: Materials 100%, Labour 80%, Overheads 60%

Closing work in progress: 1,000 units

Degree of completion: Materials 100%, Labour 60%, Overheads 50%

Normal loss 10% of total input

Scrap value ₹ 2 per unit

Solution

Statement of Equivalent Production

Input		Output		Material		Labour		Overheads	
				%	Units	%	Units	%	Units
Op. WIP	1,000	Op. WIP	1,000	-	-	50	500	60	600
Input	10,000	Introduced & Complete	7,500	100	7,500	100	7,500	100	7,500
		Transferred	8,500						
		Normal Loss (11,000×10%)	1,100	-	-	-	-	-	-
		Abnormal Loss (1500 - 1100)	400	100	400	80	320	60	240
		Closing WIP	1,000	100	1,000	60	600	50	500
	11,000		11,000		8,900		8,920		8,840

Statement of Cost per Equivalent Unit

Particulars	Material	Labour	Overheads
Cost	37,800	17,840	8,840
Less: Normal Scrap (1,100 × 2)	(2,200)	-	-
Total	35,600	17,840	8,840
Equivalent Units	8,900	8,920	8,840
Cost per equivalent unit	4	2	1

Statement of distribution of cost

Particulars	Element of Cost	Equivalent units	Cost per unit	Cost	Total Cost
Opening WIP	Material	-	4	-	
	Labour	500	2	1,000	
	Overheads	600	1	600	1,600
Introduced & Complete	Material	7,500	4	30,000	
	Labour	7,500	2	15,000	
	Overheads	7,500	1	7,500	52,500
Abnormal Loss	Material	400	4	1,600	
	Labour	320	2	640	
	Overheads	240	1	240	2,480
Closing WIP	Material	1,000	4	4,000	
	Labour	600	2	1,200	
	Overheads	500	1	500	5,700

Process Account

Particulars	Units	Amount	Particulars	Units	Amount
To Opening WIP	1,000	10,000	By Normal Loss A/c	1,100	2,200
To Material	10,000	37,800	By Abnormal loss A/c	400	2,480
To Labour	-	17,840	By Next Process A/c	8,500	64,100
To Overheads	-	8,840	(52,500+1,600+10,000)		
			By closing WIP	1,000	5,700
	11,000	74,480		11,000	74,480

Question – 6	

The following data is related to Process S for August:

(a)   Opening WIP   8,000 units

        Material (100%)   ₹ 63,900

        Labour (60%)   ₹ 10,800

        Overheads (60%)   ₹ 5,400

(b)   Input of 1,82,000 units   ₹ 7,56,900

(c)   Labour paid   ₹ 3,28,000

(d)   Overheads incurred   ₹ 1,64,000

(e)   Units scrapped   14,000 units

Degree of Completion: Material 100%; Labour & Overheads 50%

(f)   Closing WIP   18,000 units

Degree of Completion: Material 100%; Labour & Overheads 70%

(g)   1,58,000 units were completed and transferred to next process

(h)   Normal loss is 8% of total input

(i)   Scrap value is ₹ 8 per unit

You are required to prepare Process A/c and other relevant account assuming average method is used.

Solution

Statement of Equivalent Production

Input		Output		Material		Labour		Overheads	
				%	Units	%	Units	%	Units
Op. WIP	8,000	Complete & Transferred	1,58,000	100	1,58,000	100	1,58,000	100	1,58,000
Input	1,82,000	Normal Loss (1,90,000×8%)	15,200	-	-	-	-	-	-
		Abnormal Gain (14000 - 15200)	(1,200)	100	(1,200)	100	(1,200)	100	(1,200)
		Closing WIP	18,000	100	1,000	60	600	50	500
	1,90,000		1,90,000		1,74,800		1,69,400		1,69,400

Statement of Cost per Equivalent Unit

Particulars	Material	Labour	Overheads
Cost	7,56,900	3,28,000	1,64,000
Add: Opening WIP cost	63,900	10,800	5,400
Less: Normal Scrap (15,200 × 8)	(1,21,600)	-	-
Total	6,99,200	3,38,800	1,69,400
Equivalent Units	1,74,800	1,69,400	1,69,400
Cost per equivalent unit	4	2	1

Cost of next process account = 1,58,000 × (4 + 2 + 1) = ₹ 11,06,000

Cost of closing WIP = (18,000 × 4) + (12,600 × 2) + (12,600 × 1) = ₹ 1,09,800

Cost of abnormal gain = 1,200 × (4 + 2 + 1) = ₹ 8,400

Process S Account

Particulars	Units	Amount	Particulars	Units	Amount
To Opening WIP	8,000	80,100	By Normal Loss A/c	15,200	1,21,600
To Material	1,82,000	7,56,900	By Next Process A/c	1,58,000	11,06,000
To Labour	-	3,28,000	By closing WIP	1,800	1,09,800
To Overheads	-	1,64,000			
To Abnormal Gain	1,200	8,400			
	1,91,200	13,37,400		1,91,200	13,37,400

Abnormal Gain Account

Particulars	Units	Amount	Particulars	Units	Amount
To Normal loss A/c (1,200 × 8)	1,200	9,600	By Process S A/c	1,200	8,400
			By Costing P&L A/c	-	1,200
	1,200	9,600		1,200	9,600

Normal Loss Account

Particulars	Units	Amount	Particulars	Units	Amount
To Process S A/c	15,200	1,21,600	By Abnormal Gain A/c	1,200	9,600
			By Bank A/c	14,000	1,12,000
	15,200	1,21,600		15,200	1,21,600

Question – 7

A company produces a component, which passes through two processes. During the month of April, materials for 40,000 components were put into Process I of which 30,000 were completed and transferred to Process II. Those not transferred to Process II were 100% complete as to materials cost and 50% complete as to labour and overheads cost. The Process I cost incurred were as follows:

Direct Materials	₹ 15,000
Direct Wages	₹ 18,000
Factory Overheads	₹ 12,000

Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process II. There were 1,800 units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

No further process material costs occur after introduction at the first process until the end of the second process, when protective packing is applied to the completed components. The process and packing costs incurred at the end of the Process II were:

Packing Material	₹ 4,000
Direct Wages	₹ 3,500
Factory Overheads	₹ 4,500

Required:

(a) Prepare statement of equivalent production, cost per unit and Process I A/c.

(b) Prepare statement of equivalent production, cost per unit and Process II A/c.

Solution

Statement of Equivalent Production and Cost per Unit for Process I

Input		Output		Material		Labour		Overheads	
				%	Units	%	Units	%	Units
Input	40,000	Introduced & Complete	30,000	100	30,000	100	30,000	100	30,000
		Closing WIP	10,000	100	10,000	50	5,000	50	5,000
	40,000		40,000		40,000		35,000		35,000
		Cost			15,000		35,000		12,000
		Cost per unit			0.375		0.514286		0.342857

Statement of apportionment of cost for Process I

Particulars	Element of Cost	Equivalent units	Cost per unit	Cost	Total Cost
Introduced & Complete	Material	30,000	0.375	11,250	
	Labour	30,000	0.514286	15,429	
	Overheads	30,000	0.342857	10,286	36,965
Closing WIP	Material	10,000	0.375	3,750	
	Labour	5,000	0.514286	2,571	
	Overheads	5,000	0.342857	1,714	8,035

Process I Account

Particulars	Units	Amount	Particulars	Units	Amount
To Material	40,000	15,000	By Process II A/c	30,000	36,965
To Labour	-	18,000	By Closing WIP	10,000	8,035
To Overheads	-	12,000			
	40,000	45,000		40,000	45,000

Statement of Equivalent Production and cost per unit for Process II

Input		Output		Material - 1		Material – 2		Labour		Overheads	
				%	Units	%	Units	%	Units	%	Units
Input	30,000	Introduced & Complete	28,000	100	28,000	100	28,000	100	28,000	100	28,000
		Normal Loss	200	-	-	-	-	-	-	-	-
		Closing WIP	1,800	100	1,800	-	-	25	450	25	450
	30,000		30,000		29,800		28,000		28,450		28,450

Cost	36,965		4,000	3,500	4,500
Cost per unit	1.2404		0.1429	0.123	0.1582

Statement of apportionment of cost for Process II

Particulars	Element of Cost	Equivalent units	Cost per unit	Cost	Total Cost
Introduced & Complete	Material – 1	28,000	1.2404	34,732	
	Material – 2	28,000	0.1429	4,000	
	Labour	28,000	0.123	3,445	
	Overheads	28,000	0.1582	4,429	46,606
Closing WIP	Material – 1	1,800	1.2404	2,233	
	Material – 2	-	0.1429	-	
	Labour	450	0.123	55	
	Overheads	450	0.1582	71	2,359

Process II Account

Particulars	Units	Amount	Particulars	Units	Amount
To Process I A/c	30,000	36,965	By Normal loss A/c	200	-
To Packing Material	-	4,000	By Finished Goods A/c	28,000	46,606
To Labour	-	3,500	By Closing WIP	1,800	2,359
To Overheads	-	4,500			
	30,000	48,965		30,000	48,965

Question – 8

KT Ltd. produces a product EMM which passes through two processes before it is completed and transferred to finished stock. The following data relate to May 2019.

Particulars	Process A	Process B	Finished Stock
Opening stock	₹ 5,000	₹ 5,500	₹ 10,000
Direct materials	9,000	9,500	
Direct wages	5,000	6,000	
Factory overheads	4,600	2,030	
Closing stock	2,000	2,490	5,000
Inter process profit included in opening stock	--	1,000	4,00

Output of Process A is transferred to Process B at 25% profit on the transfer price and output of Process B is transferred to finished stock at 20% profit on the transfer price. Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from Process B. Sales during the period are ₹ 75,000.

Prepare the process cost accounts and Finished stock account showing the profit element at each stage.

Solution

Process A Account

Particulars	Cost	Profit	Total	Particulars	Cost	Profit	Total
To Opening stock	5,000	-	5,000	By Process B A/c	28,800	7,200	21,600
To Direct material	9,000	-	9,000				
To Direct wages	5,000	-	5,000				
	19,000	-	19,000				
(-) Closing stock	(2,000)	-	(2,000)				
	17,000	-	17,000				
To Factory OHs	4,600	-	4,600				
	21,600	-	21,600				
To Profit	-	7,200	7,200				
	21,600	7,200	28,800		21,600	7,200	28,800

Process B Account

Particulars	Cost	Profit	Total	Particulars	Cost	Profit	Total
To Opening stock	4,500	1,000	5,500	By F. Stock A/c	41,550	20,125	61,675
To Process A A/c	21,600	7,200	28,800				
To Direct material	9,500	-	9,500				
To Direct wages	6,000	-	6,000				
	41,600	8,200	49,800				
(-) Closing stock	(2,080)	(410)	(2,490)				
	39,520	7,790	47,310				
To Factory OHs	2,030	-	2,030				
	41,550	7,790	49,340				
To Profit	-	12,335	12,335				
	41,550	20,125	61,675		41,550	20,125	61,675

Profit element in closing stock = $\frac{8,200}{49,800} \times 2,490 = ₹ 410$

Finished Stock Account

Particulars	Cost	Profit	Total	Particulars	Cost	Profit	Total
To Opening stock	6,000	4,000	10,000	By Costing P&L A/c	44,233	30,767	75,000
To Process B A/c	41,550	20,125	61,675				
	47,550	24,125	71,675				
(-) Closing stock	(3,317)	(1,683)	(5,000)				
	44,233	22,442	66,675				
To Profit (Bal. fig)	-	8,325	8,325				
	44,233	30,767	75,000		44,233	30,767	75,000

Profit element in closing stock $= \frac{24{,}125}{71{,}675} \times 5{,}000 = ₹\ 1{,}683$

Question – 9

In X Ltd. 500 units of raw material were introduced in Process I . The actual output and normal loss of the respective processes are:

	Output	Normal loss on output
Process I	450 units	10%
Process II	340 units	20%
Process III	270 units	25%

The abnormal effective in Process III is _____ units.

    (a) 10   (b) 15

    (c) 20   (d) 25

Question – 10

Arnav Ltd. manufactures chemical solutions used in paint and adhesive products. Chemical solutions are produced in different processes. Some of the processes are hazardous in nature which may results in fire accidents.

At the end of the last month, one fire accident occurred in the factory. The fire destroyed some of the paper files containing records of the process operations for the month.

You being an associate to the Chief Manager (finance), are assigned to prepare the process accounts for the month during which the fire occurred. From the documents and files of other sources, following information could be retrieved:

Opening work-in-process at the beginning of the month was 500 litres, 80% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 2,78,000.

Closing work-in-process at the end of the month was 100 litres, 20% complete for labour and 10% complete for overheads.

Normal loss is 10% of input(fresh) and total losses during the month were 800 litres partly due to the fire damage.

Output transferred to finished goods was 3,400 litres

Losses have a scrap value fo ₹ 20 per litre

All raw material are added at the commencement of the process.

The cost per equivalent unit is ₹ 660 for the month made up as follows:

Raw material ₹ 300; labour ₹ 200; Overheads ₹ 160.

The company uses FIFO method to value work-in-process and finished goods. The following information are required for managerial decisions:

Question – 1
How much quantity of raw material introduced during the month?
(a) 4,300 litres
(b) 3,500 litres
(c) 4,200 litres
(d) 3,800 litres

Question – 2
The quantity of normal loss and abnormal loss are:
(a) Normal loss – 380 litres and abnormal loss – 420 litres
(b) Normal loss – 350 litres and abnormal loss – 450 litres
(c) Normal loss – 430 litres and abnormal loss – 370 litres
(d) Normal loss – 420 litres and abnormal loss – 380 litres

Question – 3
Value for raw material added to the process during the month is:
(a) ₹ 10,10,000
(b) ₹ 10,33,600
(c) ₹ 10,18,400
(d) ₹ 10,20,000

Question – 4
Value of labour and overhead in closing Work-in-process are:
(a) ₹ 4,000 & ₹ 1,600 respectively
(b) ₹ 20,000 & ₹ 16,000 respectively
(c) ₹ 16,000 & ₹ 9,000 respectively
(d) ₹ 13,200 & ₹ 6,600 respectively

Question – 5
Value of output transferred to finished goods is:
(a) ₹ 22,57,200
(b) ₹ 20,06,400
(c) ₹ 22,44,000
(d) ₹ 19,27,.200

1	2	3	4	5
D	A	B	A	C

JOINT & BY-PRODUCT - CONCEPTS

1. Multiple Output
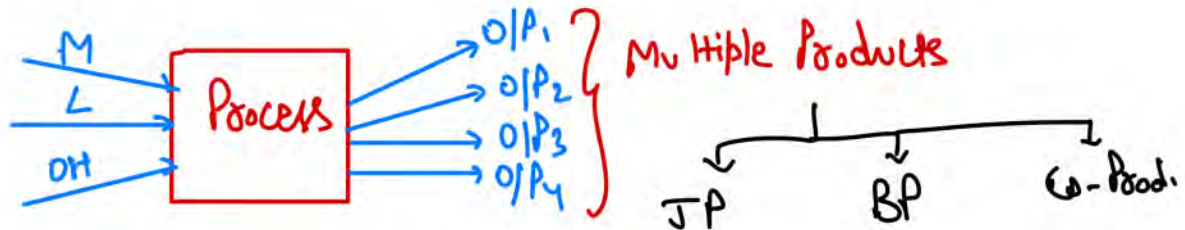
2. Meaning of Basic Terms
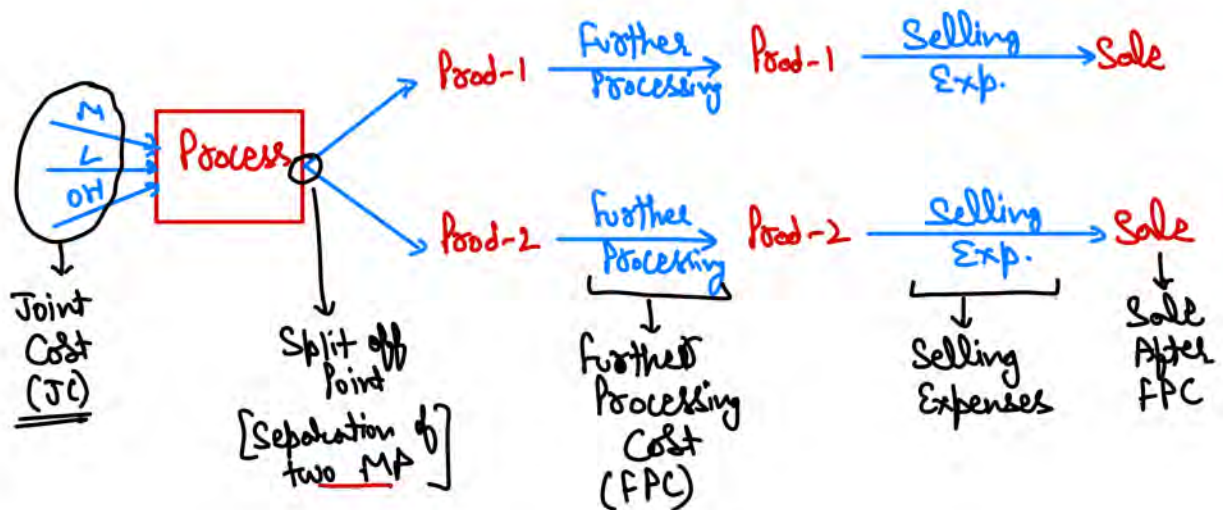
3. Treatment of By-Product

Treatment of BP		
	BP of small value	**Option – 1** Treat similar to Normal loss
		Option – 2 Consider it as miscellaneous income and show in credit side of costing P&L A/c
	BP of considerable value or BP requires FPC	Treat as JP or MP i.e. calculate share of JC for this
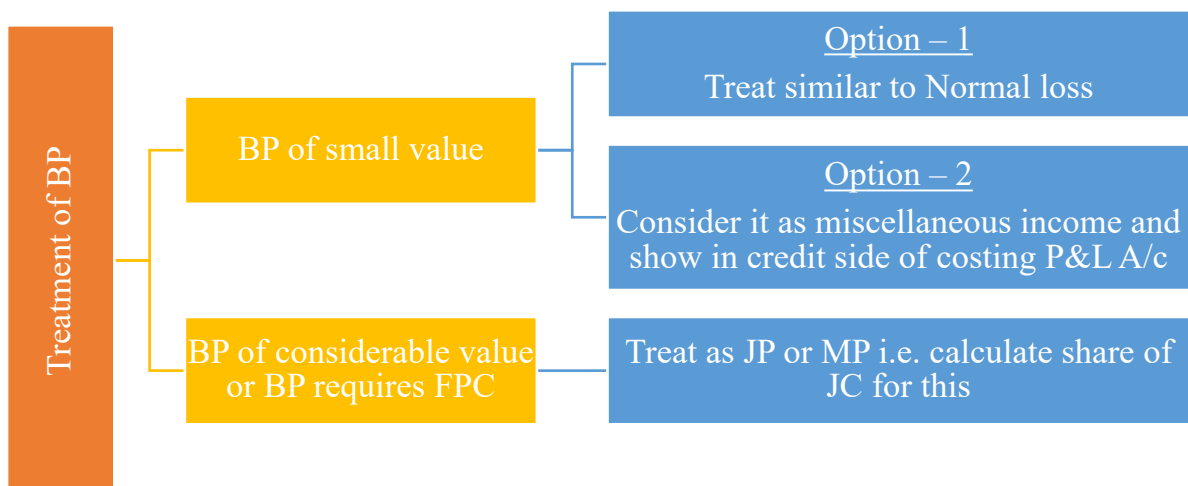
4. Methods of Apportionment of Joint Cost (JC)

(A) Reverse Cost Method

Particulars	Product A	Product B
Sale value	-	-
Less: Profit	-	-
Total Cost	-	-
Less: Selling expenses	-	-
Work Cost	-	-
Less: Further Processing cost	-	-
Share of Joint Cost		

If total joint cost is not matching with value given in question then distribute actual joint cost given in question in the share of joint cost calculated from above statement.

If data of profit is given for only one product then prepare above table for one product after that share of JC of other product = Total JC – Share of JC from above table for one product.

(B) Physical Unit Method – Distribute on the basis of physical units produced

(C) Sale value at split off method – Distribute on the basis of sale value at split off of units produced.

(D) Sale value after FPC method – Distribute on the basis of sale value after FPC of units produced.

(E) Net Realizable Value (NRV) Method – Distribute on the basis of NRV
NRV = Sale after FPC – Selling Expenses – FPC

(F) Contribution Margin Method
- Distribute variable cost on the basis of units produced
- Distributed fixed cost on the basis of contribution
- If any product has zero or negative contribution than FC will not be distributed for that product.

(G) Average Cost Method

$$\text{Average cost} = \frac{Total\ Joint\ Cost}{Total\ Untis\ at\ Seperation\ Point}$$

5. Decision Regarding Further Processing

Compare Incremental Revenue with Incremental Cost

If Incremental revenue > Incremental cost   - Yes further process

If Incremental revenue < Incremental cost   - Not to further process

Incremental revenue = Sale after FPC – Sale at split off

Incremental cost = FPC + Increase in any other cost – Decrease in any other cost

JOINT & BY-PRODUCT – QUESTIONS

Question – 1

A company's plant processes 6,750 units of a raw material in a month to produce two products 'M' and 'N'. The process yield is as under:

Product M	80%
Product N	12%
Process loss	8%

The cost of raw material is ₹ 80 per unit.

