dronacharya

FOR

CA INTERMEDIATE

2024

Marathon Part 2

Cost & Management Accounting

Lecture – 02

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Topics *to be covered*

1. Service Costing ✓
2. Process Costing ✓
3. Joint & By-Product ✓
4. Marginal Costing ✓
5. Budget & Budgetary Control ✓
6. Standard Costing ✓

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.

   - Single Cost unit → where only one unit is involved. e.g. Kg, dozen etc.
   - Composite/Multiple Cost unit → where more than 1 unit is involved. e.g. Passenger-km, ton-km etc.

3. **Cost Unit** in case of Trucks / Lorries

   A) Absolute ton-km = Actual kms × Actual tons

   B) Commercial ton-km = Actual kms × Average tons

4. **Effective Cost Unit** = Total units − Normal loss (Travel w/o Passenger or goods etc.)

   ④ Strike is an abnormal loss so shouldn't be deducted from above.

5. **Total Cost**

- **Fixed / Standing Charges**
  - → Rent
  - → Stationary
  - → Insurance
  - → Driver Salary etc.
  - → Depreciation (if fixed)
- **Variable / Running Charges**
  - → Petrol / Oil
  - → Lubricants
  - → Dep. (if variable)
- **Maintenance**
  - → Tyres & Tubes
  - → Repair & Maint.
  - → Servicing Cost

6. **Cost Per Unit** = $\frac{\text{Total Cost}}{\text{Effective Cost Unit}}$

7. **Points To Remember (PTRs)**

Petrol, oil and similar charges are always on the basis of actual km travel

Treatment of Depreciation

- Life Based on Years → Fixed
- Life based on some variable base e.g. Kms → Variable

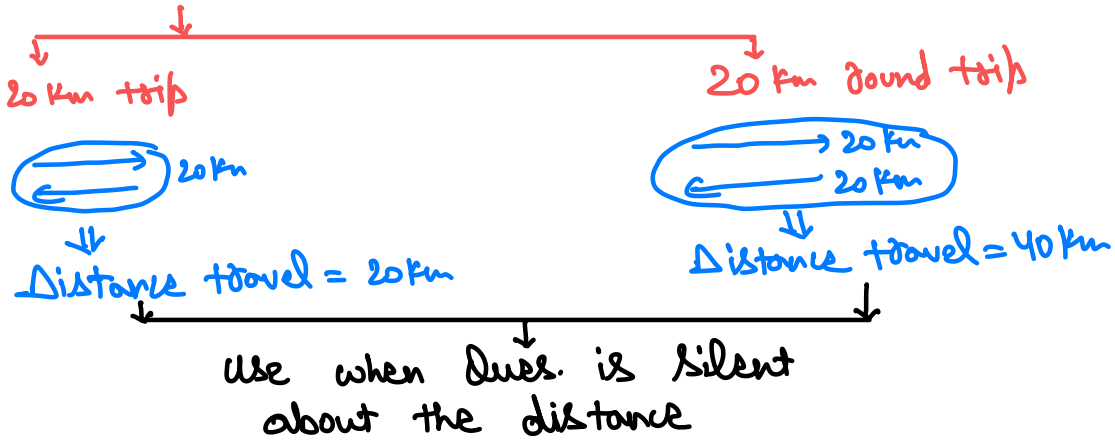
④ Service Cost of Rs. 2000 after every 3000 km.
Actual kms travel ① 3500 km ② 8500 km

No. of Service = $\frac{3500}{3000}$ = 1. ... ④ 1 TC = 1 × 2000 = Rs. 2000

No. of Service = $\frac{8500}{3000}$ = 2.83 ④ 2 TC = 2 × 2000 = Rs. 4000

Treatment of Distance

Mr. X travels



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

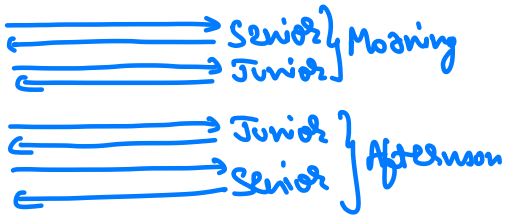
Delhi to Panchkula = 150 × 0.16 = ₹ 24

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.



Total 8 rounds in a day

Distance in a day = 8 × 8 = 64 km

Distance in a month = 64 × 25 = 1600 km

Distance p.a. = 1600 × 9

= 14400 kms

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

$\frac{2}{4} \times 14400 = 7200$

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)	0.92	1.60	0.72
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 Nano Car	Old Innova 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 Nano Car	Old Innova 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 Nano Car	Old Innova 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 Nano car for travel upto 19,000 kms.