Processing cost is ₹ 2,25,000 of which labour cost is accounted for 66%. Labour is chargeable to products 'M' and 'N' in the ratio of 100:80.

Prepare a comprehensive cost statement for each product showing:

(i)   Apportionment of joint cost among products 'M' and 'N' and

(ii)   Total cost of the products 'M' and 'N'.

<u>Solution</u>

Total joint cost = Raw material cost + Processing cost = (6,750 × 80) + 2,25,000 = ₹ 7,65,000

Total labour cost = 2,25,000 × 66% = ₹ 1,48,500

Joint cost other than labour cost = 7,65,000 – 1,48,500 = ₹ 6,16,500

Statement of Joint Cost Apportionment

Particulars	Product M	Product N
Labour Cost (1,48,500 in 100:80)	82,500	66,000
Cost other than labour cost (6,16,500 in 80:12)	5,36,087	80,413
Share of Joint Cost	6,18,587	1,46,413

Statement of Total Cost

Particulars	Product M	Product N
Raw material cost (5,40,000 in 80:12)	4,69,565	70,435
Labour Cost (1,48,500 in 100:80)	82,500	66,000
Other Processing Cost (76,500 in 80:12)	66,522	9,978
Share of Joint Cost	6,18,587	1,46,413

Question – 2

A factory producing article P also produces a by-product Q which is further processed into finished product. The joint costs of manufacture are given below:

	₹
Material	5,000
Labour	3,000
Overheads	2,000
	10,000

Subsequent costs are given below:

	P	Q
Material	₹ 3,000	₹ 1,500
Labour	1,400	1,000
Overheads	600	500
	5,000	3,000

Selling prices are: P – ₹ 16,000 and Q – ₹ 8,000

Estimated profits margin on selling prices are 25% for P and 20% for Q.

Assume that selling and distribution expenses are in proportion of sales prices. Show how you would apportion joint costs of manufacture and prepare a statement showing cost of production of P and Q.

Solution

Statement of Cost

Particulars	Product P	Product Q
Sales	16,000	8,000
Less: Profit	16,000×25% = 4,000	8,000×20% = 1,600
Total Cost	12,000	6,400
Less: Selling expenses (w.n. – 1)	267	133
Work Cost	11,733	6,267
Less: Further Processing Cost	5,000	3,000
Share of Joint Cost	6,733	3,267

Working Note-1

Total sales = Total Joint Cost + Total Further Processing Cost + Total Selling Expenses + Total Profit

24,000 = 10,000 + 8,000 + Total Selling Expenses + 5,600

Total Selling Expenses = ₹ 400

Ratio of sales = 16,000 : 8,000 = 2:1

Selling expenses of P = 400 × (2/3) = ₹ 267

Selling expenses of Q = 400 × (1/3) = ₹ 133

Statement of Cost of Production

Particulars	Product P	Product Q
Joint Cost:		
Material (5,000 in 6,733:3,267)	3,367	1,633
Labour (3,000 in 6,733:3,267)	2,020	980
Overheads (2,000 in 6,733:3,267)	1,347	653
Further Processing Cost:		
Material	3,000	1,500
Labour	1,400	1,000
Overheads	600	500
Cost of Production	11,733	6,267

Question – 3

The SK Oil company purchase crude vegetable oil. It does refining of the same. The refining process results in four products at the split off point: M, N, O & P.

Product O is fully processed at the split off point. Product M, N, & P can be individually further refined into 'Super M', 'Super N' and 'Super P'. In the most recent month (October), the output at split off point was:

Product M	3,00,000 gallons
Product N	1,00,000 gallons
Product O	50,000 gallons
Product P	50,000 gallons

The joint cost of the purchasing the crude vegetable oil and Processing it were ₹ 40,00,000. SK had no beginning or ending inventories. Sales of Product O in October were ₹ 20,00,000. Total output of products M, N and P was further refined and then sold. Data related to October are as follows:

Product	Further processing cost to make super products	Sales
Super M	₹ 80,00,000	₹ 1,20,00,000
Super N	₹ 32,00,000	₹ 40,00,000
Super P	₹ 36,00,000	₹ 48,00,000

SK had the option of selling products M, N and P at the split off point. This alternative would have yielded the following sales for the October, production:

Product M	₹ 20,00,000
Product N	₹ 12,00,000
Product P	₹ 28,00,000

You are required to answer:

    (a) How the joint cost of ₹ 40,00,000 would be allocated between each product under the following methods

        (i) Sales value at split off point

(ii)   Physical output (gallon)

(iii)   Estimated net realizable value

(b)   Could SK have increased its October operating profits by making different decisions about the further refining of product M, N or P? Show the effect of any change you recommend on operating profits.

Solution

(a) (i)   **Statement of Cost**   **(₹ in lakhs)**

Particulars	Product M	Product N	Product O	Product P
Sale value at split off	20	12	20	28
Share of Joint Cost (40 in 20:12:20:28)	10	6	10	14

(a) (ii)   **Statement of Cost**   **(₹ in lakhs)**

Particulars	Product M	Product N	Product O	Product P
Physical Output	3	1	0.50	0.50
Share of Joint Cost (40 in 3:1:0.5:0.5)	24	8	4	4

(a) (iii)   **Statement of Cost**   **(₹ in lakhs)**

Particulars	Product M	Product N	Product O	Product P
Sale value after FPC	120	40	20	48
Less: Further Processing cost	80	32	-	36
Less: Selling expenses	-	-	-	-
Net Realizable Value	40	8	20	12
Share of Joint Cost (40 in 40:8:20:12)	20	4	10	6

(b)   **Statement of Incremental Profit/(Loss)**   **(₹ in lakhs)**

Particulars	Product M	Product N	Product P
Sales after FPC	120	40	48
Less: Sale at Split off	20	12	28
Incremental Sales	100	28	20
Less: Further Processing Cost	80	32	36
Incremental Profit/(Loss)	20	(4)	(16)

Thus, it is recommended that Product M should be further processed into Super M and Product N & P should be sold at split off point without any further processing. With this suggestion, company's operating profit will rise by ₹ 20,00,000 as the existing losses of ₹ 4,00,000 and ₹ 16,00,000 will get cut down.

Question – 4

SK Ltd. is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of May, 2021, SK Ltd. purchased 50 kilolitre processed cream @ ₹ 100 per 1,000 ml. Conversion cost of ₹ 1,00,000 were incurred up-to the split off point, where tow saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee.

The May, 2021 production and sales information is as follows:

Products	Production (in Kilolitre/tonne)	Sales Quantity (in Kilootire/tonne)	Selling price per litre/kg (₹)
Buttermilk	28	28	30
Butter	20	-	-
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of ₹ 1,20,000 to yield 16 Kilolitre of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in May, 2021.

Required:

(i)   Show how joint cost would be apportioned between Buttermilk and Butter under estimated net realizable value method.

(ii)   MP Ltd. offers to purchase 20 tonne of butter in June at ₹ 360 per kg. In case SK Ltd. accepts this offer, no Ghee would be produced in June. Suggest whether SK Ltd. shall accept the offer affecting its operating income or further process butter to make Ghee itself?

Solution

(i)   Total Joint Cost = Processed cream cost + conversion cost

= (50 × 1,000 × 100) + 1,00,000 = ₹ 51,00,000

Statement of Joint Cost

Particulars	Buttermilk Amount (₹)	Butter Amount (₹)
Sales Value	30×28×1,000 = 8,40,000	16×1,000×480 = 76,80,000
Less: Post split-off cost	-	(1,20,000)
Net Realizable Value	8,40,000	75,60,000
Apportionment of Joint Cost of ₹ 51,00,000 in ratio of 1:9	5,10,000	45,90,000

(ii)   **Statement of Incremental Profit or Loss**

Particulars	(₹)
Revenue from Ghee	16 × 1,000 ×480 = 76,80,000
(-) Revenue from Butter	20 × 1,000 × 360 = 72,00,000
Incremental Revenue	4,80,000

(-) Further processing cost	1,20,000
Incremental Profit	3,60,000

The operating income of SK Ltd. will be reduced by ₹ 3,60,000 in June if it sells 20 tonne of Butter to MP Ltd., instead of further processing of Butter into Ghee for sale. Thus, SK Ltd. is advised not to accept the offer and further process butter to make Ghee itself.

Question – 5	

A company produces two products A and B, through a joint production process. The total joint production cost incurred is as under:

Material	₹ 20,000
Labour	₹ 10,000
Variable overheads	₹ 6,000
Fixed overheads	₹ 24,000

Product A and B can be sold for ₹ 20 per unit and ₹ 15 per unit respectively at split off point. The produced quantities are Product A-2,000 units and Product B – 4,000 units.

(i)   You are required to calculate the joint production cost allocation for each product using the:
      (a) Physical unit method.
      (b) Contribution margin method.

(ii)   Product B can be further processed by incurring expenditure of ₹ 12,000. Loss in further processing is 2%. It can be sold @ ₹ 18 per unit. Explain the impact on profitability if Product B is further processed.

Solution

(i)   (a) Total Joint Cost = 20,000 + 10,000 + 6,000 + 24,000 = ₹ 60,000

          Share of Joint cost of Product A = $60,000 \times \frac{2,000}{6,000}$ = ₹ 20,000

          Share of Joint cost of Product B = $60,000 \times \frac{4,000}{6,000}$ = ₹ 40,000

    (b) Total Variable cost = 20,000 + 10,000 + 6,000 = ₹ 36,000
          Total Fixed cost = ₹ 24,000

Statement of Cost

Particulars	Product A	Product B
Sales Value (A)	2,000 × 20 = 40,000	4,000 × 15 = 60,000
Variable Cost (B) [36,000 in quantity ratio 2:4]	12,000	24,000
Contribution (A – B)	28,000	36,000
Fixed cost (C) [24,000 in 28:36]	10,500	13,500
Share of Joint Cost (B + C)	22,500	37,500

(ii)   **Statement of Profit of Product B**

Particulars	Amount
Units produced and sold 98% of 4,000 units	3,920
Selling price per unit	18
Sales value after FPC	70,560
Sales value at split off	60,000
Incremental revenue	10,560
Less: Further processing cost	12,000
Incremental loss after further processing	(1,440)

Thus, there is a net loss of ₹ 1,440 if the Product B is further processed and sold.

Question – 6

ABC Company produces a Product 'X' that passes through three processes: R, S and T. Three types of raw materials, viz., J, K and L are used in the ratio of 40:40:20 in process R. The output of each process is transferred to next process. Process loss is 10% of total input in each process. At the stage of output in process T, a by-product 'Z' is emerging and the ratio of the main product 'X' to the by-product 'Z' is 80:20. The selling price of product 'X' is ₹ 60 per kg.

The company produced 14,580 kgs of product 'X'.
Material price: Material K @ ₹ 15 per kg; Material K @ ₹ 9per kg.
Material L @ ₹ 7 per kg. Process costs are as follows:

Process	Variable cost per kg (₹)	Fixed cost of input (₹)
R	5.00	42,000
S	4.50	5,000
T	3.40	4,800

The by-product 'Z' cannot be processed further and can be sold at ₹ 30 per kg at the split-off stage. There is no realizable value of process losses at any stage.

Required:
Present a statement showing the apportionment of joint costs on the basis of the sales value of product 'X' and by-product 'Z' at the split-off point and the profitability of product 'Z' and by-product 'Z'.

Solution
Working Note:
(1)   Let total raw material in Process R of raw material R be 100

Process	Input	Loss	Output
R	100	100 × 10% = 10	90
S	90	90 × 10% = 9	81
T	81	81 × 10% = 8.10	72.90

Thus, for input of 100 units in process R, output of 72.90 units is obtained from process T.
Actual output of X = 14,580 units
80% of output of Process T = 14,580 units

Output of process T = 14,580 ÷ 80% = 18,225

Input of process R = $\frac{18,225}{72.9} \times 100 = 25,000$ kgs

(2) Calculation of Joint cost

Process	Inputs	Variable costs	Fixed cost	Total cost
R	25,000	25,000 × 5 = 1,25,000	42,000	1,67,000
S	22,500	22,500 × 4.5 = 1,01,250	5,000	1,06,250
T	20,250	20,250 × 3.4 = 68,850	4,800	73,650
				3,46,900

Raw material J	= 10,000 × 15	= ₹ 1,50,000
Raw material K	= 10,000 × 9	= ₹ 90,000
Raw material L	= 5,000 × 7	= ₹ 35,000
		₹ 2,75,000
Add: Processing cost (as above)		₹ 3,46,900
Total joint cost		₹ 6,21,900

(i) Statement showing apportionment of joint cost

Particulars	Product X	By-Product Z	Total
Units	14,580	3,465	
Selling price (₹)	60	30	
Sales value (₹)	8,74,800	1,09,350	9,84,150
Share of joint cost (₹ 6,21,900 in ratio of sales value)	5,52,800	69,100	6,21,900

(ii) Statement of profitability

Particulars	Product X	By-Product Z	Total
Sales value (₹)	8,74,800	1,09,350	9,84,150
(-) Share of joint cost	(5,52,800)	(69,100)	(6,21,900)
Profit	3,22,000	40,250	3,62,250

Question – 7

Mayura Chemicals Ltd. buys a particular raw material at ₹ 8 per litre. At the end of the processing in Department-1, this raw material splits-off into products X, Y and Z. Product X is sold at the split-off point, with no further processing. Products Y and Z require further processing before they can be sold. Product Y is processed in Department-2, and Product Z is processed in Department-3. Following is a summary of the costs and other related data for the year 2019-20:

Particulars	Department		
	1	**2**	**3**
Cost of Raw Material	₹ 4,80,000	-	-
Direct Labour	₹ 70,000	₹ 4,50,000	₹ 6,50,000

Manufacturing Overhead	₹ 48,000	₹ 2,10,000	₹ 4,50,000
	Products		
	X	**Y**	**Z**
Sales (litres)	10,000	15,000	22,500
Closing inventory (litres)	5,000	-	7,500
Sale price per litre (₹)	30	64	50

There were no opening and closing inventories of basic raw materials at the beginning as well as at the end of the year. All finished goods inventory in litres was complete as to processing. The company uses the Net-realizable value method of allocating join costs.

You are required to prepare:

(iii)   Schedule showing the allocation of joint costs

(iv)   Calculate the cost of goods sold of each product and the cost of each item in Inventory

(v)   A comparative statement of Gross Profit

Solution

(i)   **Statement of allocation of joint cost**

Particulars	Product X	Product Y	Product Z	Total
Units sold	10,000	15,000	22,500	
Add: Closing stock (A)	5,000	-	7,500	
Units Produced (B)	15,000	15,000	30,000	
Selling price per unit (C)	30	64	50	
Sale value of Prod. (B × C)	4,50,000	9,60,000	15,00,000	29,10,000
Less: Additional cost	-	6,60,000	11,00,000	17,60,000
Net realizable value	4,50,000	3,00,000	4,00,000	11,50,000
Share of joint cost (D) (5,98,000 in NRV ratio)	2,34,000	1,56,000	2,08,000	5,98,000

(ii)   **Statement of calculation of cost of goods sold and inventory**

Particulars	Product X	Product Y	Product Z	Total
Share of joint cost	2,34,000	1,56,000	2,08,000	5,98,000
Add: Additional costs	-	6,60,000	11,00,000	17,60,000
Less: Cost of inventories	$\frac{2,34,000 \times 5,000}{15,000} =$ (78,000)	-	$\frac{13,08,000 \times 7,500}{30,000}$ = (3,27,000)	(4,05,000)
Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000

(iii)   **Statement of calculation of gross profit**

Particulars	Product X	Product Y	Product Z	Total
Units sold	10,000	15,000	22,500	
Selling price per unit	30	64	50	
Sales	3,00,000	9,60,000	11,25,000	23,85,000
Less: Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000
Profit / (loss)	1,44,000	1,44,000	1,44,000	4,32,000

Question – 8

A Company produces two joint products P and Q in 70:30 ratio from basic raw materials in department A. The input output ratio of department A is 100:85. Product P can be sold at the split off stage or can be processed further at department B and sold as product AR. The input output ratio is 100:90 of department B. The department B is created to process product P only and to make it product AR.

    The selling prices per kg are as under:

    Product P   ₹ 85

    Product Q   ₹ 290

    Product AR   ₹ 115

The production will be taken up in the next month.

    Raw materials 8,00,000 kgs

    Purchase price ₹ 80 per kg

	Deptt. A (₹ Lacs)	Deptt. B (₹ Lacs)
Direct materials	35.00	5.00
Direct labour	30.00	9.00
Variable overhead	45.00	18.00
Fixed overheads	40.00	32.00
Total	150.00	64.00
Selling Expenses	₹ in lacs	
Product P	24.60	
Product Q	21.60	
Product AR	16.80	

Required:

    (i) Prepare a statement showing the apportionment of joint costs if Joint Costs are apportioned in the proportion of NRV at Split-off point.

    (ii) State whether it is advisable to produce product AR or not.

Solution

    (a) Input in Department A = 8,00,000 units

          Output in Department A = 8,00,000 × 85% = 6,80,000 units

Output of Product P = 6,80,000 × (70/100) = 4,76,000 units

Output of Product Q = 6,80,000 × (30/100) = 2,04,000 units

Statement of Joint Cost

Particulars	Amount (₹ in lakhs)
Raw Material (8,00,000 × 80)	640
Direct materials	35
Direct labour	30
Variable overheads	45
Fixed overheads	40
Total Joint Cost	790

Statement of Apportionment of Joint Cost (₹ in lakhs)

Particulars	Product P	Product Q
Sale at split off	4.76 × 85 = 404.60	2.04 × 290 = 591.60
Less: Selling expenses	24.60	21.60
Net realizable value at split off	380	570
Share of Joint Cost (790 in 38:57)	316	474

(b) Statement of Evaluation of Proposal

Particulars	Amount (₹ in lakhs)
Sales after further processing cost (w.n.-1)	492.66
(-) Sale at split off	404.60
Incremental sales	88.06
(-) Further processing cost	64
(+) Savings in selling expenses (24.60 – 16.80)	7.80
Net Benefit	31.86

Since there is net benefit, thus it is recommended to further process Product P into Product AR.

Working note – 1

Input in Department B = 4,76,000 units

Output in Department B i.e. Product AR = 4,76,000 × 90% = 4,28,400 units

Sale value after further processing cost = 115 × 4.284 lakhs = ₹ 492.66 lakhs

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Question – 9	

In case of joint products, the main objective of accounting of the cost is to apportion the joint costs incurred up to the split off point. For cost apportionment one company has chosen Physical Quantity Method. Three joint products 'A', 'B' and 'C' are produced in the same process. Up to the point of split off the total production of A, B and C is 60,000 kg, out of which 'A' produces 30,000 kg and joint costs are Rs. 3,60,000. Joint costs allocated to product A is

(a) ₹ 1,20,000

(b) ₹ 60,000

(c) ₹ 1,80,000

(d) ₹ 2,00,000

Question – 10

eSalt is the biggest producer of sodium hydroxide in India. This main product of the company has a strong reactivity with other organic compounds. It is highly versatile and is alkaline in nature. However, the basic material required for the production of this product is salt along with the electricity.

The manufacturing process involve electrolysis which produces Halogen as co-product. Modern use of Halogen is widespread. However, the common use is in disinfection like for purifying drinking water or swimming pool water. It is also an important ingredient of toothpaste. Thus, the company's management affirmed the simultaneous production of Halogen.

During the previous financial year, the company purchased the base material of ₹ 5,34,000. For the current year, company decided to increase the production by 2 times. Due to increased production, the total conversion cost hiked to 3 times. Last year, the conversion cost accounted to ₹ 8,01,000 up to the point at which two products i.e. sodium hydroxide and Halogen are separated.

The production and sales information for current year is provided as below:

	Sodium hydroxide	Halogen
Production/ Sales (in tonne)	24,030	16,020
Selling price per tonne (₹)	100	150

During the current year, the management of the company pointed the extensive use of Vinly which can be produced by further processing Halogen. Having selling price of ₹ 250 per tonne higher than that of the Halogen, it was decided not to sell Halogen and further process it into Vinly. The incremental processing cost took ₹ 8,01,000 producing 10,012.50 tonnes of Vinyl.

You are required to figure out the following for managerial decision:

Question – 1
For the current year, the amount of base material purchased and th conversion cost up to the point at which two products i.e. Sodium hydroxide and Halogen are separated would be:
A. base material ₹ 10,68,000 and conversion cost ₹ 24,03,000
B. base material ₹ 10,68,000 and conversion cost ₹ 16,02,000
C. base material ₹ 16,02,000 and conversion cost ₹ 24,03,000
D. base material ₹ 24,03,000 and conversion cost ₹ 16,02,000

Question – 2
Joint cost to be apportioned between Sodium hydroxide and Halogen as per the physical unit method would be:
A. Sodium hydroxide ₹ 24,03,000 and Halogen ₹ 10,68,000
B. Sodium hydroxide ₹ 10,68,000 and Halogen ₹ 16,02,000
C. Sodium hydroxide ₹ 16,02,000 and Halogen ₹ 24,03,000

D. Sodium hydroxide ₹ 24,03,000 and Halogen ₹ 16,02,000

Question – 3

Joint cost to be apportioned between Sodium hydroxide and Halogen as per the sales value at split-off point method would be:

A. Sodium hydroxide ₹ 20,02,500 and Halogen ₹ 20,02,500
B. Sodium hydroxide ₹ 16,02,000 and Halogen ₹ 24,03,000
C. Sodium hydroxide ₹ 24,03,000 and Halogen ₹ 16,02,000
D. Sodium hydroxide ₹ 10,68,000 and Halogen ₹ 20,02,500

Question – 4

Joint cost to be apportioned between Sodium hydroxide and Halogen as per the estimated net realisable value method would be:

A. Sodium hydroxide ₹ 23,44,390 and Halogen ₹ 16,60,610
B. Sodium hydroxide ₹ 17,16,429 and Halogen ₹ 22,88,571
C. Sodium hydroxide ₹ 22,88,571 and Halogen ₹ 17,16,429
D. Sodium hydroxide ₹ 16,60,610 and Halogen ₹ 23,44,390

Question – 5

Considering that the decision relating to further processing Halogen is not approved, suggest whether this would be in favour of the management by calculating incremental revenue/loss from further processing Halogen into Vinyl.

A. Incremental loss would be ₹ 16,02,000, thus the decision of not further processing Halogen is correct.
B. Incremental loss would be ₹ 8,01,000, thus the decision of not further processing Halogen is correct.
C. Incremental revenue would be ₹ 8,01,000, thus the decision relating to further processing Halogen needs to be approved.
D. Incremental revenue would be ₹ 16,02,000, thus the decision relating to further processing Halogen needs to be approved.

1	2	3	4	5
C	D	A	B	C

MARGINAL COSTING - CONCEPTS

1. Marginal Costing

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                    Marginal Costing
                          |
        ┌─────────────────┼─────────────────┐
   CVP Analysis    Decision Making    Marginal vs
                                      Absorption
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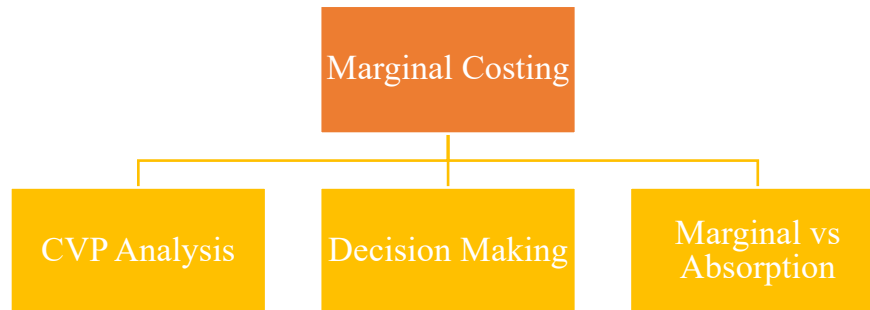
Sales	**xx**
(-) Variable cost	**xx**
Contribution	**xx**
(-) Fixed Cost	**xx**
Profit	**xx**

2. Contribution = Sales – Variable Cost = Fixed Cost + Profit

3. Profit Volume (PV) Ratio or Contribution Ratio

➤ This ratio doesn't change with change in level of output

➤ This ratio changes with change in either selling price per unit or variable cost per unit

➤ PV Ratio $= \frac{Contribution}{Sales} \times 100 = \frac{Sales - Variable\ Costs}{Sales} \times 100 = \frac{Fixed\ cost + Profit}{Sales} \times 100$

➤ PV Ratio = 100 – Variable Cost Ratio

➤ PV Ratio $= \frac{Change\ in\ Contribution}{Change\ in\ Sales} \times 100 = \frac{Change\ in\ Profit}{Change\ in\ Sales} \times 100$

4. Break-even point (BEP)

➤ It is the level of sales at which there is neither any profit nor any sales

➤ In other words, it is the level of sales at which contribution is just able to recovery FC.

o Break-even Point (units of sale) $= \frac{Fixed\ Cost}{Contribution\ per\ unit}$

o Break-even Point (in sales value) $= \frac{Fixed\ Cost}{P/V\ Ratio}$

$= $ Break-even point units × Selling price per unit

5. Cash Break-even Point

➢ It is level of sales at which cash profit or loss is zero.

    o Cash Break-even Point (units of sale) $= \dfrac{Cash\ Fixed\ Cost}{Contribution\ per\ unit}$

    o Cash Break-even Point (in sales value) $= \dfrac{Cash\ Fixed\ Cost}{P/V\ Ratio}$

6. Required sales for a given level of profit

Sales to earn desired profit (units) $= \dfrac{Fixed\ cost + Desired\ profit}{Contribution\ per\ unit}$

Sales to earn desired profit (in ₹) $= \dfrac{Fixed\ cost + Desired\ profit}{P/V\ Ratio}$

7. Margin of Safety (MOS)

It is the level of sales over and above break-even sales

Margin of Safety (in ₹) = Actual sales – Break-even sales

Margin of Safety (in units) = Actual sale units – Break-even sales units

Margin of safety (in %) $= \dfrac{Margin\ of\ safety}{Total\ Sales} \times 100$

Margin of Safety (in %) = 100% - Break-even Sales %

Margin of safety (in ₹) $= \dfrac{Profit}{P/V\ Ratio}$

Margin of safety (in units) $= \dfrac{Profit}{Contribution\ per\ unit}$
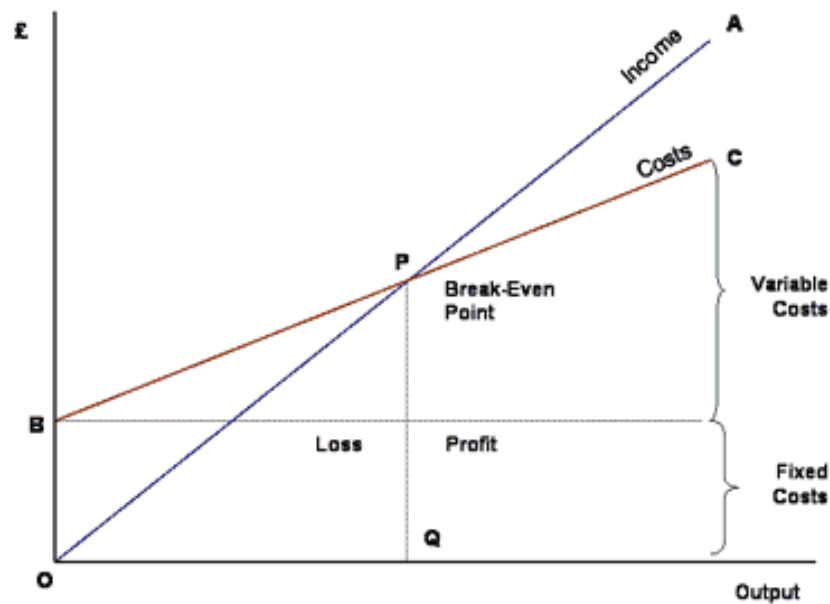
8. Points to Remember (PTRs)

(A) If fixed cost per unit is given then multiply it with the level of units at which such fixed cost per unit was computed.

(B) Apply price effect of Total FC and never apply on FC per unit

9. Dual Selling price or Dual variable cost questions

- It will lead to generation of dual contribution per unit

Steps to solve

- Find both contribution per unit

- First calculate total contribution from 1st option which will be sold first.

- Recover the required value (FC or Profit etc.) from this and then calculate the balance required value.

10. Composite or Overall BEP

This concept is used when company deals in multiple products.

Particulars	Prod. A	Prod. B	Prod. C	Total
Sales	-	-	-	-
(-) Variable cost	-	-	-	-
Contribution	-	-	-	-
(-) Fixed Cost				-
Profit				-

o Overall Contribution per unit = Weighted average of contribution per unit
$$= \frac{Total\ Contribution}{Total\ Units}$$

o   Overall P/V Ratio = Weighted average of P/V Ratio = $\frac{Total\ Contribution}{Total\ Sales} \times 100$

o   Overall Break-even Point (in units) = $\frac{Fixed\ Cost}{Overall\ Contribution\ Per\ unit}$

o   Overall Break-even Point (in ₹) = $\frac{Fixed\ Cost}{Overall\ P/V\ Ratio}$

11.   Activity level % at BES $= \frac{Break-even\ sales}{Total\ Sales\ at\ 100\%\ level} \times \mathbf{100}$

12.   Shut down point $= \frac{Avoidable\ fixed\ cost}{Contribution\ per\ unit\ or\ PV\ Ratio}$

13.   Cost with regard to decision making

```
Cost with regard to decision making
│
├── Relevant cost ── Which changes with change in decisions ── Consider for decision making
│
└── Irrelevant cost ── Which doesn't change with change in decisions ── Ignore for decision making
```

14.   Make vs Buy

```
Relevant Cost
│
├── Spare Capacity Exist ── Relevant Cost = VC + Additional FC
│
└── Spare capacity not exist ── Relevant cost = VC + Additional FC + Opportunity Cost
```

Relevant Cost Vs Purchase Cost	Relevant Cost > Purchase cost	Recommend to BUY
	Relevant Cost < Purchase cost	Recommend to Make
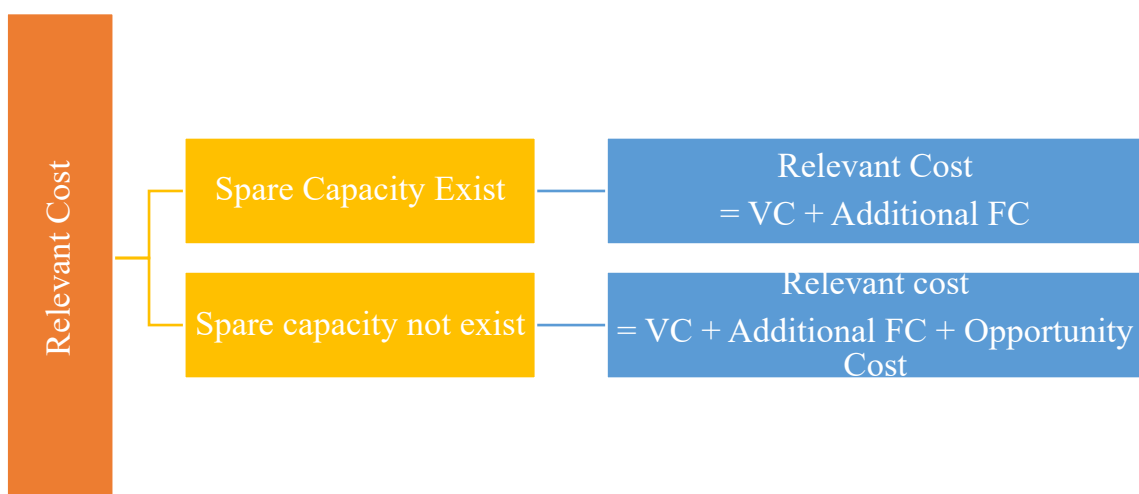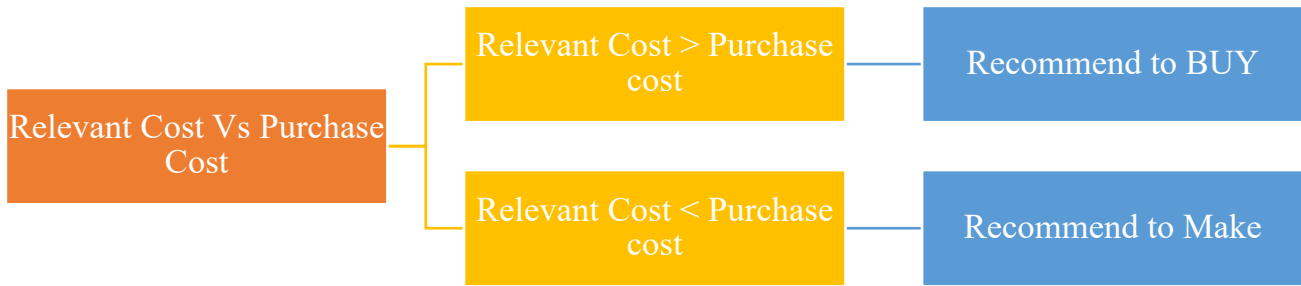
15. Dropping an existing product for new product

Existing Profits Vs New Profits	Existing Profits > New Profits	Not to drop existing product
	Existing Profits < New Profits	Drop existing product and include new product
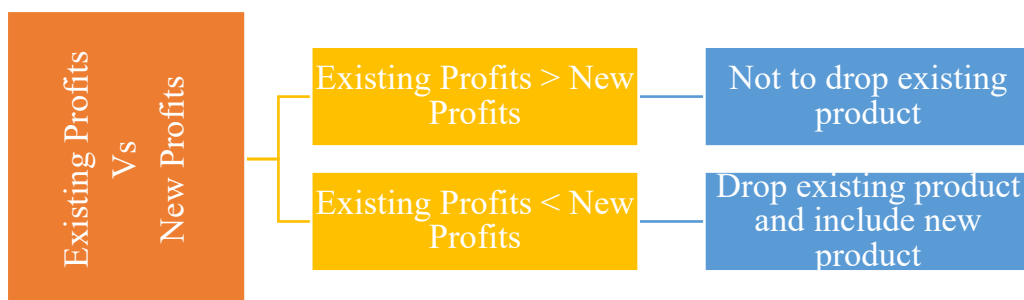
16. Key factor or limiting factor

It is the factor which is limited in its availability

Decision will be taken on the basis of contribution per unit of key factor

Key Factor	Basis of Decision
Sales (in units)	Contribution per unit
Sales (in ₹)	P/V Ratio
Material	Contribution per unit of material
Labour hour	Contribution per labour hour
Machine hour	Contribution per machine hour

17. Indifference Level

Level at which cost of two options will be equal

$$\text{Indifference level} = \frac{Difference\ in\ Fixed\ cost}{Difference\ in\ variable\ cost\ per\ unit}$$

OR   Total cost of option (i) = Total cost of option (ii)

$$(VC1)(Q) + FC1 = (VC2)(Q) + FC2$$
Solve and find Q i.e. indifference level

Level	Recommendation
Actual quantity > Indifference level	Select option having variable cost per unit is low
Actual quantity < Indifference level	Select option where fixed cost is low
Actual quantity = Indifference level	Select any option

In case if there are three 3 options, then compute as follows:

    (a) Case 1 & 2
    (b) Case 2 & 3
    (c) Case 1 & 3

18. Income statement under Marginal Costing

Particulars	Amount
Revenue (A)	-
Direct Material	-
Direct Labour	-
Direct expenses	-
Variable manufacturing overheads	-
Variable GFC/NFC/COP	-
Add: Opening stock of finished goods	-
Less: Closing stock of finished goods	-
Variable COGS	-
Add: Variable administration overheads	-
Add: Variable selling & distribution overheads	-
Variable COS (B)	-
Contribution (A – B)	-
Less: Fixed manufacturing overheads	-
Less: Fixed administration overheads	-
Less: Fixed selling & distribution overheads	-
Profit	-

19. Income statement under Absorption Costing

Particulars	Amount
Revenue (A)	-
Direct Material	-
Direct Labour	-
Direct expenses	-

Particulars	Amount
Variable manufacturing overheads	-
Fixed manufacturing overheads	-
GFC/NFC/COP	-
Add: Opening stock of finished goods	-
Less: Closing stock of finished goods	-
COGS	-
Add: Fixed & Variable administration overheads	-
Add: Fixed & Variable selling & distribution overheads	-
COS	-
Add: Under absorbed fixed manufacturing overheads	-
Less: Over absorbed fixed manufacturing overheads	-
Total Cost (B)	-
Profit/(loss) (A – B)	-

20. Profit of Marginal and Absorption differ due to difference in the stock values under both methods

Particulars	Amount
Profit as per Marginal Costing	-
(+) Opening stock under valued in Marginal	-
(-) Closing stock under valued in Marginal	-
Profit as per Absorption Costing	-

MARGINAL COSTING – QUESTIONS

Question – 1

AZ company has prepared its budget for the production of 2,00,000 units. The variable cost per unit is ₹ 16 and fixed cost is ₹ 4 per unit. The company fixes its selling price to fetch a profit of 20% on total cost.

You are required to calculate:

(i)   Present break-even sales (in ₹ and in quantity)

(ii)   Present profit-volume ratio

(iii)   Revised break-even sales in Rs and the revised profit-volume ratio, if it reduces its selling price by 10%.

(iv)   What would be revised sales in quantity and the amount, if a company desires a profit increase of 20% more than the budgeted profit and selling price is reduced by 10% as above in point (iii).

Solution

(i)   Present Fixed cost = 4 × 2,00,000 = ₹ 8,00,000

Present Profit = Total cost × 20% = (16 + 4) × 20% = ₹ 4

Present Selling price = Cost + Profit = (16 + 4) + 4 = ₹ 24

Contribution = Selling price – Variable cost = 24 – 16 = ₹ 8

Present Break-even sales units = $\frac{Fixed\ cost}{Contribution\ per\ unit} = \frac{8,00,000}{8} = 1,00,000$ units

Present Break-even sales value = 1,00,000 × 24 = ₹ 24,00,000

(ii)   Present profit-volume ratio = $\frac{Contribution}{Selling\ price}$ 100 = $\frac{8}{24}$ 100 = 8.33%

(iii)   New Selling price per unit = 24 – 10% = ₹ 21.60

New contribution per unit = 21.60 – 16 = ₹ 5.60

Revised PV ratio = $\frac{5.60}{21.60}$ 100 = 25.93%

Revised break-even sales = $\frac{8,00,000}{25.93\%}$ = ₹ 30,85,229

(iv)   Required profit = Existing profit × 120% = (4 × 2,00,000) × 120% = ₹ 9,60,000

Required sales quantity = $\frac{Required\ profit + Fixed\ cost}{Contribution\ per\ unit} = \frac{9,60,000 + 8,00,000}{5.60} = 3,14,286$ units

Required sales value = 3,14,286 × 21.60 = ₹ 67,88,578

Question – 2

The sales turnover and profit of M/s SK Ltd. during the two years 2017 and 2018 were as follows:

Year	Sales (₹)	Profit (₹)
2017	4,50,000	60,000
2018	5,10,000	75,000

You are required to calculate:

(a) Profit-Volume Ratio

(b) Sales at which company will neither lose nor gain anything

(c) Sales required to earn a profit of ₹ 1,20,000

(d) The profit made when sales are ₹ 7,50,000

(e) Minimum level of sales where the company needs not to close the production if unavoidable fixed cost is ₹ 1,00,000.

Solution

(a) P/V Ratio $= \frac{Change\ in\ Profit}{Change\ in\ Sales} \times 100 = \frac{75,000-60,000}{5,10,000-4,50,000} \times 100 = \frac{15,000}{60,000} \times 100 = 25\%$

(b) Contribution for Year 2017 = 4,50,000 × 25%

   Fixed cost + Profit = 1,12,500

   Fixed cost + 60,000 = 1,12,500

   Fixed cost = ₹ 52,500

   Break-even sales (in ₹) $= \frac{Fixed\ Cost}{P/V\ Ratio} = \frac{52,500}{25\%} = ₹\ 2,10,000$

(c) Desired sales (in ₹) $= \frac{Fixed\ Cost+Desired\ Profit}{P/V\ Ratio} = \frac{52,500+1,20,000}{25\%} = ₹\ 6,90,000$

(d) Given, Sales = ₹ 7,50,000

   Profit = Contribution – Fixed Cost = (7,50,000 × 25%) – 52,500 = ₹ 1,35,000

(e) Minimum required sales $= \frac{Fixed\ cost}{P/V\ Ratio} = \frac{1,00,000}{25\%} = ₹\ 4,00,000$

Question – 3	

R Ltd. produces and sells 60,000 units of product 'AN', at its Noida Plant. The selling price of the product is ₹ 15 per unit. The variable cost is 80% of selling price per unit. Fixed cost during this period is ₹ 4,20,000. The company is continuously suffering losses, and management plans to shut down the Noida Plant.

The fixed cost is expected to be reduced by ₹ 2,50,000. Additional costs of plant shut down are expected at ₹ 25,000. You are required to comment on:

(i)   Whether the Noida plant be shut down?

(ii)   Find the shut-down point in units.

Solution

(i)   **Statement of Profit**

Particulars	If plant is continued (₹)	If plant is shut down (₹)
Selling price	15 per unit	-
Less: Variable cost	12 per unit	-
Contribution	3 per unit	-
Capacity	60,000 units	-
Total contribution	60,000 × 3 = 1,80,000	-

Less: Fixed cost	4,20,000	1,70,000
Less: Additional fixed cost	-	25,000
Loss	(2,40,000)	(1,95,000)

Since the loss of Noida plant exceeds shut down cost, it is better to shut down the plant.

(ii)   Shut down point $= \dfrac{Total\ fixed\ cost - Shut\ down\ cost}{Contribution\ per\ unit} = \dfrac{4,20,000 - 1,95,000}{3} = 75,000$ units

---

Question – 4

SK Ltd. has furnished the following data for the two years:

	2017	2018
Sales	₹ 8,00,000	?
Profit/volume ratio (P/V Ratio)	50%	37.5%
Margin of safety sales as % of total sales	40%	21.875%

There has been substantial savings in the fixed cost in the year 2018 due to the restructuring process. The company could maintain its sales quantity level of 2017 in 2018 by reducing the selling price. You are required to calculate the following:

(a) Sales for 2018 in ₹

(b) Break-even sales for 2018 in ₹

(c) Fixed cost for 2018

Solution

(a) **Year 2017**

Variable cost ratio = 100 – P/V Ratio = 10 – 50% = 50%

Variable cost = Sales × Variable cost ratio = 8,00,000 × 50% = ₹ 4,00,000

Year 2018

Since there is no change in sales quantity and no information has been provided for change in variable cost per unit.