Let at 'y' kms, cost of the two options will become equal.

Total cost of New Nano car = Total cost of Old Innova car

5,900 + (y)(3.5/10) = 3,500 + (y)(3.5/7)

y = 16,000 kms

Question – 5

Navya 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.

Required to calculate the operating cost of vehicle per month per car for both CNG & EV option.

Solution

Working Notes:

1. Calculation of Depreciation per month

	Particulars	CNG Car	EV Car
A	Car Purchase price (₹)	9,20,000	15,20,000
B	Less: Govt. Subsidy	-	(1,50,000)
C	Less: Residual value (₹)	(95,000)	(1,70,000)
D	Depreciation value of cat (₹) (A – B – C)	8,25,000	12,00,000
E	Life of the car	15 years	10 years
F	Depreciation per month (₹) [D ÷ (E × 12)]	4,583.33	10,000

2. Fuel/Electricity consumption per month

	Particulars	CNG Car	EV Car
A	Average distance covered in a month	1,500	1,500
B	Mileage (KM)	20	240
C	Quantity of CNG/Full charge required (A × B)	75 kg	6.25
D	Electricity consumption (C × 30 Kwh)	-	187.5
E	Cost of CNG per kg (₹)	60	-
F	Power cost per Kwh (₹)	-	7.60
G	CNG Cost per month (₹) (C × E)	4,500	-
H	Power cost per month (₹) (D × F)	-	1,425

3. Amortized cost of Tyre replacement

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	5 years	5 years
C	No. of time replacement required	2 times	1 time
D	Cost of tyres for each replacement (₹)	16,000	16,000
E	Total replacement cost (₹) (C × D)	32,000	16,000
F	Cost per month (₹) [E ÷ (A × 12)]	177.78	133.33

4. Amortized cost of Battery replacement

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	8 years	8 years
C	No. of time replacement required	1 time	1 time

D	Cost of battery for each replacement (₹)	12,000	5,40,000
E	Total replacement cost (₹) (C × D)	12,000	5,40,000
F	Cost per month (₹) [E ÷ (A × 12)]	66.67	4,500

Statement of Operating Cost

Particulars	**CNG Car (₹)**	**EV Car (₹)**
Fixed Cost:		
Depreciation (working note - 1)	4,583.33	10,000
Driver's Salary	20,000	20,000
Garage rent	4,500	4,500
Total Fixed Cost (A)	30,583.33	36,000
Variable Cost:		
Fuel cost/ power cost (Working note – 2)	4,500	1,425
Total Variable Cost (B)	4,500	1,425
Maintenance Cost:		
Annual maintenance cost	666.67	433.33
Annual insurance cost	633.33	1,216.67
Amortized cost of tyres replacement (working note – 3)	177.78	133.33
Amortized cost of battery replacement (working note – 4)	66.67	4,500
Total Maintenance Cost (C)	1,544.45	62,83.33
Operating cost per month (A + B + C)	**36,627.78**	**43,708.33**

Question – 6

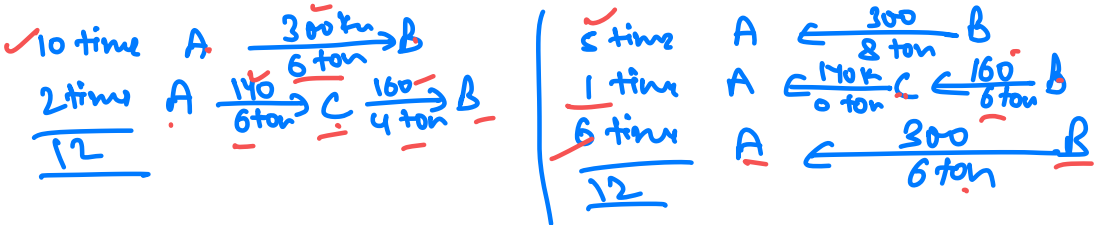
SK Transport Ltd. charges ₹ 90 per ton for its 6 tons truck lorry load from city 'A' to city 'B'. The charges for the return journey are ₹ 84 per ton. No concession or reduction in these rates is made for any delivery of goods at intermediate station 'C'. In January, the truck made 12 outward journeys 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:	

Particulars	Amount (₹)
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:	
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