∴ Variable cost of Year 2018 = Variable Cost of Year 2017 = ₹ 4,00,000

Variable cost ratio = 100 – P/V Ratio = 100 – 37.5% = 62.5%

$\dfrac{Variable\ cost}{Sales} = 62.5\%$

Sales = Variable cost ÷ 62.5%

Sales = 4,00,000 ÷ 62.5% = ₹ 6,40,000

(b) Breakeven sales (in %) = 100 – Margin of Safety (in %) = 100 – 21.875% = 78.125%

Breakeven sales = 6,40,000 × 78.125% = ₹ 5,00,000

(c) Breakeven sales $= \dfrac{Fixed\ Cost}{P/V\ Ratio}$

Fixed cost = Breakeven sales × P/V Ratio = 5,00,000 × 37.5% = ₹ 1,87,500

Question – 5

A company manufactures two types of herbal product S and K. Its budget shows profit figures after apportioning the fixed joint cost of ₹ 15 lacs in proportion of the numbers of units sold. The budget for 2022, indicates:

	S	K
Profit (₹)	1,50,000	30,000
Selling price / unit (₹)	200	120
P/V Ratio (%)	40	50

Required:

Compute the best option among the following, if the company expects that the number of units to be sold would be equal.

(a) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increase by 7½%.

(b) Price of S could be increase by 20% as it is expected that the price elasticity of demand would be unity over the range of price.

(c) Simultaneous introduction of both the option, viz. (a) and (b) above.

Solution

Working Notes:

1) Contribution per unit of S = 200 × 40% = ₹ 80

∴Variable cost per unit of S = 200 – 80 = ₹ 120

Contribution per unit of K = 120 × 50% = ₹ 60

∴Variable cost per unit of K = 120 – 60 = ₹ 60

2) Let units sold of S & K = y

Contribution = Fixed cost + Profit

80y + 60y = 15,00,000 + 1,50,000 + 30,000

140y = 16,80,000

y = 12,000

∴Units sold of each product = 12,000

(a) **Statement of Profit**

Particulars	Amount (₹)
Contribution of S [{200 – (120 + 7.5%)} × 12,000]	8,52,000
Contribution of K [{120 – (60 + 7.5%)} × 12,000]	6,66,000
Total contribution	15,18,000
Less: Fixed Cost (15,00,000 – 15%)	12,75,000
Profit	2,43,000

(b) Existing total sales of S = 12,000 × 200 = ₹ 24,00,000

New Selling price of S = 200 + 20% = ₹ 240

New quantity of S = 24,00,000 ÷ 240 = 10,000 units

Statement of Profit

Particulars	Amount (₹)
Contribution of S [(240 – 120) × 10,000]	12,00,000
Contribution of K [(120 – 60) × 12,000]	7,20,000
Total contribution	19,20,000
Less: Fixed Cost	15,00,000
Profit	4,20,000

(c)   **Statement of Profit**

Particulars	Amount (₹)
Contribution of S [{240 – (120 + 7.5%)} × 10,000]	11,10,000
Contribution of K [{120 – (60 + 7.5%)} × 12,000]	6,66,000
Total contribution	17,76,000
Less: Fixed Cost (15,00,000 – 15%)	12,75,000
Profit	5,01,000

A comparison of increase in profit figures under above three options clearly indicates that the option (c) is the best as it has the highest profit of ₹ 5,01,000.

Question – 6

SK a zero sugar cold drink manufacturing Indian company, is planning to establish a subsidiary company in Nepal to produce coconut flavored juice. Based on the estimated annual sales of 60,000 bottles of the juice, cost studies produced the following estimates for the Nepalese subsidiary:

	Total Annual Costs (₹)	Percent of total annual cost which is variable
Material	2,70,000	100%
Labour	1,97,000	80%
Factory Overheads	1,20,000	60%
Administration Expenses	52,000	35%

The Nepalese production will be sold by manufacturer's representative who will receive a commission of 9% of the sale price. No portion of the Indian office expenses is to be allocated to the Nepalese subsidiary. You are required to:

(i) Compute the sale price per bottle to enable the management to realize an estimated 20% profit on sale proceeds in Nepal

(ii) Calculate the break-even point in rupees value sales and also in number of bottles for the Nepalese subsidiary on the assumption that the sale price is ₹ 14 per bottle.

Solution

(i)   **Computation of Sale Price Per Bottle**

	(₹)
Variable Cost:	
Material	2,70,000
Labour (₹ 1,97,000 × 80%)	1,57,600
Factory Overheads (₹ 1,20,000 × 60%)	72,000
Administrative Overheads (₹ 52,000 × 35%)	18,200
Total (A)	5,17,800
Fixed Cost:	
Labour (₹ 1,97,000 × 20%)	39,400
Factory Overheads (₹ 1,20,000 × 40%)	48,000
Administrative Overheads (₹ 52,000 × 65%)	33,800
Total (B)	1,21,200
Total Cost without commission (A + B)	6,39,000
Add: Commission (9% 0f ₹ 9,00,000)	81,000
Add: Profit (20% of ₹ 9,00,000)	1,80,000
Sales Proceeds (6,39,000 ÷ 71%) (C)	9,00,000
No. of bottles (D)	60,000
Selling price per bottle (C ÷ D)	15

(ii)   Statement of calculation of break-even point

Particulars	Amount (₹)
Sale price per bottle	14.00
(-) Variable cost per bottle $\left(\frac{5,17,800}{60,000}\right)$	8.63
(-) commission per bottle (14 × 9%)	1.26
Contribution per bottle	4.11
Break-even point (in number of bottles)	$\frac{1,21,200}{4.11}$ = 29,489
Break-even point (in sales value)	29,489 × 14 = 4,12,846

Question – 7

SK Ltd. manufacture and sales its product S-9. The following figures have been collected from cost records of last year for the product S-9:

Elements of Cost	Variable Cost Portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	-
Direct Labour	15% of Cost of Goods Sold	-
Factory Overheads	10% of Cost of Goods Sold	₹ 2,30,000

| General & Administration Overheads | 2% of Cost of Goods Sold | ₹ 71,000 |
| Selling & Distribution Overhead | 4% of Cost of Sales | ₹ 68,000 |

Last Year 5,000 units were sold at ₹ 185 per unit. From the given data find the followings:

(a) Break-even Sales (in rupees)

(b) Profit earned during last year

(c) Margin of safety (in %)

(d) Profit if the sales were 10% less than the actual sales.

(Assume that administration overheads are related with production activity)

Solution

Working Notes:

(i) COGS = {(DM - 0.3COGS) + (DL - 0.15COGS) + (FOH - 0.10COGS + ₹ 2,30,000)

+ (G&AOH - 0.02COGS + ₹ 71,000)}

COGS = 0.57 COGS + ₹ 3,01,000

COGS = $\frac{3,01,000}{0.43}$ = ₹ 7,00,000

(ii) COS = COGS + (S&DOH - 0.04COS + ₹ 68,000)

COS = ₹ 7,00,000 + (0.04 COS + ₹ 68,000)

COS = $\frac{7,68,000}{0.96}$ = ₹ 8,00,000

(iii) Calculation of Variable Costs:

Direct Material	(0.3 × ₹ 7,00,000)	₹	2,10,000
Direct Labour	(0.15 × ₹ 7,00,000)	₹	1,05,000
Factory Overhead	(0.10 × ₹ 7,00,000)	₹	70,000
General & Administration OH	(0.02 × ₹ 7,00,000)	₹	14,000
Selling & Distribution OH	(0.04 × ₹ 8,00,000)	₹	32,000
		₹	4,31,000

(iv) Calculation of total Fixed Costs:

Factory Overhead-	₹	2,30,000
General & Administration OH	₹	71,000
Selling & Distribution OH	₹	68,000
	₹	3,69,000

(v) P/V Ratio = $\frac{Sales - Variable\ Cost}{Sales}$ × 100 = $\frac{(185 \times 5,000) - 4,31,000}{185 \times 5,000}$ × **100** = 53.41%

(a) Break-Even Sales = $\frac{Fixed\ Costs}{P/V\ ratio}$ = $\frac{3,69,000}{53.41\%}$ = ₹ 6,90,882

(b) Profit earned during the last year = (Sales – Total Variable Costs) – Total Fixed Costs

= (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000 = ₹ 1,25,000

(c) Margin of Safety (%) = $\frac{Sales - Breakeven}{Sales}$ × 100 = $\frac{9,25,000 - 6,90,882}{9,25,000}$ × **100** = 25.31%

(d) Profit if sales were 10% less than the actual sales

= 90% (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000 = ₹ 75,600

Question – 8	

SK Ltd. manufactures and sells a single product X whose selling price is ₹ 100 per unit and the variable cost is ₹ 60 per unit.

(a) If the Fixed Costs for this year are ₹ 24,00,000 and the annual sales are at 60% margin of safety, Calculate the rate of return on sales, assuming an income tax level of 40%.

(b) For the next year, it is proposed to add another product line Y whose selling price would be ₹ 150 per unit and the variable cost ₹ 100 per unit. The total fixed costs are estimated at ₹ 28,00,000. The sales mix of X : Y would be 5 : 3. Compute the breakeven sales in units for both the products.

Solution

(a) Contribution per unit = Selling price – Variable cost = ₹ 100 – ₹ 60 = ₹ 40

Break-even point = ₹ $\frac{Fixed\ Cost}{Contribution\ per\ unit} = \frac{24,00,000}{40} = 60,000$ units

Break-even sale (in %) = 100 – Margin of safety = 100 - 60% of sales = 40% of sales

$\frac{Break-even\ sales\ in\ units}{Actual\ sales\ units} = \frac{40}{100}$

$\frac{60,000}{Actual\ sale\ units} = 0.40$

Actual sale units = 1,50,000 units

Particulars	**₹**
Sales Value (1,50,000 × 100)	1,50,00,000
Less: Variable cost (1,50,000 × 60)	90,00,000
Contribution	60,00,000
Less: Fixed cost	24,00,000
Profit	36,00,000
Less: Income tax @ 40%	14,40,000
Net Return	21,60,000
Rate of net return on sales $\left(\frac{21,60,000}{1,50,00,000} \times 100\right)$	14.40%

(b) Contribution per unit of Product X = 100 – 60 = ₹ 40

Contribution per unit of Product Y = 150 – 100 = ₹ 50

Overall contribution per unit = $\left(40 \times \frac{5}{8}\right) + \left(50 \times \frac{3}{8}\right) = ₹ 43.75$

Overall Break-even point = $\frac{Fixed\ cost}{Overall\ Contribution\ per\ unit} = \frac{28,00,000}{43.75} = 64,000$ units

Break-even point of Product X = 64,000 × 5/8 = 40,000 units

Break-even point of Product Y = 64,000 × 3/8 = 24,000 units

Question – 9	

LR Ltd. is considering two alternative methods to manufacture product it intends to market. The two methods have a maximum output of 50,000 units each and produce identical items with a selling price of ₹ 25 each. The costs are:

	Method – I Semi-Automatic (₹)	Method – II Fully automatic (₹)
Variable cost per unit	15	10
Fixed costs	1,00,000	3,00,000

You are required to calculate:

(i)   Cost Indifference Point in units. Interpret your results.

(ii)   The Break-even point of each method in terms of units

Solution

(i)   Let cost indifference units = y

Thus, Total cost of Method – I = Total cost of Method – II

1,00,000 + 15y = 3,00,000 + 10y

5y = 2,00,000

y = 40,000

At y = 40,000 units, cost of the two methods will be equal.

If quantity produced is more than 40,000 units than option where variable cost per unit is low i.e. Method - II will have greater benefits in term of cost. If quantity produced is less than 40,000 units than option with lowest fixed cost i.e. Method – I will have greater benefits in terms of total cost.

(ii)   **Statement of Break-even point**

Particulars	Method – I	Method - II
Contribution per unit (A)	25 – 15 = 10	25 – 10 = 15
Fixed cost (B)	1,00,000	3,00,000
Break-even point (in units) (B÷A)	10,000	20,000

Question – 10	

Two manufacturing companies A and B are planning to merge. The details are as follows:

	A	B
Capacity utilization (%)	90	60
Sales (₹)	63,00,000	48,00,000
Variable Cost (₹)	39,60,000	22,50,000
Fixed Cost (₹)	13,00,000	15,00,000

Assuming that the proposal is implemented, calculate:

(i) Break-Even sales of the merged plant and the capacity utilization at that stage.

(ii) Profitability of the merged plant at 80% capacity utilization.

(iii) Sales Turnover of the merged plant to earn a profit of ₹ 60,00,000.

(iv) When the merged plant is working at a capacity to earn a profit of ₹ 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

Solution

(i)   **Statement of Profit**   (₹ in lakhs)

Particulars	Plant A	Plant B	Total
Sales	63÷90% = 70	48÷60% = 80	150
(-) Variable Cost	39.6÷90% = 44	22.5÷60% = 37.50	81.50
Contribution	26	42.50	68.50
(-) Fixed Cost	13	15	28
Profit	13	27.50	40.50

Overall P\V Ratio $= \frac{Contribution}{Sales} \times 100 = \frac{68,50,000}{1,50,00,000} \times 100 = 45.67\%$

Overall Break-even point (in ₹) $= \frac{Fixed\ Cost}{Overall\ P\backslash V\ Ratio} = \frac{28,00,000}{45.67\%} = ₹\ 61,30,939$

Break-even point capacity $= \frac{Break-even\ sales}{Total\ Sales\ at\ 100\%\ level} \times 100 = \frac{61,30,939}{1,50,00,000} \times 100 = 40.87\%$

(ii) Sales at 80% level = 1,50,00,000 × 80% = ₹ 1,20,00,000

Profit = Contribution – Fixed Cost = (1,20,00,000 × 45.67%) – 28,00,000 = ₹ 26,80,400

(iii) Desired Sales $= \frac{Fixed\ Cost + Desired\ Profit}{Overall\ P\backslash V\ Ratio} = \frac{28,00,000 + 60,00,000}{45.67\%} = ₹\ 1,92,68,867$

(iv) Increase in fixed cost = 28,00,000 × 5% = ₹ 1,40,000

∴ Percentage increase in selling price $= \frac{1,40,000}{1,92,68,867} \times 100 = 0.726\%$

Question – 11

A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

(i) On 1st January, 2019, the company has an opening stock of 20,000 packets whose variable cost is ₹ 180 per packet.

(ii) In 2018, production was 1,20,000 packets and the expected production in 2019 is 1,50,000 packets. Expected sales for 2019 is 1,60,000 packets.

(iii) In 2018, fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 2019. The variable cost is expected to increase by 25%. Selling price for 2019 has been fixed at ₹ 300 per packet.

You are required to calculate the Break-even volume in units for 2019.

Solution

Total fixed cost for year 2019 = 1,20,000× 60 × 110% = ₹ 79,20,000

Contribution per unit upto first 20,000 units (Opening stock units) = 300 – 180 = ₹ 120

Contribution per unit beyond 20,000 units (After sale of opening stock) = 300 – (180 × 125%) = ₹ 75

Total contribution on first 20,000 units = ₹ 20,000 × 120 = ₹ 24,00,000

Thus, fixed cost recovered from initial sale of 20,000 units = ₹ 24,00,000

Balance fixed cost to be recovered = ₹ 79,20,000 – ₹ 24,00,000 = ₹ 55,20,000

Units to be sold for recovery of additional fixed cost = $\dfrac{55,20,000}{75}$ = 73,600 units

Thus, Break-even point = 20,000 + 73,600 = 93,600 units

Question – 12

JC Ltd. has a production capacity of 80,000 units per year. Presently a company produces 60,000 units. Its cost structure is as under:

Material Cost	₹6 per unit
Labour Cost	₹4 per unit
Variable overheads	₹2 per unit

Total fixed cost ₹3,00,000 per annum. Present selling price ₹20 per unit in the month of January, 2024 company received an offer from a Japanese client to supply 20,000 units at a price of ₹14 per unit with the additional shipping cost of ₹8,000.

Required:

(i)   On the basis of changes in the profit, advice to the company, whether the offer should be accepted or not?

(ii)   Will your advice be different, if the customer is local one?

(iii) If Japanese client offer for supply of 30,000 units to a price of ₹14 (part supply of order not accepted) and shipping cost treated as variable cost, analyze the impact on the profit of JC Ltd., if order accepted.

Solution

(i)   Statement Showing "Cost and Profit under Both Situation"

Particulars	Existing Production (60,000 units) (₹)	After Offer (80,000 units) (₹)
Sales		
Existing (60,000 × ₹20)	12,00,000	12,00,000
Offer (20,000 × ₹14)	-	2,80,000
Total Sales	12,00,000	14,80,000
Less: Direct Materials @ ₹6	3,60,000	4,80,000
Direct Labour @ ₹4	2,40,000	3,20,000
Variable Overheads @ ₹2	1,20,000	1,60,000
Contribution	4,80,000	5,20,000
Less: Additional Shipping cost	–	8,000
Less: Fixed Cost	3,00,000	3,00,000
Profit	**1,80,000**	**2,12,000**

Since the Profit has increased by ₹32,000, the proposal of the Japanese client should be accepted

(ii) Yes, the advice will be different, if the customer is local one since the company is currently selling at ₹20 in local market and therefore, selling at discounted price of ₹14 may impact its local market.

(iii) Statement Showing "Cost and Profit"

Particulars	After Offer (80,000 units) (₹)
Sales	
Existing (50,000 × ₹20)	10,00,000
Offer (30,000 × ₹14)	4,20,000
Total Sales	14,20,000
Less: Direct Materials @ ₹6	4,80,000
Direct Labour @ ₹4	3,20,000
Variable Overheads @ ₹2	1,60,000
Additional Shipping cost (₹8,000/20,000 units) × 30,000 units	12,000
Contribution	4,48,000
Less: Fixed Cost	3,00,000
Profit	**1,48,000**

If offer of Japanese client to supply 30,000 units at a price of ₹14 is accepted, the Profit will decrease by ₹32,000 from the current level.

Question – 13

Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse it's production mix in respect of these three products – 'X', 'Y' and 'Z'.

You have the following information:

	X	Y	Z
Direct materials (₹) per unit	160	120	80
Variable overheads (₹) per unit	8	20	12

Direct labour:

Departments:	Rate per hour (₹)	Hours per unit X	Hours per unit Y	Hours per unit Z
Department-A	4	6	10	5
Department-B	8	6	15	11

From the current budget, further details are as below:

	X	Y	Z
Annual production at present (in units)	10,000	12,000	20,000
Estimated selling price per unit (₹)	312	400	240
Sales department estimate of possible sales in the coming year (in units)	12,000	16,000	24,000

There is a constraint on supply of labour in Department-A and its manpower cannot be increase beyond its present level.

Required:

(i) Identify the best possible product mix of Moon Ltd.

(ii) Calculate the total contribution from the best possible product

Solution

Present supply of labour hours in Department-A

= (10,000 × 6) + (12,000 × 10) + (20,000 × 5) = 2,80,000 labour hours

Statement of Contribution

Particulars	X	Y	Z
Selling price per unit	312	400	240
(-) Direct material per unit	160	120	80
(-) Labour cost per unit			
Department A	4×6 = 24	4×10 = 40	4×5 = 20
Department B	8×6 = 48	8×15 = 120	8×11 = 88
(-) Variable overheads per unit	8	20	12
Contribution per unit	72	100	40
Labour hours per unit	6	10	5
Contribution per labour hour	12	10	8
Rank	I	II	III

Statement of Product Mix and Contribution

Product	Units	Labour hours per unit	Labour Hours consumed	Contribution
X	12,000	6	72,000	72,000×12 = 8,64,000
Y	16,000	10	1,60,000	1,60,000×10 = 16,00,000
Z	48,000÷5 = 9,600	5	(Bal. fig.) 48,000	48,000×8 = 3,84,000
	37,600		2,80,000	28,48,000

Question – 14

ABC Ltd. is a well-known company for producing baby care products. The company produces and sells two variants of organic shampoo for children: "Baby Rose" and "Baby Lily". The sales and cost data for both products are provided below:

Particulars	Baby Rose	Baby Lily
Current demand and Sales (Number of bottles)	4,000	3,000
Production Capacity (Number of bottles)	7,500	6,000
Selling Price per bottle (₹)	600	750
Variable Costs per bottle:		
- Direct Materials (₹20 Per litre)	160	200
- Other Variable Costs	270	350

The fixed costs amount to ₹5,00,000 and ₹4,50,000 for Baby Rose and Baby Lily respectively. The Production Manager has informed that 1,00,000 litres of material is available for production. A dealer has approached the company and proposed to purchase both products at the existing selling prices, which are to be produced by utilizing the remaining unused material. However, he has insisted that all the bottles must be packed with eco-friendly packaging, which will result in an additional cost of ₹10 per bottle for the company. Presently, the company is not using eco-friendly material for packing of bottles.

Required:
Prepare a detailed statement showing the overall contribution and profit of the company after acceptance of the dealer's proposal.

Solution

Particulars	Baby Rose (₹)	Baby Lily (₹)	Total (₹)
Selling price per bottle	600	750	–
Less: Direct Materials	160	200	–
Other variable costs	270	350	–
Contribution per bottle Before additional packaging	170	200	–
Contribution per bottle per unit of raw material Before additional packaging	21.25	20	
Ranking on the basis of Contribution per bottle per unit of raw material	I	II	

Particulars	Current Sales (WN2) (₹)	Additional Sales of Baby Rose (3,500 bottles) (₹)	Additional Sales of Baby Lily (1,000 bottles) (₹)	Total (₹)
Selling price per bottle	–	600	750	–
Less: Direct Materials	–	160	200	–
Other variable costs	–	270	350	–
Additional packaging	–	10	10	
Contribution per unit	–	160	190	–
Total Contribution	12,80,000	5,60,000	1,90,000	20,30,000
Less: Fixed Cost	9,50,000	–	–	9,50,000
Profit	3,30,000	5,60,000	1,90,000	10,80,000

WN1

	Baby Rose	Baby Lily
Raw Material used per unit of bottle (a)	8 litres (₹160/ ₹20)	10 litres (₹200/ ₹20)
Current Demand and Sales (b)	4,000 bottles	3,000 bottles
Total Raw Material used (c = a × b)	32,000 litres	30,000 litres

WN2

Statement showing the current contribution and profit of the company

Particulars	Baby Rose	Baby Lily	Total
	(₹)	(₹)	(₹)
Selling price per bottle	600	750	–
Less: Direct Materials	160	200	–
Other variable costs	270	350	–
Contribution per bottle Before additional packaging	170	200	–
Contribution per bottle per unit of raw material Before additional packaging	21.25	20	
Total Contribution Before additional packaging	6,80,000	6,00,000	12,80,000
Less: Fixed Cost	5,00,000	4,50,000	9,50,000
Profit	1,80,000	1,50,000	3,30,000

WN3

Raw Material available after current sales = 1,00,000 litres – 62,000 litres = 38,000 litres
Since the contribution per unit of Baby Rose is higher than Baby Lily, the company will produce and sale Baby Rose shampoo to the dealer.

Number of units that can be produced in 38,000 litres = 38,000 litres/8 litres = 4,750 bottles
However, the Production capacity of Baby Rose is 7,500 bottles, only 3,500 bottles can be produced.
Raw materials used in 3,500 bottles = 8 litres × 3,500 bottles = 28,000 litres
Remaining material = 10,000 litres
Number of Baby Lily that can be produced in 10,000 litres = 10,000 litres/10 litres = 1,000 bottles

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Question – 15

The profit for the year of SK Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Sales	₹ 5,00,000
Direct Materials	₹ 2,50,000
Direct Labour	₹ 1,00,000
Variable Overheads	₹ 40,000
Capital Employed	₹ 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in selling price of 4% and an over cost reduction in all the elements of cost by 2%.

Required:

Find out by computing in details the cost and profit for the next year, whether the proposal of sales manager can be adopted.

Solution

Statement of Calculation of Fixed Overheads

Particulars	Amount
Sales	5,00,000
(-) Profit (4,00,000 × 12.5%)	50,000
Total Cost	4,50,000
(-) Direct material	2,50,000
(-) Direct labour	1,00,000
(-) Variable overheads	40,000
Fixed overheads	60,000

Statement of Profit (Proposed Situation)

Particulars	Amount
Sales [$5,00,000 \times \frac{110}{100} \times \frac{104}{100}$]	5,72,000
(-) Variable cost [$(2,50,000 + 1,00,000 + 40,000) \times \frac{110}{100} \times \frac{98}{100}$]	4,20,420
Contribution	1,51,580
(-) Fixed Overheads ($68,000 \times \frac{98}{100}$)	58,800
Profit	92,780

Profit as % of capital employed $= \frac{92,780}{4,00,000} \times 100 = 23.195\%$

Since the profit as % of capital employed is increasing, thus it is recommended to accept the proposal.

Question – 16

SK Ltd. manufactures three different products and the following information has been collected form the books of accounts:

	Products		
	S	**K**	**M**
Sales Mix	35%	35%	30%
Selling price	₹ 300	₹ 400	₹ 200
Variable cost	₹ 150	₹ 200	₹ 120
Total Fixed costs			₹ 18,00,000
Total Sales			₹ 60,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of product M and replace it with Product J, when the following results are anticipated:

	Products		
	S	K	J
Sales Mix	50%	25%	25%
Selling price	₹ 300	₹ 400	₹ 300
Variable cost	₹ 150	₹ 200	₹ 150
Total Fixed costs			₹ 18,00,000
Total Sales			₹ 64,00,000

Required:

(i) Compute the PV ratio, total contribution, profit and Break-even sales for the existing product mix.

(ii) Compute the PV ratio, total contribution, profit and Break-even sales for the proposed product mix.

Solution

(i) **Computation of PV ratio**

	Products		
	S	K	M
Selling price	300	400	200
Less: Variable cost	150	200	120
Contribution per unit	150	200	80
PV ratio	50%	50%	40%

Overall PV Ratio = Weighted average PV ratio = $(50 \times 0.35) + (50 \times 0.35) + (40 \times 0.30) = 47\%$

Total Contribution = Sales × Overall PV Ratio = $60,00,000 \times 47\% = ₹ 28,20,000$

Total Profit = Contribution – Fixed Cost = $28,20,000 – 18,00,000 = ₹ 10,20,000$

Break-even Sales $= \dfrac{Fixed\ Cost}{Pverall\ PV\ Ratio} = \dfrac{18,00,000}{47\%} = ₹ 38,29,787$

(ii) **Computation of PV ratio**

	Products		
	S	K	J
Selling price	300	400	300
Less: Variable cost	150	200	150
Contribution per unit	150	200	150
PV ratio	50%	50%	50%

Overall PV Ratio = Weighted average PV ratio = $(50 \times 0.50) + (50 \times 0.25) + (50 \times 0.25) = 50\%$

Total Contribution = Sales × Overall PV Ratio = $64,00,000 \times 50\% = ₹ 32,00,000$

Total Profit = Contribution – Fixed Cost = $32,00,000 – 18,00,000 = ₹ 14,00,000$

Break-even Sales $= \dfrac{Fixed\ Cost}{Pverall\ PV\ Ratio} = \dfrac{18,00,000}{50\%} = ₹ 36,00,000$

Question – 17

SK Ltd. has a production capacity of 2,00,000 units per year. Normal capacity utilization is reckoned as 90%. Standard variable production costs are ₹ 11 per unit. The fixed costs are ₹ 3,60,000 per year. Variable selling costs are ₹ 3 per unit and fixed selling costs are ₹ 2,70,000 per year. The unit selling price is ₹ 20.

In the year just ended on 31st March, 2019, the production was 1,60,000 units and sales were 1,50,000 units. The closing inventory on 31st March was 20,000 units. The actual variable production costs for the year were ₹ 35,000 higher than the standard.

(a) Calculate the profit for the year

    (i) By absorption costing method and

    (ii) By marginal costing method

(b) Explain the difference in the profits

Solution

Working Note

Particulars	Year 2019
Opening stock	(Bal. fig.) 10,000
(+) Production	1,60,000
(-) Sales	1,50,000
Closing Stock	20,000

(a)   **Income Statement under Absorption Costing**

Particulars	Amount
Sales (A)	1,50,000×20 = 30,00,000
Variable Production Cost	1,60,000×11 = 17,60,000
Under Recovered Variable Prod. Cost	35,000
Fixed Production	$\frac{3,60,000}{2,00,000×90\%}×1,60,000 = 3,20,000$
GFC/NFC/COP	21,15,000
(+) Op. Stock FG	10,000×(11 + 2) = 1,30,000
(-) Cl. Stock FG	$\frac{21,15,000}{1,60,000}×20,000 = 2,64,375$
COGS	19,80,625
(+) Variable Selling Cost	1,50,000×3 = 4,50,000
(+) Fixed Selling Cost	2,70,000
COS	27,00,625
(+) Under Recovered Fixed Prod. Cost	3,60,000 – 3,20,000 = 40,000
Total Cost (B)	27,40,625
Profit (A – B)	2,59,375

Income Statement under Marginal Costing

Particulars	Year 2019
Sales (A)	1,50,000×20 = 30,00,000
Variable Production Cost	1,60,000×11 = 17,60,000
Under recovered variable Prod. Cost	35,000
Variable GFC/NFC/COP	17,95,000
(+) Op. Stock FG	10,000×11 = 1,10,000
(-) Cl. Stock FG	$\frac{17,95,000}{1,60,000} \times 20,000 = 2,24,375$
Variable COGS (B)	16,80,625
(+) Variable Selling cost	1,50,000×3 = 4,50,000
Variable COS (B)	21,30,625
Contribution (A – B)	8,69,375
(-) Fixed Production Cost	3,60,000
(-) Fixed Selling Cost	2,70,000
Profit	2,39,375

(b) The difference in profit is due to the valuation of stock in both methods.

Question – 18

Mefttal Ltd. is currently operating at 60% of its total capacity which is 1.5 times than the previous year. The total capacity of the company is 2,00,000 units.

Other information relating to the production is provided below:
   (i)   The total cost of production for the current year is ₹ 59,28,000, and for the previous year, it was ₹ 44,72,000.
   (ii) No changes are anticipated in the cost structure for the upcoming years.
   (iii) Selling price is ₹ 52 per unit and is expected to remain the same in the coming years.
You are required to calculate Break-Even Point (in units)
      (a) 1,20,000 units   (b) 40,000 units
      (c) 80,000 units   (d) 1,00,000 units

Question – 19

A garment manufacturer has been producing and selling T-shirts exclusively for Indian market. His T-shirts are made of a specific material which is eco-friendly. It means that T-shirts are bio-degradable in soil after it becomes unsuitable for use.

This invention has been applauded throughout the country. Owner, Vikas, registered for the patent rights for his invention so that no one else could use it. Vikas feels that this invention will also be liked

in foreign markets, and thus plans to expand his business outside India. He feels that US market is the first foreign market he should tap into.

Current cost structure (each T-shirt):

Direct material	90
Direct labour	60
Special service	80
(Used in T-shirt making, 50% fixed)	
Fixed overhead	50
Administration overhead (fixed)	20
Total cost per T-shirt	300
(+) Profit margin	200
Selling price in India	500

There is no limitation of any resources in India. Vikas is able to sell 80,000 T-shirts each year. He is currently working at 80% of his total capacity.

After searching for potential customers in US, Vikas received an inquiry for 30,000 units from a wholesale distributor in California. As per the inquiry, order will be placed if price per T-shirt is reasonable and the order has to be satisfied in full.

Vikas decided to send a quote and the order was placed by the foreign client, on the same day. Vikas, without a second thought accepted the order, but did not feel the need to extend the manufacturing capacity; therefore he decided forgo a few Indian clients.

This foreign order also required special packaging. It is spent at 20% of the total prime cost per T-shirt. The production was done quickly and foreign consignment was transported to custom port via services from a carriage agency. It charged ₹ 80,000 for 1 truck, whose capacity was 500 kg, to transport whole of the consignment. Truck was 20% vacant after loading the consignment.

Bill of lading was filed and a professional fee of ₹ 25,000 for filing this was paid to a Chartered accountant. Custom port also charged ₹ 80 per kg per day to handle the material, storing it in warehouse, and for loading the goods on ship.

The shipping company, which was booked by Vikas for taking the consignment to US, got delayed due to bad weather. Stock was held at port for 5 days and on 6th day it was loaded on ship. Shipping company charged ₹ 2,800/ 10kg of goods. Insurance was charged flat at ₹ 1,11,000. There is no custom duty on such exports. Answer the following questions:

Question – 1
Vikas had sufficient funds in his hands but he still raised a short-term working capital loan @ 6.5% p.a. for the satisfaction of this foreign order because he found a one time investment opportunity which was giving him 9.25% returns. Foreign order was accepted on 1st June and loan was taken on the same

day. Repayment of the loan will be made on 1st September. Calculate net cash outflow due to this export order. Which of the following is correct?

(a) ₹ 73,91,000
(b) ₹ 75,47,750
(c) ₹ 74,76,500
(d) ₹ 71,06,000

Question – 2

What would have been the minimum price that Vikas could have quoted per T-shirt in US dollars? (exchange rate on 1st June, $1 = ₹ 83.86)

(a) $ 4.23
(b) $ 4.20
(c) $ 4.17
(d) $4.05

Question – 3

Payment from foreign client was received on 8th October when exchange rate was ₹ 86 for each US $. Calculate the profit earned from this export order if actual quoted price was $4.90 per T-shirt. Select the correct amongst following:

(a) ₹ 40,65,500
(b) ₹ 41,51,000
(c) ₹ 39,94,250
(d) ₹ 44,36,000

Question – 4

What is the net cash Inflow from this export order?

(a) ₹ 55,36,000
(b) ₹ 51,65,500
(c) ₹ 52,51,000
(d) ₹ 50,94,250

Question – 5

What is the Incremental benefit from this export order?

(a) ₹ 19,94,250
(b) ₹ 21,51,000
(c) ₹ 20,65,500
(d) ₹ 24,36,000

1	2	3	4	5
B	A	C	D	A

BUDGET & BUDGETARY CONTROL - CONCEPTS

1. **Types of budget**

   (A) Master Budget – Summary budget of entire organization

   (B) Period – Wise Budget

   Long term budget – Beyond 3 years

   Short term budget – 1 to 3 years

   Current budget – Upto 1 year

   (C) Fixed Budget – Doesn't change with change in units or output

   (D) Flexible Budget – Can be changed with change in units or output

   (E) Function wise Budget

   Sales Budget

   Production Budget

   Material Consumption Budget

   Material Purchase Budget

   Labour Budget

   Overheads Budget

   Capital budget

   Cash Budget

   Plant Utilization Budget

   Research & Development Cost Budget

2. Type of Costs
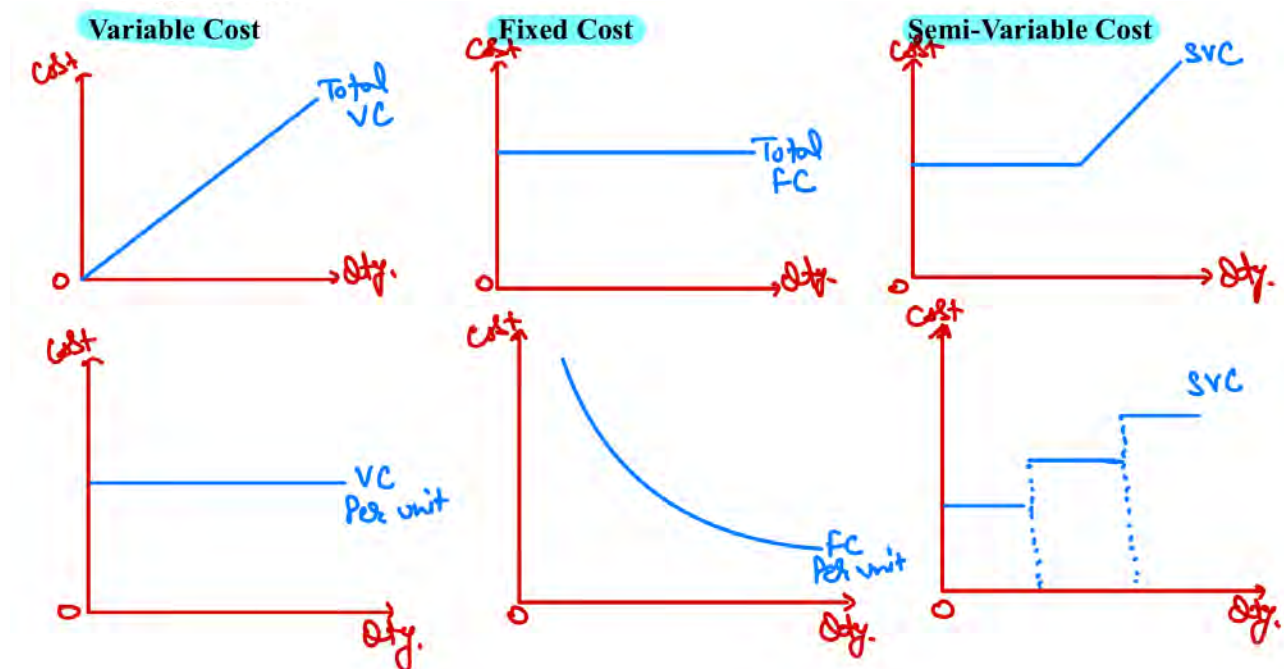
3. Total Cost = No. of units × Cost per unit

4. Quantity & Price Effect

	Total Variable Cost	Total Fixed Cost
Quantity Effect	Yes	No
Price Effect	Yes	Yes

5. Points to Remember (PTRs)

Unless otherwise provided, following assumptions are to be taken

- VC per unit will remain same
- Total Fixed cost will remain same
- All direct cost are assumed to be variable
- All overheads are assumed to be fixed

Wages $\propto \dfrac{1}{Efficiency}$ and   Efficiency $\propto$ Output

6. Distribution of Semi-Variable Cost

Variable cost per unit out of SVC = $\dfrac{Difference\ in\ cost}{Difference\ in\ units}$

Fixed cost out of SVC = Total cost – Total variable cost

7. Sales Budget

Product	Units	Selling price per unit	Sales
A	-	-	-
B	-	-	-
C	-	-	-
Total	-		-

8.   Production Budget

Particulars	Product A	Product B	Product C
Sales	-	-	-
(+) Closing Stock	-	-	-
(-) Opening Stock	-	-	-
Production units	-	-	-

9.   Raw Material Consumption Budget

Product	Prod. Quantity	RM consumption per unit	Total RM Consumption
A	-	-	-
B	-	-	-
C	-	-	-
	-	-	-

10.   Raw Material Purchase Budget

Particulars	January	February	March
Raw Material Consumed	-	-	-
(+) Closing Stock	-	-	-
(-) Opening Stock	-	-	-
Raw Material Purchased	-	-	-

11.   Labour Budget

Particulars	Product A	Product B	Product C

Production Units	-	-	-
Direct labour hour per unit	-	-	-
Total Labour hours	-	-	-
Total Labour cost @ Rs. __ per hour	-	-	-

BUDGET & BUDGETARY CONTROL – QUESTIONS

Question – 1

PJ Ltd. manufactures hockey sticks. It sells the products at ₹ 500 each and makes a profit of ₹ 125 on each stick. The Company is producing 5,000 stocks annually by using 50% of its machinery capacity. The cost of each stick is as under:

Direct material	₹ 150
Direct wages	₹ 50
Work Overheads	₹ 125 (50% fixed)
Selling Expenses	₹ 50 (25% variable)

The anticipation for the next year is that cost will go up as under:

Fixed charges	10%
Direct wages	20%
Direct material	5%

There will not be any change in selling price There is an additional order for 2,000 sticks in the next year. Calculate the lowest price that can be quoted so that the Company can earn the same profit as it earned in the current year?

Solution

Statement of calculation of selling price

Particulars	Amount (₹)
Direct Material [(150 + 5%) × 7,000]	11,02,500
Direct Wages [(50 + 20%) × 7,000]	4,20,000
Variable Works Overhead [125 × 50% × 7,000]	4,37,500
Fixed Works Overhead [125 × 50% × 5,000 × 110%]	3,43,750
Variable Selling Expenses [50 × 25% × 7,000]	87,500
Fixed Selling Expenses [50 × 75% × 5,000 × 110%]	2,06,250
Total Cost	25,97,500
Add: Desired Profit (125 × 7,000)	8,75,000
Total Sales Value	34,72,500
Less: Existing Sales from 5,000 units [5,000 × 500]	25,00,000
Sales value to be obtained from remaining 2,000 units (A)	9,72,500
Sale units (B)	2,000
Selling price per unit (A ÷ B)	486.25

Question – 2

During the FY 2020-21, SK Limited has produced 60,000 units operating at 50% capacity level. The cost structure at the 50% level of activity is as under:

	(₹)
Direct material	300 per unit
Direct wages	100 per unit
Variable overheads	100 per unit
Direct Expenses	60 per unit
Factory expenses (25% fixed)	80 per unit
Selling and Distribution expenses (80% variable)	40 per unit
Office and administrative expenses (100 % fixed)	20 per unit

The company anticipates that in FY 2021-22, the variable costs will go up by 20% and fixed costs will go up by 15%. The selling price per unit will increase by 10% to ₹ 880. Required:

(i) Calculate the budgeted profit/loss for the FY 2020-21.

(ii) Prepare an expense budget on marginal cost basis for the FY 2021-22 for the company at 50% and 60% level of activity and find out the profits at respective levels.