(35×150) + (80×25) + 750 = 8000

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 = $\frac{55,34,000}{8,000}$ = ₹ 691.75

(b) Contribution = Revenue – Variable cost = ₹ 1,60,00,000 – ₹ 56,05,000 = ₹ 1,03,95,000

Contribution per patient day = $\frac{1,03,95,000}{8,000}$ = ₹ 1,299.375

Break-even point = $\frac{Fixed\ cost}{Contribution\ per\ patient\ day}$ = $\frac{48,61,000}{1,299.375}$ = 3,741 patient days

Question – 9

SEZ Ltd. built a 120 km long highway and now operates a toll road to collect tolls. The company has invested ₹ 900 crore to build the road and has estimated that a total of 120 crore vehicles will be using the highway during the 10 years toll collection tenure. The other costs for the month of 'June 2020' are as follows:

(i) Salary"

- Collection personnel (3 shifts and 5 persons per shift) - ₹ 200 per day per person.
- Supervisor (3shifts and 2 persons per shift) - ₹ 350 per day per person
- Security personnel (2shifts and 2 persons per shift) - ₹ 200 per day per person
- Toll Booth Manager (3 shifts and 1 person per shift) - ₹ 500 per day per person

(ii) Electricity - ₹ 1,50,000

(iii) Telephone - ₹ 1,00,000

(iv) Maintenance cost - ₹ 50 lakhs

(v) The company needs 30% profit over total cost.

Required:

(1) Calculate cost per kilometer

(2) Calculate the toll rate per vehicle

Solution

(1) Statement of Cost

Particulars	**Amount (₹)**
Capital Cost:	
Capital cost share $\left[\frac{900\ crore}{10} \times \frac{1}{12}\right]$	7,50,00,000
Total Capital Cost (A)	7,50,00,000
Operating Cost:	
Salary – Collection Personnel (3 × 5 × 30 × 200)	90,000
- Supervisor (3 × 2 × 30 × 350)	63,000
- Security Personnel (2 × 2 × 30 × 200)	24,000
- Toll booth manager (3 × 1 × 30 × 500)	45,000
Electricity	1,50,000
Telephone	1,00,000
Total Operating Cost (B)	4,72,000
Maintenance Cost:	
Maintenance	50,00,000
Total Maintenance Cost (C)	50,00,000
Total Cost (A + B + C)	8,04,72,000
Kms	120
Total cost per km	6,70,600

(2) Vehicles per month = $\frac{120,00,00,000}{10} \times \frac{1}{12}$ = 1,00,00,000

Total cost per month	= 8,04,72,000
Add: Profit (30%×8,04,72,000)	= 2,41,41,600
Total Revenue	=10,46,13,600
Vehicles	= 1,00,00,000
Toll per vehicle	= 10.46

Question – 10

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

Eq. Off-S
14400
3600
18000

Computation of Total Cost

	₹
(1) Salary	2,75,000
(2) Repairs	1,30,500
(3) Laundry and Linen	40,000

12 Month
6 Season
6 off-Season
4 winter
2 other
$\frac{120}{30} \times 7200$ =
$\frac{30}{30} \times \frac{3600}{6} \times 4$ =
$\frac{120}{30} \times \frac{3600}{6} \times 2$ =

(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 [14 18 400 ÷ 80%]	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

off-seas. 1773000 / 18000 = 98.50

season = 98.50 × 2 = 197

Question – 11

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 = $\frac{1,88,000}{500} = 376$

Service Costing

MCQs

Q(1). Composite cost unit for a hospital is:
A. per patient
B. per patient-day
C. per day
D. per bed

Q(2). Cost of diesel and lubricant is an example of:
A. operating cost
B. fixed charges
C. semi-variable cost
D. none of the above

Q(3). Cost units used in power sector is:
A. Kilo meter (KM)
B. Kilowatt-hour (kWh)
C. Number of electric points
D. Number of hours

Q(4). Absolute Tonne-km is an example of:
A. Composite unit in power sector
B. Composite unit of transport sector
C. Composite unit for bus operation
D. Composite unit for oil and natural gas

Q(5). Depreciation is treated as fixed cost if it is related to:
A. Activity level
B. Related with machine hours
C. Efflux of time
D. None of the above

Q(6). Jobs undertaken b IT & ITES organizations are considered as:
A. project
B. batch work
C. contract
D. all of the above

Q(7). In toll Road costing, the repetitive costs include:
A. Maintenance cost
B. Annual operating costs
C. None of the above
D. Both (a) and (b)