Solution

(i) Calculation of Budgeted Profit for the year FY 2020-21

	60,000 Units	
	Per Unit	**Total**
Sales (A)	800.00	4,80,00,000
Variable Cost		
Direct material	300.00	1,80,00,000
Direct wages	100.00	60,00,000
Variable overheads	100.00	60,00,000
Direct expenses	60.00	36,00,000
Variable factory exp. (80×75%)	60.00	36,00,000
Variable selling exp. (40×80%)	32.00	19,20,000
Total Variable cost (B)	652	3,91,20,000
Fixed Cost		
Office and admin. Exp. (100%)	-	12,00,000
Fixed factory exp. (25%)	-	12,00,000
Fixed selling & dist. Exp. (20%)	-	4,80,000
Total Fixed cost (C)	-	28,80,000
Total cost (B+C = D)	-	4,20,00,000
Profit (A – D)	**-**	**60,00,000**

(ii) Expenses Budget for the year FY 2021-22 at 50% & 60% level

	60,000 units		72,000 units	
	Per Unit	**Total**	**Per Unit**	**Total**
Sales (A)	880	5,28,00,000	880	6,33,60,000
Variable Cost				
Direct material	360.00	2,16,00,000	360.00	2,59,20,000

Direct wages	120.00	72,00,000	120.00	86,40,000
Variable overheads	120.00	72,00,000	120.00	86,40,000
Direct expenses	72.00	43,20,000	72.00	51,84,000
Variable factory exp. (80×75%)	72.00	43,20,000	72.00	51,84,000
Variable selling exp. (40×80%)	38.40	23,04,000	38.40	27,64,800
Total Variable cost (B)	782.40	4,69,44,000	782.40	5,63,32,800
Fixed Cost				
Office and admin. Exp. (100%)	-	13,80,000	-	13,80,000
Fixed factory exp. (25%)	-	13,80,000	-	13,80,000
Fixed selling & dist. Exp. (20%)	-	5,52,000	-	5,52,000
Total Fixed cost (C)	-	33,12,000	-	33,12,000
Total cost (B + C = D)	-	5,02,56,000	-	5,96,44,800
Profit (A – D)	**-**	**25,44,000**	**-**	**37,15,200**

Question – 3

The Accountant of KPMR Ltd. has prepared the following budget for the coming year 2022 for its two products 'AYE' and 'ZYE':

Particulars	Product 'AYE'	Product 'ZYE'
Production and Sales (in Units)	4,000	3,000
	Amount (in ₹)	Amount (in ₹)
Selling price per unit	200	180
Direct material per unit	80	70
Direct labour per unit	40	35
Variable overhead per unit	20	25
Fixed overhead per unit	10	10

After reviewing the above budget, the management has called the marketing team for suggesting some measures for increasing the sales. The marketing team has suggested that by promoting the products on social media, the sales quantity of both the products can be increased by 5%. Also, the selling price per unit will go up by 10%. But this will result in increase in expenditure on variable overhead and fixed overhead by 20% and 5% respectively for both the products.

You are required to prepare flexible budget for both the products:
(i)   Before promotion on social media
(ii)   After promotion on social media

Solution

(i) Flexible Budget (Before promotion)

Particulars	Product AYE	Product ZYE	Total
Sales	4,000 × 200 = 8,00,000	3,000 × 180 = 5,40,000	13,40,000
Less: Direct Material	4,000 × 80 = 2,40,000	3,000 × 70 = 2,10,000	4,50,000
Less: Direct labour	4,000 × 40 = 1,60,000	3,000 × 35 = 1,05,000	2,65,000

Less: Variable OHs	4,000 × 20 = 80,000	3,000 × 25 = 75,000	1,55,000
Less: Fixed OHs	4,000 × 10 = 40,000	3,000 × 10 = 30,000	70,000
Profit	2,80,000	1,20,000	4,00,000

(ii) Flexible Budget (After promotion)

Particulars	Product AYE	Product ZYE	Total
Sales	4,200 × 220 = 9,24,000	3,150 × 198 = 6,23,700	15,47,700
Less: Direct Material	4,200 × 80 = 3,36,000	3,150 × 70 = 2,20,500	5,56,500
Less: Direct labour	4,200 × 40 = 1,68,000	3,150 × 35 = 1,05,000	2,73,000
Less: Variable OHs	4,200 × 24 = 1,00,800	3,150 × 25 = 1,10,250	2,11,050
Less: Fixed OHs	40,000 + 5% = 42,000	30,000 + 5% = 31,500	73,500
Profit	2,77,200	1,56,450	4,33,650

Question – 4

PSV Ltd. manufactures and sells a single product and estimated the following related information for the period November, 2020 to March, 2021.

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Opening Stock of Finished goods (in Units)	7,500	3,000	9,000	8,000	6,000
Sales (in Units)	30,000	35,000	38,000	25,000	40,000
Selling Price per unit (in ₹)	10	12	15	15	20

Additional information:

- Closing stock of finished goods at the end of march, 2021 is 10,000 units
- Each unit of finished output requires 2kg of Raw Material 'A' and 3kg of Raw Material 'B'.

You are required to prepare the following budgets for the period November, 2020 to March 2021 on monthly basis:

(i)   Sales budget (in ₹)
(ii) Production Budget (in units) and
(iii) Raw material budget for raw material 'A' and 'B' separately (in units)

Solution

(i)   **Sales Budget**

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Sales (in Units)	30,000	35,000	38,000	25,000	40,000
Selling Price per unit (in ₹)	10	12	15	15	20
Sales Value	3,00,000	4,20,000	5,70,000	3,75,000	8,00,000

(ii)   **Production Budget**

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Sales Units	30,000	35,000	38,000	25,000	40,000
Add: Closing Stock Units	3,000	9,000	8,000	6,000	10,000
Less: Opening Stock Units	(7,500)	(3,000)	(9,000)	(8,000)	(6,000)
Production Units	25,500	41,000	37,000	23,000	44,000

(iii)   **Raw Material 'A' Budget**

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Production Units	25,500	41,000	37,000	23,000	44,000
Raw material consumption per unit	2	2	2	2	2
Raw Material Consumption	51,000	82,000	74,000	46,000	88,000

Raw Material 'B' Budget

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Production Units	25,500	41,000	37,000	23,000	44,000
Raw material consumption per unit	3	3	3	3	3
Raw Material Consumption	76,500	1,23,000	1,11,000	69,000	1,32,000

Question – 5

AB manufacturing Company manufactures two products A and B. Both Products use a common Raw Material 'C'. The Raw Material 'C' is purchased at the rate of ₹ 45 per kg from the Market. The Company has made estimates for the year ended 31st March, 2018 (the budget period) as under:

	Product A	Product B
Sales in Units	36,000	16,700
Finished goods stock increase by year-end (in Units)	860	400
Post-production Rejection Rate (%)	3	5
Material 'C' per completed Unit, net of wastage	4 kg	5 kg
Material 'C' wastage in %	5	4

Additional information available is as under:

- Usage of Raw Material 'C' is expected to be at a constant rate over the period.
- Annual cost of holding one unit of Raw Material 'C' in Stock is 9% of the Material Cost.
- The cost of placing an order is ₹ 250 per order.

You are required to:

(i)   Prepare Functional Budgets for the year ended 31st March, 2018 under the following categories:
   a) Production Budget for Products A and B in Units
   b) Purchase Budget for Raw Material 'C' in kg and value.
(ii) Calculate the Economic Order Quantity (EOQ) in kg for Raw Material 'C'.

Solution

(i)   **Production Budget (in units) for the year ended 31st March 2018**

Particulars	Product A	Product B
Budgeted sales (units)	36,000	16,700
Add: Increase in closing stock	860	400
No. of good units to be produced	36,860	17,100
Post production rejection rate	3%	5%
Post production good units rate	100% – 3% = 97%	100% - 5% = 95%
No. of units to be produced	36,860 ÷ 97% = 38,000	17,100 ÷ 95% = 18,000

(ii) **Purchase budget (in kgs and value) for Material C**

Particulars	Product A	Product B
No. of units to be produced	38,000	18,000
Usage of Material C per unit of production	4 kg	5 kg
Material needed for production	1,52,000 kg	90,000 kg
Wastage % of Material C	5%	4%
Good usage % of Material C	100% - 5% = 95%	100% - 4% = 96%
Material to be purchased (in kg)	1,52,000÷95% = 1,60,000	90,000÷96% = 93,750
Rate per kg of Material C	₹ 45	₹ 45
Total Purchase cost	1,60,000×45 = 72,00,000	93,750×45 = 42,18,750

Total purchase cost = 72,00,000 + 42,18,750 = ₹ 1,14,18,750

(iii) A = 1,60,000 + 93,750 = 2,53,750 kg

O = ₹ 250

C = ₹ 45 × 9% = ₹ 4.05

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 2,53,750 \times 250}{4.05}} = 5,597 \text{ kg}$$

Question – 6	

A Limited has furnished the following information for the months from 1st January to 30th April, 2023:

	January	February	March	April
Number of working days	25	24	26	25
Production (in units) per working day	50	55	60	52

Raw material purchases (% by weights to total of 4 months)	21%	26%	30%	23%
Purchase price of raw material (per kg)	₹ 10	₹ 12	₹ 13	₹ 11

Quantity of raw material per unit of product: 4 kg

Opening stock of raw material on 1st January: 6,020 kg. (Cost ₹ 63,210)

Closing stock of raw material on 30th April: 5,100 kg.

All the purchases of material are made at the start of each month.

Required:

(i)   Calculate the consumption of raw material (in kgs) month-by-month and in total

(ii)   Calculate the month-wise quantity and value of raw materials purchased

(iii) Prepare the priced stores ledger for each month using the FIFO method.

Solution

(i)   **Calculation of consumption for Raw Material (in kgs) month by month and total**

Particulars	Jan	Feb	March	April	Total
No. of working cays	25	24	26	25	-
Production (per day)	50	55	60	52	-
Production	1,250	1,320	1,560	1,300	5,430
Raw material consumed (in kgs)	5,000	5,280	6,240	5,200	21,720

Calculation of Raw Material Purchased

Purchased	Kg
Closing stock on 30th April	5,100
Add: Raw material consumed	21,720
Less: Opening stock on 1st January	(6,020)
Raw material purchased	20,800

(ii)   **Calculation of month wise quantity and value of raw materials purchased**

Month	Purchase quantity (Kgs)	Price (₹)	Value (₹)
January	20,800 × 21% = 4,368	10	43,680
February	20,800 × 26% = 5,408	12	64,896
March	20,800 × 30% = 6,240	13	81,120
April	20,800 × 23% = 4,784	11	52,624
Total	20,800		2,42,320

(iii) **Stores Price Ledger by using FIFO Method**

Month	Receipts			Issues			Balance		
	Qty. (kg)	Rate (₹)	Amount	Qty. (kg)	Rate (₹)	Amount	Qty. (kg)	Rate (₹)	Amount
Jan	-	-	-	-	-	-	6,020	10.5	63,210
Jan	4,368	10	43,680	-	-	-	6,020	10.5	63,210
							4,368	10	43,680
Jan	-	-	-	5,000	10.5	52,500	1,020	10.5	10,710

Date	Qty	Rate	Amount	Qty	Rate	Amount	Qty	Rate	Amount
							4,368	10	43,680
Feb	5,408	12	64,896	-	-	-	1,020	10.5	10,710
							4,368	10	43,680
							5,408	12	64,896
Feb	-	-	-	1,020	10.5	10,710	108	10	1,080
				4,260	10	42,600	5,408	12	64,896
March	6,240	13	81,120	-	-	-	108	10	1,080
							5,408	12	64,896
							6,240	13	81,120
March	-	-	-	108	10	1,080	5,516	13	71,708
				5,408	12	64,896			
				724	13	9,412			
April	4,784	11	52,624	-	-	-	5,516	13	52,624
							4,784	11	71,708
April	-	-	-	5,200	13	67,600	316	13	4,108
							4,784	11	52,624

Question – 7

An electronic gadget manufacturer has prepared sales budget for the next few months. In this respect, following figures are available:

Month	Electronic gadgets' sales
January	5,000 units
February	5,000 units
March	7,000 units
April	7,500 units
May	8,000 units

To manufacture an electronic gadget, a standard cost of ₹ 1,500 is incurred and it is sold through dealers at an uniform price of ₹ 2,000 per gadget to customers. Dealers are given a discount of 15% on selling price.

Apart from other materials, two units of batteries are required to manufacture a gadget. The company wants to hold stock of batteries at the end of each month to cover 30% of next month's production and to hold stock of manufactured gadgets to cover 25% of the next month's sale. 3,250 units of batteries and 1,200 units of manufactured gadgets were in stock on 1st January.

Required:
(i)   Prepare production budget (in units) for the month of January, February, March and April
(ii)   Prepare purchase budget for batteries (in units) for the month of January, February and March and calculate profit for the quarter ending on March.

Solution

(i)   **Production Budget**

Particulars	January	February	March	April
Budgeted Sales	5,000	6,000	7,000	7,500
Add: Closing Stock	1,500	1,750	1,875	2,000
Less: Opening Stock	(1,200)	(1,500)	(1,750)	(1,875)
Production	**5,300**	**6,250**	**7,125**	**7,625**

Working Notes:

(1) Closing stock of January = 25% × 6,000 = 1,500

Closing stock of February = 25% × 7,000 = 1,750

Closing stock of March = 25% × 7,500 = 1,875

Closing stock of April = 25% × 8,000 = 2,000

(2) Opening stock of February, March and April are taken as equal to closing stock of respective previous month.

(ii)   **Material Purchase Budget**

Particulars	Material A January	February	March
Raw material consumption @₹ 2 per gadget	10,600	12,500	14,250
Add: Closing Stock	3,750	4,275	4,575
Less: Opening Stock	(3,250)	(3,750)	(4,275)
Raw Material Purchase	**53,500**	**53,000**	**44,000**

Working Notes:

(1) Closing stock of material of January = 30% × 12,500 = 3,750

Closing stock of material of February = 30% × 14,250 = 4,275

(2) Raw Material consumption of Material for Month of April = 7,625 × 2 = 15,250

Closing stock of material of March of Material = 30% × 15,250 = 4,575

(3) Opening stock for material for month of February and March are taken as equal to closing stock of respective previous month.

Statement Showing Profit

Particulars	January	February	March	Total
Sales (A)	5,000	6,000	7,000	18,000
Selling price per unit	₹ 2,000	₹ 2,000	₹ 2,000	₹ 2,000
Less: Discount @15% of selling price	₹ 300	₹ 300	₹ 300	₹ 300
Less: Standard cost of manufacturing	₹ 1,500	₹ 1,500	₹ 1,500	₹ 1,500
Profit (B)	₹ 200	₹ 200	₹ 200	₹ 200
Total Profit (A × B)	₹ 10,00,000	₹ 12,00,000	₹ 14,00,000	₹ 36,00,000

Question – 8

SK Ltd. Produces and sells a single product. Sales budget for the calendar year 2019 by quarter is as under:

Quarter	No. of units to be sold
I	12,000
II	15,000
III	16,500
IV	18,000

The year is expected to open with an inventory of 4,000 units of finished product and close with an inventory of 6,500 units.

Production is customarily scheduled to provide for two-thirds of the current quarter's sales demand plus one third of the following quarter's demand. Thus, production anticipates sales volume by about one month.

The standard cost details for one unit of the product is as follows:

Direct materials 10 lbs. @ 50 paise per lb.

Direct labour 1 hour 30 minutes @ ₹ 4 per hour.

Variable overheads 1 hour 30 minutes @ ₹ 1 per hour.

Fixed overheads 1 hour 30 minutes @ ₹ 2 per hour based on a budgeted volume of 90,000 direct labour hour for the year.

(i)   Prepare a production budget for 2019, by quarters, showing the number of units to be produced, and the total costs of direct labour, variable overheads and fixed overheads.

(ii)   If the budgeted selling price per unit is ₹ 17, what would be the budgeted profit for the year as a whole?

(iii)   In which quarter of the year is the company expected to breakeven?

Solution

(i)   **Production Budget**

Particulars	Quarter - 1	Quarter – 2	Quarter – 3	Quarter – 4	Total
Sales units	12,000	15,000	16,500	18,000	61,500
Production					
2/3 of current month	8,000	10,000	11,000	12,000	41,000
1/3 of next month	5,000	5,500	6,000	6,500*	23,000
Production	**13,000**	**15,500**	**17,000**	**18,500**	**64,000**

*This value of 6,500 units is computed as balancing figure.

Working Note -

Annual total production = Sales + closing stock – Opening stock = 61,500 + 6,500 – 4,000 = 64,000

Production for Quarter - 4 = Total production – production of first three quarters

= 64,000 – 13,000 – 15,500 – 17,000 = 18,500

Statement of Cost

Particulars	Quarter - 1	Quarter – 2	Quarter – 3	Quarter – 4	Total
Production units	13,000	15,500	17,000	18,500	64,000
Direct material (10 × 0.5 = 5 p.u.)	65,000	77,500	85,000	92,500	3,20,000
Direct labour (1.5 × 4 = 6 p.u.)	78,000	93,000	1,02,000	1,11,000	3,84,000
Variable Ohs (1.5 × 1 = 1.5 p.u.)	19,500	23,250	25,500	27,750	96,000
Fixed overheads	45,000	45,000	45,000	45,000	1,80,000 (90,000×2)

(ii) **Statement of profit**

Particulars	Amount
Sales (17 × 61,500)	10,45,500
Less: Variable cost $\left[\frac{(3,20,000+3,84,000+96,000)}{64,000} \times 61,500\right]$	7,68,750
Contribution	2,76,750
Less: Fixed costs	1,80,000
Profit	96,750

(iii) Breakeven point $= \dfrac{Fixed\ Cost}{Contribution\ per\ unit} = \dfrac{1,80,000}{\left(\frac{2,76,750}{61,500}\right)} = 40,000$ units

Particulars	Quarter - 1	Quarter – 2	Quarter – 3	Quarter – 4
Sales units	12,000	15,000	16,500	18,000
Cumulative Sales units	12,000	27,000	43,500	61,500

∴ Breakeven will be achieved in quarter 3.

Question – 9

SK Ltd. manufactures two products using two types of materials and one grade of labour. Shown below is an extract from the company's working papers for the next month's budget:

	Product-A	Product-B
Budgeted sales (in units)	2,400	3,600
Budgeted material consumption per unit (in kg):		
Material-X	5	3
Material-Y	4	6
Standard labour hours allowed per unit of product	3	5

Material-X and Material-Y cost ₹ 4 and ₹ 6 per kg and labours are paid ₹ 25 per hour. Overtime premium is 50% and is payable, if a worker works for more than 40 hours a week. There are 180 direct workers.

The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct workers in actually manufacturing the products is 80%. In addition the non-productive down-time is budgeted at 20% of the productive hours worked.

There are four 5-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be:

Product-A = 400 units;   Product-B = 200 units;

Material-X = 1,000 kgs;   Material-Y = 500 kgs.

The anticipated closing stocks for budget period are as below:

Product-A   4 days sales

Product-B   5 days sales

Material-X   10 days consumption

Material-Y   6 days consumption

Required to calculate the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month.

Solution

Number of days in budget period = 4 weeks × 5 days = 20 days

Number of units to be produced

	Product-A (units)	Product-B (units)
Budgeted Sales	2,400	3,600
Add: Closing stock $\left(\frac{2,400\ units}{20\ days} \times 4\ days\right)\left(\frac{3,600\ units}{20\ days} \times 5\ days\right)$	480	900
Less: Opening stock	400	200
	2,480	4,300

(i) Material purchase budget

	Material-X (kg)	Material-Y (kg)
Material required:		
Product-A	12,400 (2,480 units x 5 kg)	9,920 (2,480 units x 4 kg)
Product-B	12,900 (4,300units x 3 kg)	25,800 (4,300units x 6kg)
	25,300	35,720
Add: Closing Stock $\left(\frac{25,300\ kg}{20\ days} \times 10\ days\right)\left(\frac{35,720\ units}{20\ days} \times 6\ days\right)$	12,650	10,716
Less: Opening stock	1,000	500
Quantity to be purchased	36,950	45,936
Rate per kg. of material	₹ 4	₹ 6
Total cost	₹ 1,47,800	₹ 2,75,616

(ii) Wages Budget

	Product-A (Hours)	Product-B (Hours)
Units to be produced	2,480 units	4,300 units
Standard hours allowed per unit	3	5
Total standard hours allowed	7,440	21,500
Productive hours required for production	$\frac{7,440\ hours}{80\%}= 9,300$	$\frac{21,500\ hours}{80\%}= 26,875$
Add: Non-Productive down time	1,860 hours (20% of 9,300 hours)	5,375 hours (20% of 26,875 hours)
Hours to be paid	11,160	32,250

Total Hours to be paid   = 43,410 hours (11,160 + 32,250)

Hours to be paid at normal rate   = 4 weeks × 40 hours × 180 workers = 28,800 hours

Hours to be paid at premium rate   = 43,410 hours – 28,800 hours = 14,610 hours

Total wages to be paid   = (28,800 hours × ₹ 25) + (14,610 hours × ₹ 37.5)

                                  = ₹ 7,20,000 + ₹ 5,47,875 = ₹ 12,67,875

Question – 10

The following extract is taken from the overhead budget of X:

Budgeted activity	50%	75%
Budgeted overhead (₹)	30,00,000	40,00,000

What would be the budgeted overhead for 60% level of activity:

    (a) ₹ 32,00,0000   (b) ₹ 34,00,000

    (c) ₹ 30,00,000   (d) ₹ 36,00,000

Question – 11

SR Ltd. is a manufacturer of Garments. For the first three months of financial year 2022-23 commencing on 1st April, 2022, production will be constrained by direct labour. It is estimated that only 12,000 hours of direct labour hours will be available in each month.

For market reasons, production of either of the two garments must be at least 25% of the production of the other. Estimated cost and revenue per garment are as follows:

	Shirt (₹)	Short (₹)
Sales price	60	44
Raw materials		
Fabric @12 per metre	24	12
Dyes and cotton	6	4
Direct labour @8 per hour	8	4
Fixed Overhead @4 per hour	4	2
Profit	18	22

From the month of July 2022 direct labour will no longer be a constraint. The company expects to be able to sell 15,000 shirts and 20,000 shorts in July 2022. There will be no opening stock at the beginning of July 2022.

Sales volumes are expected to grow at 10% per month cumulatively thereafter throughout the year. Following additional information is available:

- The company intends to carry stock of finished garments sufficient to meet 40% of the next month's sale from July 2022 onwards.
- The estimated selling price will be same as above.

Question – 1

The contribution per labour hour for shirt and short is:

(a) ₹ 22 and ₹ 24 respectively
(b) ₹ 22 and ₹ 48 respectively
(c) ₹ 44 and ₹ 24 respectively
(d) ₹ 44 and ₹ 48 respectively

Question – 2

The number of shirts to be manufactures is:

(a) 4,000
(b) 8,000
(c) 12,000
(d) 16,000

Question – 3

The number of shorts to be manufactures is:

(a) 4,000
(b) 8,000
(c) 12,000
(d) 16,000

Question – 4

The amount of sales for shirt for month of august is:

(a) ₹ 9,00,000
(b) ₹ 9,90,000
(c) ₹ 8,80,000
(d) ₹ 9,68,000

Question – 5

The number of units to be manufactured of short for august is:

(a) 21,600
(b) 28,800
(c) 22,880
(d) 25,168

1	2	3	4	5
B	A	D	B	C

STANDARD COSTING - CONCEPTS

1. Basic Terms

Budget	Standard	Actual
↓	↓	↓
Kya Socha tha	**Kya Hona Chahiye Tha**	**Kya Ho gGaya**

2. Always calculate standard data on the basis of actual output

3. Variances

Variances
- +ve — Favourable = (F)
- -ve — Adverse = (A)
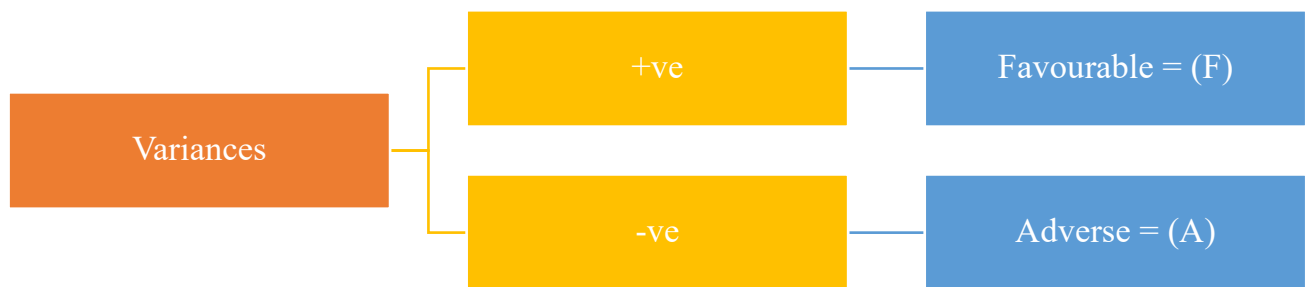
4. Material Variance

5. Material Cost Variance (MCV)

MCV = Standard cost – Actual Cost

6. Material Price Variance (MPV)

MPV = (SP – AP) × Actual quantity

7. Material Usage Variance (MUV)

MUV = (SQ – AQ) × SP

8. Material Mix Variance (MMV)

MMV = (RSQ – AQ) × SP

9. Material Yield Variance (MYV)

MYV = (SQ – RSQ) × SP

MYV = (AY – SY) × Standard cost per unit of output

10. Actual Quantity

```
                          ┌─── Actual quantity purchased
                          │         (Prefer for exam)
   Actual Quantity ───────┤
                          │
                          └─── Actual quantity consumed ─── opening stock + Purchases
                                                                  - Closing Stock
```
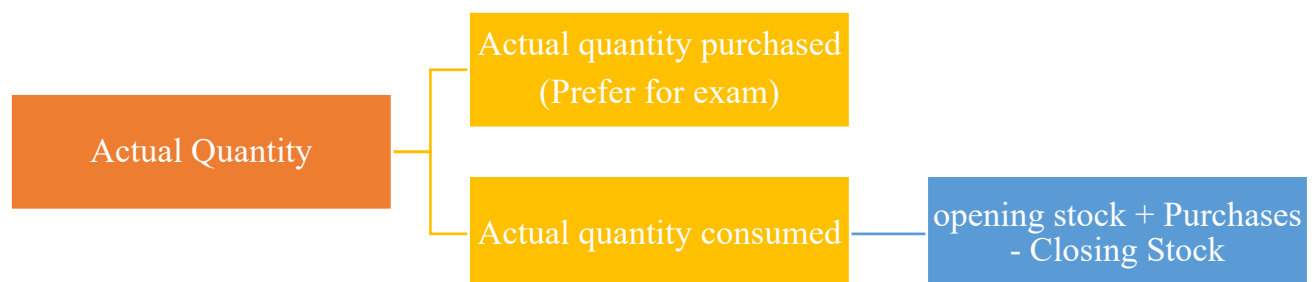
* If opening stock rate is not given then consider it at standard price

* Unless otherwise provided, FIFO method is used

11. Total Hours paid

```
                          ┌─── Idle Hours ───┬─── Normal idle hour ─── Burden Pass to
   Total hour paid ───────┤                  │                           consumer
                          │                  └─── Abnormal idle ──── Burden pass to
                          └─── Hours worked        hours                  owner
```
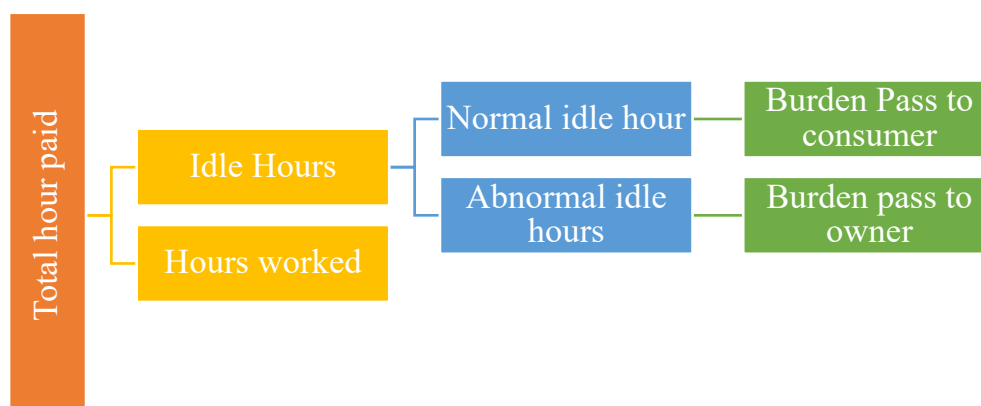
12. Labour Variances

13. Labour Cost Variance (LCV)
LCV = Standard cost – Actual cost

14. Labour Rate Variance (LRV)
LRV = (SR – AR) × Actual hours paid

15. Labour Efficiency Variance (LEV)
LEV = (SH – Actual hours worked) × SR

16. Labour Idle Time Variance
Idle time variance = Idle hours × SR

17. Labour Mix Variance (LMV)
LMV = (RSH – AH worked) × SR

18. Labour Yield Variance (LYV)
LYV = (SH – RSH) × SR
LYV = (AY – SY) × Standard cost per unit of output

19. Variable OHs Variance

20. Variable OH Cost Variance (VOCV)
VOCV = Recovered OHs – Actual OHs

21. Variable OH Expenditure Variance (VOEV)
VOEV = (Recover Rate – Actual Rate) × Actual hours worked

22. Variable OH Efficiency Variance (VOEFV)
VOEFV = (SH – Actual hours worked) × Recovery Rate

23. Fixed OHs Variance
- This is based on hours paid
- Fixed OHs are estimated in advance
- Based on estimated OHs, recovery rate is computed
- Based on Recovery rate, OHs are recovered
- Actual OHs are paid

24. Fixed OH Cost Variance (FOCV)
FOCV = Recovered OHs – Actual OHs

25. Fixed OH Expenditure Variance (FOEV)
FOEV = Budgeted OHs – Actual OHs

26. Fixed OH Volume Variance (FOVV)
FOVV = Recovered OHs – Budgeted OHs

27. Fixed OH Efficiency Variance (FOEFV)
FOEFV = (Standard hours – Actual Hours) × Recovery Rate

28. Fixed OH Capacity Variance (FOCPV)
FOCPV = (Actual Hours – Revised budgeted hours) × Recovery Rate

29. Fixed OH Calendar Variance (FOCLV)
FOCLV = (Revised budgeted hours – Budgeted hours) × Recovery Rate

30. Budget Ratios

Efficiency Ratio $= \dfrac{Standard\ hours}{Actual\ hours} \times 100$

Activity Ratio $= \dfrac{Standard\ hours}{Budgeted\ hours} \times 100$

Calendar Ratio $= \dfrac{Actual\ working\ days}{Budgeted\ Working\ Days} \times 100 = \dfrac{Revised\ budgeted\ hours}{Budgeted\ hours} \times 100$

Actual usage of Budgeted Capacity Ratio $= \dfrac{Actual\ hours}{Budgeted\ hours} \times 100$

Standard Capacity Ratio $= \dfrac{Budgeted\ hours}{Maximum\ possible\ hours\ in\ budget} \times 100$

Actual Capacity Usage Ratio $= \dfrac{Actual\ hours}{Maximum\ possible\ working\ hours} \times 100$

STANDARD COSTING – QUESTIONS

Question – 1	

The standard cost of a chemical mixture is as follows:

60% of Material A @ ₹ 50 per kg

40% of Material B @ ₹ 60 per kg

A standard loss of 25% on output is expected in production. The cost records for a period has shown the following usage.

540 kg of Material A @ ₹ 60 per kg

260 kg of Material B @ ₹ 50 per kg

The quantity processed was 680 kilograms of good product.

From the above given information, calculate:

(i)   Material cost variance
(ii)   Material price variance
(iii)   Material usage variance
(iv)   Material mix variance
(v)   Material yield variance

Solution

Basic Calculation

Particulars	Standard			Actual			Revised Std. Quantity
	Quantity	Rate	Amount	Quantity	Rate	Amount	
Material A	850 × 60% = 510	50	25,500	540	60	32,400	800 × 60% = 480
Material B	850 × 40% = 340	60	20,400	260	50	13,000	800 × 40% = 320
Input	850		45,900	800		45,400	800
(-) Loss	680 × 25% = 170			120			
Output	680			680			

Calculation of Variances

(i)   Material Cost Variance = Standard Cost – Actual cost

$$A = 25,500 – 32,400 \qquad = ₹ \qquad 6,900 \ (A)$$
$$B = 20,400 – 13,000 \qquad = ₹ \qquad \underline{7,400 \ (F)}$$
$$MCV = ₹ \qquad \underline{500 \ (F)}$$

1.   Material Price Variance = (SP – AP) × AQ

$$A = (50 – 60) × 540 \qquad = ₹ \qquad 5,400 \ (A)$$

$$B = (60 - 50) \times 260 \qquad = ₹ \quad 2,600 \ (F)$$
$$MPV = ₹ \quad 2,800 \ (A)$$

2. Material Usage (or Quantity) Variance = (SQ – AQ) × SP

$$A = (510 - 540) \times 50 \qquad = ₹ \quad 1,500 \ (A)$$
$$B = (340 - 260) \times 60 \qquad = ₹ \quad 4,800 \ (F)$$
$$MUV = ₹ \quad 3,300 \ (F)$$

3. Material Mix Variance = (RSQ - AQ) × SP

$$A = (480 - 540) \times 50 \qquad = ₹ \quad 3,000 \ (A)$$
$$B = (320 - 260) \times 60 \qquad = ₹ \quad 3,600 \ (F)$$
$$MMV = ₹ \quad 600 \ (F)$$

4. Material Yield Variance = (SQ - RSQ) × SP

$$A = (510 - 480) \times 50 \qquad = ₹ \quad 1,500 \ (F)$$
$$B = (340 - 320) \times 60 \qquad = ₹ \quad 1,200 \ (F)$$
$$MYV = ₹ \quad 2,700 \ (F)$$

OR Material Yield Variance (MYV)

= (Actual yield – St. yield) × St. cost per unit of output

$$= \left[680 - \left(\frac{680}{850} \times 800\right)\right] \times \left(\frac{45,900}{680}\right) = ₹ \ 2,700 \ (F)$$

Question – 2

SK Ltd. manufactures SK by mixing three raw materials. For each batch of 100 kg of SK, 125 kg of raw material are used. In June 60 batches are prepared to produce an output of 5600 kg of SK. The standard and actual particulars for June are as follows:

Raw materials	Standard		Actual		Quantity of raw material purchased
	Mix %	Price per kg (₹)	Mix %	Price per kg (₹)	
X	50	20	60	21	5000
Y	30	10	20	8	2000
Z	20	5	20	6	1200

Calculate all variances.

Solution   **Basic Calculation**

Particulars	Standard			Actual			Revised Std. Quantity
	Quantity	Rate	Amount	Quantity	Rate	Amount	
Material X	7,000 × 50% = 3,500	20	70,000	7,500 × 60% = 4,500	21	94,500	7,500 × 50% = 3,750
Material Y	7,000 × 30% = 2,100	10	21,000	7,500 × 20% = 1,500	8	12,000	7,500 × 30% = 2,250

Material Z	7,000 × 20% = 1,400	5	7,000	7,500 × 20% = 1,500	6	9,000	7,500 × 20% = 1,500
Input	7,000		98,000	60×125 = 7,500		1,15,500	7,500
(-) Loss	5,600 × (1/4) = 1,400			1,900			
Output	5,600			5,600			

Calculation of Variances

1. Material Cost Variance = Standard Cost – Actual cost

$$X = 70,000 – 94,500 \qquad = ₹ \quad 24,500 \ (A)$$
$$Y = 21,000 – 12,000 \qquad = ₹ \quad 9,000 \ (F)$$
$$Z = 7,000 – 9,000 \qquad = ₹ \quad 2,000 \ (A)$$
$$MCV = ₹ \quad 17,500 \ (A)$$

2. Material Price Variance = (SP – AP) × AQ

$$X = (20 – 21) × 4,500 \qquad = ₹ \quad 4,500 \ (A)$$
$$Y = (10 – 8) × 1,500 \qquad = ₹ \quad 3,000 \ (F)$$
$$Z = (5 – 6) × 1,500 \qquad = ₹ \quad 1,500 \ (A)$$
$$MPV = ₹ \quad 3,000 \ (A)$$

Material Price Variance = (SP – AP) × AQ

(On purchase qty.)
$$X = (20 – 21) × 5,000 \qquad = ₹ \quad 5,000 \ (A)$$
$$Y = (10 – 8) × 2,000 \qquad = ₹ \quad 4,000 \ (F)$$
$$Z = (5 – 6) × 1,200 \qquad = ₹ \quad 1,200 \ (A)$$
$$MPV = ₹ \quad 2,200 \ (A)$$

3. Material Usage (or Quantity) Variance = (SQ – AQ) × SP

$$X = (3,500 – 4,500) × 20 \qquad = ₹ \quad 20,000 \ (A)$$
$$Y = (2,100 – 1,500) × 10 \qquad = ₹ \quad 6,000 \ (F)$$
$$Z = (1,400 – 1,500) × 5 \qquad = ₹ \quad 500 \ (A)$$
$$MUV = ₹ \quad 14,500 \ (A)$$

4. Material Mix Variance = (RSQ - AQ) × SP

$$X = (3,750 – 4,500) × 20 \qquad = ₹ \quad 15,000 \ (A)$$
$$Y = (2,250 – 1,500) × 10 \qquad = ₹ \quad 7,500 \ (F)$$
$$Z = (1,500 – 1,500) × 5 \qquad = ₹ \quad NIL$$
$$MMV = ₹ \quad 7,500 \ (A)$$

5. Material Yield Variance = (SQ - RSQ) × SP

$$X = (3,500 – 3,750) × 20 \qquad = ₹ \quad 5,000 \ (A)$$
$$Y = (2,100 – 2,250) × 10 \qquad = ₹ \quad 1,500 \ (A)$$

$$Z = (1,400 - 1,500) \times 5 \qquad = ₹ \qquad 500 \ (A)$$
$$MYV = ₹ \qquad 7,000 \ (A)$$

OR Material Yield Variance (MYV)

= (Actual yield – St. yield) × St. cost per unit of output

$$= \left[5,600 - \left(\frac{100}{125} \times 7,500\right)\right] \times \left(\frac{98,000}{5,600}\right) = ₹ \ 7,000 \ (A)$$

Question – 3	

Following data is extracted from the books of SK Ltd. for the month of May, 2021:

(i) Estimation-

Particulars	Quantity (kg)	Price(₹)	Amount (₹)
Material – A	800	?	-
Material – B	600	30.00	18,000
			-

Normal loss was expected to be 10% of total input materials.

(ii) Actuals-

1,480 kg of output produced

Particulars	Quantity (kg)	Price(₹)	Amount (₹)
Material – A	900	?	-
Material – B	?	32.50	-
			59,825

(iii) Other information-

     Material cost variance   = ₹ 3,625 (F)

     Material price variance   = ₹ 175 (F)

You are required to calculate:

(i)   Standard price of Material-A

(ii)   Actual quantity of Material–B

(iii)   Actual price of Material-A

(iv)   Revised standard quantity of Material-A and Material-B; and

(v)   Material Mix Variance

Solution

(i)   Material cost variance = Standard cost – Actual cost

     3,625 (F) = Standard cost – 59,825

     3,625 = Standard cost – 59,825

     Standard cost = 63,450

     Total standard input required for actual output $= \frac{1,480}{90\%} = 1,645$ kg

Standard quantity of material A $= \frac{800}{(800+600)} \times 1{,}645 = 940$ kg

Standard quantity of material B $= \frac{600}{(800+600)} \times 1{,}645 = 705$ kg

Standard cost of Material A + Standard cost of Material B = 63,450

$(SQ_A \times SP_A) + (SQ_B \times SP_B) = 63{,}450$

$(940 \times SP_A) + (705 \times 30) = 63{,}450$

$SP_A = \frac{42{,}300}{940}$

Standard price of material A = ₹ 45

(ii) Material price variance $= (AQ \times SP) - (AQ \times AP)$

175 (F) $= (AQ \times SP) - 59{,}825$

175 $= (AQ \times SP) - 59{,}825$

$AQ \times SP = 60{,}000$

$(AQ_A \times SP_A) + (AQ_B \times SP_B) = 60{,}000$

$(900 \times 45) + (AQ_B \times 30) = 60{,}000$

$AQ_B = \frac{19{,}500}{30}$

Actual quantity of material B = 650 kg

(iii) Given, $AQ \times AP = 59{,}825$

$(AQ_A \times AP_A) + (AQ_B \times AP_B) = 59{,}825$

$(900 \times AP_A) + (650 \times 32.50) = 59{,}825$

$AP_A = \frac{38{,}700}{900}$

Actual price of material A = ₹ 43

(iv) Total actual input quantity = 900 + 650 = 1,550 kg

Revised standard quantity of material A $= \frac{800}{(800+600)} \times 1{,}550 = 886$ kg

Revised standard quantity of material A $= \frac{600}{(800+600)} \times 1{,}550 = 664$ kg

(v) Material Mix Variance $= (RSQ - AQ) \times SP$

Material A	$= (886 - 900) \times 45$	$=$ ₹ 630 (A)
Material B	$= (664 - 650) \times 30$	$=$ ₹ 420 (F)
		₹ 210 (A)

Question – 4	

A gang of workers normally consists of 30 skilled workers, 15 semi-skilled workers and 10 unskilled workers. They are paid at standard rate per hour as under:

Skilled	₹ 70
Semi-skilled	₹ 65
Unskilled	₹ 50

In a normal working week of 40 hours, the gang is expected to produce 2,000 units of output. During the week ended 31st March, 2019, the gang consisted of 40 skilled, 10 semi-skilled and 5 unskilled workers. The acutal wages paid were at the rate of ₹ 75, ₹ 60 and ₹ 52 per hour respectively. Four hours were lost due to machine breakdown and 1,600 units were produced.

Calculate the following variances showing clearly adverse (A) or favorable (F)

(i) Labour Cost Variance   (ii) Labour Rate Variance

(iii) Labour Efficiency Variance   (iv) Labour Mix Variance

(v) Labour Idle Time variance

Solution

Basic Calculation

Particulars	Standard (1,600 units)			Actual (1,600 units)			Revised Std. Qty.
	Quantity	Rate	Amount	Quantity	Rate	Amount	
Skilled	$\frac{40\times30}{2,000}\times1600 = 960$	70	67,200	$40\times40 = 1,600$	75	1,20,000	$\frac{960}{1,760}\times1980 = 1,080$
Semi-skilled	$\frac{40\times15}{2,000}\times1600 = 480$	65	31,200	$40\times10 = 400$	60	24,000	$\frac{480}{1,760}\times1980 = 540$
Unskilled	$\frac{40\times10}{2,000}\times1600 = 320$	50	16,000	$40\times5 = 200$	52	10,400	$\frac{320}{1,760}\times1980 = 360$
Total	1,760		1,14,400	2,200		1,54,400	1,980

Particulars	Hours Paid	Idle Hours	Hours Worked
Skilled	40 × 40 =1,600	40 × 4 = 160	1,600 – 160 = 1,440
Semi-skilled	40× 10 = 400	10 × 4 = 40	400 – 40 = 360
Unskilled	40× 5 = 200	5 × 4 = 20	200 – 20 = 180
Total	22,00	220	1,980

Calculation of Variances

(i) Labour Cost Variance = Standard Cost – Actual cost

Skilled = 67,200 – 1,20,000 = ₹ 52,800 (A)

Semi-skilled = 31,200 – 24,000 = ₹ 7,200 (F)

Unskilled = 16,000 – 10,400 = ₹ 5,600 (F)

LCV = ₹ 40,000 (A)

(ii) Labour Rate Variance = (SR – AR) × AH paid

Skilled = (70 – 75) × 1,600 = ₹ 8,000 (A)

Semi-Skilled = (65 – 60) × 400 = ₹ 2,000 (F)

Unskilled = (50 – 52) × 200   = ₹   400 (A)

LRV = ₹   6,400 (A)

(iii) Labour Efficiency Variance = (SH – AH worked) × SR

Skilled = (960 – 1,440) × 70   = ₹   33,600 (A)

Semi-Skilled = (480 – 360) × 65   = ₹   7,800 (F)

Unskilled = (320 – 180) × 50   = ₹   7,000 (F)

LEV = ₹   18,800 (A)

(iv) Labour Mix Variance = (RSH – AH worked) × SR

Skilled = (1,080 – 1,440) × 70   = ₹   25,200 (A)

Semi-Skilled = (540 –360) × 65   = ₹   11,700 (F)

Unskilled = (360 – 180) × 50   = ₹   9,000 (F)

LMV = ₹   4,500 (A)

(v) Idle Time Variance = Idle Hours × SR

Skilled = 160 × 70   = ₹   11,200 (A)

Semi-Skilled = 40 × 65   = ₹   2,600 (A)

Unskilled = 20 × 50   = ₹   1,000 (A)

Idle time variance = ₹   14,800 (A)

Question – 5

The standard output of product 'DJ' is 25 units per hour in manufacturing department of a company employing 100 workers. In a 40 hours week, the department produced 960 units of product 'DJ' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 6.20, ₹ 6.00 and ₹ 5.70 respectively to group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹ 240 (F).