Q(8). BOT approach means:
A. Build, operate and Transfer
B. Buy, Operate and Transfer
C. Build, operate and Trash
D. Build, Own and Trash

Q(9). Pre-product development activities in insurance companies, include:
A. Processing of claim
B. Selling of policy
C. Provisions of conditions
D. policy application processing

Q(10). Which of the following costing method is not appropriate for costing of educational institutes:
A. Batch costing
B. Activity based costing
C. Absorption costing
D. Process costing

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)	-	x
To Material	-	-	By Normal loss A/c (having scrap value)	-	-
To Labour		-			
To Factory OHs		-			
To Toxic Waste A/c		-	By Normal loss A/c (requiring cost to be incurred)	-	
To Abnormal Gain A/c	-	-	By Abnormal loss A/c	-	-
			By Next Process A/c (Tfd.)	-	-
			By Costing P&L A/c (sold)	-	-
			By Finished Goods A/c	-	-

Normal cost per unit (NCPU) = $\frac{Total\ cost - Scrap\ value\ of\ Normal\ loss}{Total\ units - Normal\ loss\ units}$

6. Treatment of Royalty

A) Debit the amount of royalty on the basis of normal production units

B) Excess or less payment of royalty will be adjusted in abnormal loss or gain account

C) 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.

Apply
a) Ques. Specify to use
b) DOC of op. WIP is not given

11. Methods of WIP Stock Valuation

	FIFO Method	W. Average Mtehod
1st Process → No. loss	Scrap value – deduct	from Mat. Cost
Opening WIP	Bal. DOC	100%
Introduced & Complete	100%	100%
Normal Loss	NIL	NIL
Abnormal Loss	DOC / 100%	DOC / 100%
Closing WIP	DOC	DOC
Subsequent Process or → No. loss Scrap value – Deduct from Mat.-1		
Double Material Questions	Mat.-1 / M-2 & OH	M-1 / M-2 & OH
Opening WIP	NIL / Bal. DOC	100% / 100%
Introduced & Complete	100% / 100%	100% / 100%
Normal Loss	NIL / NIL	NIL / NIL
Abnormal loss	100% / DOC / 100%	100% / DOC / 100%
Closing WIP	100% / DOC	100% / DOC

⇓
under this method, cost of op. WIP will be added with current cost while calculating cost per Equivalent unit

⊛ In case of Ab. Gain, DOC will always be 100% and will be shown as deduction in St. of Equivalent units.

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 $= \frac{3,42,000-3,500}{7,000-350} = \frac{3,38,500}{6,650} =$ ₹ 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 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 [85 × 600]	--	51,000			
To Selling exp. [15 × 600]	--	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	(14100 × 2.95106)		
(4,000 × 150%)	15,000	42,600		15,000	42,600

Normal cost per unit = $\frac{42,600-990}{15,000-900} = \frac{41,610}{14,100}$ = ₹ 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 = $\frac{58,320-610}{12,205-610} = \frac{57,710}{11,595}$ = ₹ 4.97715

Question – 3

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 (5%×7,500×12.5)	375	4.688
To Direct wages		1,35,750			
To Direct expenses (60% of direct wages)		81,450		75	7,259
To Manufacturing OHs (20% of direct wages)		27,150	By Abnormal Loss (75 × 96.7947)	7,050	6,82,403
			By Process II A/c (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 (65% of direct wages)		84,013	By Finished Stock A/c (6,525 × 140.096	6,525	9,13,824
To Manufacturing OHs		19,387			
To Abnormal gain (180 × 140.096)	180	25,209			
	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	6,000	8,40,298
			A/c	525	73,526
	6,525	9,13,824	By Balance c/d	6,525	9,13,824

Income Statement

	Amount		Amount
To Cost of Sales (6,000 × 140.096)	8,40,298	By Abnormal Gain [180 × (140.0496 – 37.5)]	18,459
To Abnormal loss [75 × (96.7947 – 12.50)]	6,322	By Sales (8,40,298 × 115%)	9,66,343
To Net Profit	1,38,182		
	9,84,802		9,84,802

Question – 4

Following details are related to the work done in Process-I by ABC Ltd. during the month of May 2019:

	(₹)
Opening work-in-process (3,000 units)	
Materials	1,80,500
Labour	32,400
Overheads	90,000
Material introduced in Process-I (42,000 units)	36,04,000
Labour	4,50,000
Overheads	15,18,000