You are required to calculate:

(i) Total Labour Cost Variance

(ii) Total Labour rate Variance

(iii) Total Labour Gang Variance

(iv) Total Labour Yield Variance, and

(v) Total Labour Idle Time Variance

Solution

Labour Efficiency Variance = (SH – AH worked) × SR

$$240 \text{ (F)} = \left[\left(960 \times \frac{100}{25}\right) - \{(10 + 30 + 60) \times (40 - 5\%)\}\right] \times SR$$

240 = (3,840 – 3,800) × SR

SR = ₹ 6

Particulars	Standard (960 units)		
	Quantity	**Rate**	**Amount**
Labour	$960 \times \frac{100}{25} = 3{,}840$	6	23,040

Actual data (960 units)					
No. of workers	**Hours paid**	**Wage rate**	**Wages**	**Idle hours**	**Hours worked**
10	10×40 = 400	6.20	2,480	400×5% = 20	400 – 20 = 380
30	30×40 = 1,200	6	7,200	1,200×5% = 60	1,200 – 60 = 1,140
60	60×40 = 2,400	5.70	13,480	2,400×5% = 120	2,400 – 120 = 2,280
Total	4,000		23,360	200	3,800

Calculation of Variances

(i) Labour Cost Variance = Standard Cost – Actual cost

= 23,040 – 23,360 = ₹ 320 (A)

(ii) Labour Rate Variance = (SR – AR) × AH paid

= [(6 – 6.20) ×400] + [(6 – 6)×1,200] + [(6 - 5.70)×2,400] = ₹ 640 (F)

(iii) Labour Gang Variance = (RSH – AH worked) × SR

= (3,800 – 3,800) × 6 = Nil

(iv) Labour Yield Variance = (Actual yield – St. yield) × St. cost per unit of output

$= \left[960 - \left(\frac{960}{3{,}840} \times 3{,}800\right)\right] \times \left(\frac{23{,}040}{960}\right) = ₹\ 240\ (F)$

(v) Idle Time Variance = Idle Hours × SR

= 200 × 6 = ₹ 1,200 (A)

Question – 6	

SK Ltd. had prepared the following estimation for the month of January:

	Quantity	Rate (₹)	Amount (₹)
Material – A	800 kg	90.00	72,000
Material – B	600 kg	60.00	36,000
Skilled Labour	1,000 hours	75.00	75,000
Unskilled Labour	800 hours	44.00	35,200

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material – A	900 kg	86.00	77,400
Material – B	650 kg	65.00	42,250
Skilled Labour	1,200 hours	71.00	85,200
Unskilled Labour	860 hours	46.00	39,560

You are required to calculate:

(a) Material cost variance

(b) Material price variance

(c) Material mix variance

(d) Material yield variance

(e) Labour cost variance

(f) Labour efficiency variance

(g) Labour yield variance

Solution

Basic Calculation for material

Particulars	Standard			Actual			Revised Std. Qty.
	Quantity	Rate	Amount	Quantity	Rate	Amount	
Material A	$\frac{8}{14} \times 1,644 = 939$	90	84,510	900	86	77,400	$\frac{8}{14} \times 1,550 = 886$
Material B	$\frac{6}{14} \times 1,644 = 705$	60	42,300	650	65	42,250	$\frac{6}{14} \times 1,550 = 664$
Input	$1,480 \div 90\% = 1,644$		1,26,810	1,550		1,19,650	1,550
(-) Loss	164			70			
Output	1,480			1,480			

Basic Calculation for labour

Particulars	Standard			Actual			Revised Std. Qty.
	Quantity	Rate	Amount	Quantity	Rate	Amount	
Skilled	$\frac{1,000}{1,800} \times 2,008 = 1,115$	75	83,625	1,200	71	85,200	$\frac{1,115}{2,008} \times 2,060$ $= 1,144$
Unskilled	$\frac{800}{1,800} \times 2,008 = 893$	44	38,852	860	46	39,560	$\frac{893}{2,008} \times 2,060$ $= 916$
Total	$\frac{1800 \times 0.95 \times 1,480}{1,400 \times 0.90}$ $= 2,008$		1,22,477	2,060		1,24,760	2,060

Calculation of Variances

(a) Material Cost Variance = Standard Cost – Actual cost

A = 84,510 – 77,400	= ₹	7,110 (F)
B = 42,300 – 42,250	= ₹	50 (F)
	MCV = ₹	7,160 (F)

(b) Material Price Variance = (SP – AP) × AQ

A = (90 – 86) × 900	= ₹	3,600 (F)
B = (60 – 65) × 650	= ₹	3,250 (A)
	MPV = ₹	350 (F)

(c) Material Mix Variance = (RSQ - AQ) × SP

A = (886 – 900) × 90	= ₹	1,260 (A)
B = (664 – 650) × 60	= ₹	840 (F)
	MMV = ₹	420 (A)

(d) Material Yield Variance = (SQ - RSQ) × SP

A = (939 – 886) × 90	= ₹	4,770 (F)
B = (705 – 664) × 60	= ₹	2,460 (F)
	MYV = ₹	7,230 (F)

OR Material Yield Variance (MYV)

= (Actual yield – St. yield) × St. cost per unit of output

$= \left[1,480 - \left(\frac{1,480}{1,644} \times 1,550\right)\right] \times \left(\frac{1,26,810}{1,480}\right) = ₹ 7,251$ (F)

(e) Labour Cost Variance = Standard Cost – Actual cost

Skilled = 83,625 – 85,200	= ₹	1,575 (A)
Unskilled = 38,852 – 39,560	= ₹	708 (A)
	LCV = ₹	2,283 (A)

(f) Labour Efficiency Variance = (SH – AH worked) × SR

Skilled = (1,115 – 1,200) × 75	= ₹	6,376 (A)
Unskilled = (893 – 860) × 44	= ₹	1,452 (F)
	LEV = ₹	4,924 (A)

(g) Labour Yield Variance = (SH - RSH) × SR

Skilled = (1,115 – 1,144) × 75	= ₹	2,176 (A)
Unskilled = (893 – 916) × 44	= ₹	1,012 (A)
	LYV = ₹	3,188 (A)

OR Labour Yield Variance (LYV)

= (Actual yield – St. yield) × St. cost per unit of output

$= \left[1,480 - \left(\frac{1,480}{2,008} \times 2,060\right)\right] \times \left(\frac{1,22,477}{1,480}\right) = ₹ 3,171$ (A)

Question – 7

A company operates a standard costing system and showed the following data for the month of March:

	Actual	Budgeted
No. of working days	22	20
Man-hours	4,300	4,000
Overhead rate per hour	-	₹ 0.50
Hours per unit of output	-	10
Fixed overhead incurred	₹ 1,800	-
No. of units produced	425	-

Calculate:

(a) Overhead cost variance   (b) Budget variance

(c) Volume variance   (d) Capacity variance

(e) Calendar variance   (f) Efficiency variance

Solution

Basic Calculations:

	Budgeted Hours 4,000	Recovery Rate 0.50	Budgeted Overheads 4,000×0.50 = 2,000
Revised Budgeted Hours $\frac{4,000}{20} \times 22 = 4,400$	**Actual Hours** 4,300		**Actual Overheads** 1,800
	Standard Hours 10 × 425 = 4,250	**Recovery Rate** 0.50	**Recovered Overheads** 2,125

Calculation of Variances

(a) F. O. Cost Variance = Recovered overhead – Actual overhead
= 2,125 – 1,800 = ₹ 325 (F)

(b) Budget Variance = Budgeted overhead – Actual overhead
= 2,000 – 1,800 = ₹ 200 (F)

(c) Volume Variance = Recovered overhead – Budgeted overhead
= 2,125 – 2,000 = ₹ 125 (F)

(d) Capacity Variance = (Actual Hrs. – Revised Budgeted Hrs.) × Recovery Rate
= (4,300 – 4,400) × 0.50 = ₹ 50 (A)

(e) Calendar Variance = (Revised Budgeted Hrs. – Budgeted Hours) × Recovery Rate
= (4,400 – 4,000) × 0.50 = ₹ 200 (F)

(f) Efficiency Variance = (Std. Hrs. – Actual Hrs.) × Recovery Rate
= (4,250 – 4,300) × 0.50 = ₹ 25 (A)

Question – 8	

A manufacturing concern has provided following information related to fixed overheads:

	Standard	Actual
Output in a month	5,000 units	4,800 units
Working days in a month	25 days	23 days
Fixed overheads	₹ 5,00,000	₹ 4,90,000

Compute:

(i)   Fixed overhead variance
(ii)   Fixed overhead expenditure variance
(iii)   Fixed overhead volume variance
(iv)   Fixed overhead efficiency variance

Solution

Basic Calculations:

Budgeted Days	Recovery Rate	Budgeted Overheads
25	5,00,000 ÷ 25 = 20,000	5,00,000
Actual Days		**Actual Overheads**
23		4,90,000
Standard Days	**Recovery Rate**	**Recovered Overheads**
$\frac{25}{5,000} \times 4,800 = 24$	20,000	4,80,000

Calculation of Variances

(a) F. O. Cost Variance   = Recovered overhead – Actual overhead
                                 = 4,80,000 – 4,90,000 = ₹ 10,00 (A)

(b) Expenditure Variance   = Budgeted overhead – Actual overhead
                                 = 5,00,000 – 4,90,000 = ₹ 10,000 (F)

(c) Volume Variance   = Recovered overhead – Budgeted overhead
                                 = 4,80,000 – 5,00,000 = ₹ 20,000 (A)

(d) Efficiency Variance   = (Std. days – Actual days) × Recovery Rate
                                 = (24 – 23) × 20,000 = ₹ 20,000 (F)

Question – 9	

PQR Alloys Ltd. uses a standard costing system.
Budgeted information for the year:

Budgeted output	84,000 units
Variable factory overhead per unit	₹ 16
Standard time for one unit of output	0.80 machine hour
Fixed factory overheads	₹ 6,72,000
Actual results for the year:	
Actual output	87,600 units

Variable overhead efficiency variance	₹ 67,200 (A)
Actual fixed factory overheads	₹ 7,05,000
Actual variable factory overheads	₹ 14,37,000

Required:

Calculate the following variances clearly indicating Adverse (A) or Favorable (F)

(a)   Variable factory overhead expenditure variance

(b)   Fixed factory overhead expenditure variance

(c)   Fixed factory overhead efficiency variance

(d)   Fixed factory overhead capacity variance

<u>Solution</u>

Basic Calculations

Particulars	Standard			Actual		
	Hrs.	Rate ₹	Amount ₹	Hrs.	Rate ₹	Amount ₹
Variable Expenses	70,080	20	14,01,600	73,440	$\frac{1437000}{73,440} =$ 19.567	14,37,000

Budgeted Units	Recovery Rate	Budgeted Overheads
84,000×0.8 = 67,200	$\frac{6,72,000}{67,200} = 10$	6,72,000
Actual Units		**Actual Overheads**
73,440		7,05,000
Standard Units	**Recovery Rate**	**Recovered Overheads**
87,600×0.8 = 70,080	10	7,00,800

Standard rate per hour $= \frac{Variable\ factory\ overhead\ per\ unit}{Standard\ time\ for\ one\ unit\ of\ output} = \frac{16}{0.8} = ₹\ 20$

Variable OH efficiency variance = (Standard hours – Actual hours) × Standard rate per hour

$\quad\quad\quad$ - 67,200 $\quad$ = [(87,600 × 0.8) – Actual hours] × 20

$\quad\quad\quad$ -67,200 $\quad$ = (70,080 – Actual hours) × 20

$\quad\quad$ Actual hours $\quad$ = 73,440

(a)   Variable factory OH expenditure variance = (Standard rate – Actual Rate)×Actual hours

$\quad\quad\quad\quad\quad\quad\quad\quad$ = (20 – 19.567) × 73,440 = ₹ 31,800 (F)

(b)   Fixed factory OH expenditure variance = Budgeted OHs – Actual OHs

$\quad\quad\quad\quad\quad\quad\quad\quad$ = 6,72,000 – 7,05,000 = ₹ 33,000 (A)

(c)   Fixed factory OH efficiency variance = (Standard hours – Actual hours) × Recovery rate

$\quad\quad\quad\quad\quad\quad\quad\quad$ = (70,080 – 73,440) × 10 = ₹ 33,600 (A)

(d)   Fixed factory OH capacity variance = (Actual hours – Budgeted hours) × Recovery rate

$\quad\quad\quad\quad\quad\quad\quad\quad$ = (73,440 – 67,200) × 10 = ₹ 62,400 (F)

Question – 10	

ABC Ltd. has furnished the following information regarding the overheads for the month of June 2020:

(i)	Fixed overhead cost variance	₹ 2,800 (Adverse)
(ii)	Fixed overhead volume variance	₹ 2,000 (Adverse)
(iii)	Budgeted Hours for June, 2020	2,400 hours
(iv)	Budgeted Overheads for June, 2020	₹ 12,000
(v)	Actual rate of recovery of overheads	₹ 8 per hour

From the above given information calculate:

(v)   Fixed overhead expenditure variance

(vi)   Actual overheads incurred

(vii)   Actual hours for actual production

(viii) Fixed overhead capacity variance

(ix)   Standard hours for actual production

(x)   Fixed overhead efficiency variance

Solution

Computation of required variances for June 2020:

1. Overheads expenditure variance = Overhead Cost Variance – Overheads Volume variance

    $$= ₹ 2,800(A) - ₹ 2,000(A) = - ₹ 2,800 – (- ₹ 2,000) = - ₹ 800 = ₹ 800 (A)$$

2. Actual Overheads incurred = Budgeted Overhead - Overhead Expenditure Variance

    $$= ₹ 12,000 - ₹ 800(A) = ₹ 12,000 – (- ₹ 800) = ₹ 12,000 + ₹ 800 = ₹ 12,800$$

3. Actual hours for actual production $= \dfrac{Actual\ Overheads\ Incurred}{Actual\ Rate\ of\ Recovery\ Overhead\ Per\ Hour} = \dfrac{12,800}{8} = 1,600$ hours

4. Overheads Capacity Variance = Std rate of OH rate (Actual hrs for actual production – Budgeted hours)

    $$= ₹ 5 \times (1,600 – 2,400) = ₹ 5 \times (- 800) = ₹ 4,000\ Adverse$$

    * Standard rate of Overhead recovery $= \dfrac{Budgetary\ Overheads}{Budgeted\ hours} = \dfrac{12,000}{2,400\ hours} = ₹ 5$ per hour

5. Volume Variance = Std. rate of OHs recovery (Standard hours for actual production – Budgeted hours)

    or, ₹ 2,000(A) = ₹ 5 [Std. hrs. – 2,400 hours]

    or, Std. hrs. – 2,400 hours = - $\dfrac{2,000}{5}$

    or, Std. hrs. – 2,400 hours = - 400 hours

    or, Std. hrs. = 2,400 hours - 400 hours

    Standard hours for actual production = 2,000 hours

6. Fixed overhead efficiency variance = (Std. hours for AO – Actual Hrs.) × SR

    $$= (2,000 – 1,600) \times 5 = 2,000 (F)$$

    Or

    Fixed overhead efficiency variance = Volume variance – Capacity Variance

    $$= ₹ 2,000(A) - ₹ 4,000(A) = - ₹ 2,000 – (- ₹ 4,000) = - ₹ 2,000 + ₹ 4,000 = ₹ 2,000 (F)$$

Question – 11

Following data is available for ABC Ltd.:

Standard working hours	8 hours per day of 5 days per week
Maximum capacity	60 employees
Actual working	50 employees
Actual hours expected to be worked per four week	8,000 hours
Standard hours expected to be earned per four week	9,600 hours
Actual hours worked in the four week period	7,500 hours
Standard hours earned in the four week period	8,800 hours

The related period is of four weeks. Calculate the following Ratios:

    (i)   Efficiency ratio

    (ii)   Activity ratio

    (iii)   Standard capacity usage ratio

    (iv)   Actual capacity usage ratio

    (v)   Actual usage of Budgeted capacity ratio

Solution

Working Notes:

(1) Max. capacity in a budget period = 60 employees × 8 hrs. × 5 days × 4 weeks = 9,600 hrs.

(2) Budgeted hours = 50 employees × 8 hrs. × 5 days × 4 weeks = 8,000 hrs.

(3) Actual hours = 7,500 hrs. (given)

(4) Standard hours for actual output = 8,800 hours

Calculation of ratios:

(i) Efficiency ratio $= \frac{Standard\ Hours}{Actual\ Hours} \times 100 = \frac{8,800}{7,500} \times 100 = 117.33\%$

(ii) Activity ratio $= \frac{Standard\ Hours}{Budgeted\ Hours} \times 100 = \frac{8,800}{8,000} \times 100 = 110\%$

(iii) Standard Capacity Usage ratio $= \frac{Budgeted\ Hours}{Max.\ possible\ hours\ in\ budget\ period} \times 100 = \frac{8,000}{9,600} \times 100 = 83.33\%$

(iv) Actual capacity usage ratio $= \frac{Actual\ Hours}{Max.\ possible\ working\ hours\ in\ period} \times 100 = \frac{7,500}{9,600} \times 100 = 78.125\%$

(v) Actual usage of budgeted capacity ratio $= \frac{Actual\ hours}{Budgeted\ Days} \times 100 = \frac{7,500}{8,000} \times 100 = 93.75\%$

Question – 12

The following information is given:

Budgeted production	12,000 units
Budgeted variable overhead	₹ 2,40,000
Standard time for one unit of output	2 hours

Actual production   11,800 units
Actual overhead incurred   ₹ 2,44,000
Actual hours worked   23,200 hours

What is 'Variable Overhead Efficiency Variance?

(a) ₹ 4,000 (A)   (b) ₹ 6,000 (A)
(c) ₹ 2,000 (F)   (d) ₹ 4,000 (F)

Question – 13

K Ltd. is a manufacturer of a single product A. 8,000 units of the product A has been produced in the month of March 2024. At the beginning of the year a total 1,20,000 units of the product-A has been planned for production. The cost department has provided the following estimates of overheads:

Particulars	Amount (₹)
Fixed	12,00,000
Semi-variable	1,80,000
Variable	6,00,000

Semi-variable charges are considered to include 60 per cent expenses of fixed nature and 40 per cent of variable character.

The records of the production department shows that the company could have operated for 20 days but there was a festival holiday during the month.

The actual cost data for the month of March 2024 are as follows:

Particulars	Amount (₹)
Fixed	1,10,000
Semi-variable	19,200
Variable	48,000

The cost department of the company is now preparing a cost variance report for managerial information and action. You being an accounts officer of the company are asked to calculate the following information for preparation of the variance report:

Question – 1

What is the amount of variable overhead cost variance for the month of March 2024:

(a)   ₹ 10,200 (A)
(b)   ₹ 10,400 (A)
(c)   ₹ 10,800 (A)
(d)   ₹ 10,880 (A)

Question – 2

What is the amount of fixed overhead volume variance for the month of March:

(a)   ₹ 9,000 (F)
(b)   ₹ 9,000 (A)

(c) ₹ 21,800 (A)

(d) ₹ 11,000 (A)

Question – 3
What is the amount of fixed overhead expenditure variance for the month of March:

(a) ₹ 21,520 (A)

(b) ₹ 21,500 (A)

(c) ₹ 21,400 (A)

(d) ₹ 21,480 (A)

Question – 4
What is the amount of fixed overhead calendar variance for the month of March:

(a) ₹ 5,400 (A)

(b) ₹ 5,450 (A)

(c) ₹ 5,480 (A)

(d) ₹ 5,420 (A)

Question – 5
What is the amount of fixed overhead cost variance for the month of March:

(a) ₹ 43,220 (A)

(b) ₹ 43,300 (A)

(c) ₹ 43,200 (A)

(d) ₹ 43,380 (A)

1	2	3	4	5
D	C	A	B	A