Units scrapped : 4,800 units

Degree of completion:

Materials : 100%

Labour & Overheads : 70%

Closing work-in-progress : 4,200 units

Degree of completion:

Materials : 100%

Labour & Overheads : 50%

Units finished and transferred to Process-II: 36,000 units

Normal loss:

4% of total input including opening work-in-process

Scrapped units fetch ₹ 62.50 per piece

Prepare:

(iii) Statement of equivalent production

(iv) Statement of cost per equivalent unit

(v) Process-I A/c

(vi) Normal loss account and

(vii) Abnormal loss account

Solution

(i) Statement of Equivalent Production

Input	Output		Material		Labour		Overheads	
			%	Units	%	Units	%	Units
Op. WIP → 3,000	Op. WIP →	3,000	100	3,000	100	3,000	100	3,000
Input → 42,000	Introduced & Complete (B/F)	33,000	100	33,000	100	33,000	100	33,000
	Transferred →	36,000						
	Normal Loss → (45,000×4%)	1,800	-	-	-	-	-	-
	Abnormal Loss → (4,800 - 1,800)	3,000	100	3,000	70	2,100	70	2,100
	Closing WIP	4,200	100	4,200	50	2,100	50	2,100
45,000	Same	45,000		43,200		40,200		40,200

(ii) Statement of Cost per Equivalent Unit

Particulars	Material	Labour	Overheads
Current Cost →	36,04,000	4,50,000	15,18,000
Add: Cost of Opening WIP →	1,80,500	32,400	90,000
Less: Normal Scrap (1,800 × 62.50) →	(1,12,500)	-	-
Total →	36,72,000	4,82,400	16,08,000
Equivalent Units →	43,200	40,200	40,200
Cost per equivalent unit	85	12	40

Statement of apportionment of cost

Particulars	Element of Cost	Equivalent units	Cost per unit	Cost	Total Cost
Opening WIP	Material	3,000	85	2,55,000	

	Labour	3,000	12	36,000	
	Overheads	3,000	40	1,20,000	4,11,000
Introduced & Comp.	Material	33,000	85	28,05,000	
	Labour	33,000	12	3,96,000	
	Overheads	33,000	40	13,20,000	45,21,000
Abnormal Loss	Material	3,000	85	2,55,000	
	Labour	2,100	12	25,200	
	Overheads	2,100	40	84,000	3,64,200
Closing WIP	Material	4,200	85	3,57,000	
	Labour	2,100	12	25,200	
	Overheads	2,100	40	84,000	4,66,200

(iii) **Process I Account**

Particulars	Units	Amount	Particulars	Units	Amount
To Opening WIP	3,000	3,02,900	By Normal loss A/c	1,800	1,12,500
To Material	42,000	36,04,000	By Abnormal loss A/c	3,000	3,64,200
To Labour	-	4,50,000	By Process -II A/c (bal. fig)	36,000	49,32,000
To Overheads	-	15,18,000	By Closing WIP	4,200	4,66,200
	45,000	58,74,900		45,000	58,74,900

(iv) **Normal Loss Account**

Particulars	Units	Amount	Particulars	Units	Amount
To Process-I A/c	1,800	1,12,500	By Bank A/c	1,800	1,12,500
	1,800	1,12,500		1,800	1,12,500

(v) **Abnormal Loss Account**

Particulars	Units	Amount	Particulars	Units	Amount
To Process-I A/c	3,000	3,64,200	By Bank A/c (3,000 × 62.50)	3,000	1,87,500
			By Costing P&L A/c (Bal. fig.)	-	1,76,700
	3,000	3,64,200		3,000	3,64,200

Question – 5

From the following data related to Process X, prepare process X account:

(a) Opening work in progress: 800 units valued as under:

Material = ₹ 3,200

Labour = ₹ 960

Overhead = ₹ 320

(b) Input of material = 9200 units

(c) Current cost: Material = ₹ 36,800

Labour = ₹ 16,740

Overhead = ₹ 7,930

(d) Normal loss = 8% of total input

(e) Scrap realized ₹ 40 per 10 units

(f) Closing work in progress = 900 units

(g) Transfer to next process = 7,900 units

(h) Degree of completion:

	Closing Stock	Scrap
Material	100%	100%
Labour	70%	80%
Overhead	30%	20%

Solution

Statement of Equivalent Production

Input		Output		Material		Labour		Overheads	
				%	Units	%	Units	%	Units
Op. WIP	800	Op. WIP	800	100	800	100	800	100	800
Input	9,200	Introduced & Complete	7,100	100	7,100	100	7,100	100	7,100
		Transferred	7,900						
		Normal Loss (10,000×8%)	800	-	-	-	-	-	-
		Abnormal Loss (Bal. Fig.)	400	100	400	80	320	20	80
		Closing WIP	900	100	900	70	630	30	270
	10,000		10,000		9,200		8,850		8,250

Statement of Cost per Equivalent Unit

Particulars	Material	Labour	Overheads
Cost	36,800	16,740	7,930
Add: Cost of Opening WIP	3,200	960	320
Less: Normal Scrap	(3,200)	-	-
Total	36,800	17,700	8,250
Equivalent Units	9,200	8,850	8,250

Cost per equivalent unit	4	2	1

Statement of apportionment of cost

Particulars	Element of Cost	Equivalent units	Cost per unit	Cost	Total Cost
Opening WIP	Material	800	4	3,200	
	Labour	800	2	1,600	
	Overheads	800	1	800	5,600
Introduced & Complete	Material	7,100	4	28,400	
	Labour	7,100	2	14,200	
	Overheads	7,100	1	7,100	49,700
Abnormal Loss	Material	400	4	1,600	
	Labour	320	2	640	
	Overheads	80	1	80	2,320
Closing WIP	Material	900	4	3,600	
	Labour	630	2	1,260	
	Overheads	270	1	270	5,130

Process X Account

Particulars	Units	Amount	Particulars	Units	Amount
To Opening WIP	800	4,480	By Normal loss A/c	800	3,200
To Material	9,200	36,800	By Abnormal loss A/c	400	2,320
To Labour	-	16,740	By Next Process A/c (bal. fig)	7,900	55,300
To Overheads	-	7,930	By Closing WIP	900	5,130
	10,000	65,950		10,000	65,950

Question – 6

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		18,000		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 – 7

SK Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses a FIFO process costing system to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of the paper files containing records of the process operations for the month.

SK Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- Opening work-in-process at the beginning of the month was 800 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 26,640.
- Closing work-in-process at the end of the month was 160 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,800 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 4,200 litres.
- Losses have a scrap value of ₹ 15 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is ₹ 39 for the month made up as follows:

	(₹)
Raw Material	23
Labour	7
Overheads	9
	39

Required:

(a) Calculate the quantity (in litres) of raw material inputs during the month.

(b) Calculate the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss/gain experienced in the month.

(c) Calculate the values of raw material, labour and overheads added to the process during the month.

(d) Prepare the process account for the month.

Solution

(a) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Entering Process	Litres
Opening WIP	800	Transfer to Finished Goods	4,200
Raw material input (bal. fig.)	5,360	Process Losses (Nor. + Ab.)	1,800
		Closing WIP	160
	6,160		6,160

(b) Calculation of Normal Loss and Abnormal Loss/Gain

Particulars	Litres
Total process losses for month	1,800
Normal Loss (10% input)	536
Abnormal Loss (balancing figure)	1,264

(c) Calculation of values of Raw Material, Labour and Overheads added to the process:

Particulars	Material	Labour	Overheads
Cost per equivalent unit	₹ 23.00	₹ 7.00	₹ 9.00
Equivalent units (litre) (refer the working note)	4,824	4,952	5,016
Cost of equivalent units	₹ 1,10,952	₹ 34,664	₹ 45,144
Add: Scrap value of normal loss (536 units × ₹ 15)	₹ 8,040	—	—
Total value added	₹ 1,18,992	₹ 34,664	₹ 45,144

Workings: **Statement of Equivalent Units (litre):**

Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overheads	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	800	Units completed							
Units introduced	5,360	- Opening WIP	800	—	—	240	30	320	40
		- Fresh inputs	3,400	3,400	100	3,400	100	3,400	100
		Normal loss	536	—	—	—	—	—	—
		Abnormal loss	1,264	1,264	100	1,264	100	1,264	100
		Closing WIP	160	160	100	48	30	32	20
	6,160		6,160	4,824		4,952		5,016	

(d) Process account for month

Particulars	Litres	Amount (₹)	Particulars	Litres	Amount (₹)
To Opening WIP	800	26,640	By Finished goods	4,200	1,63,800
To Raw Materials	5,360	1,18,992	By Normal Loss	536	8,040
To Wages	—	34,664	By Abnormal loss	1,264	49,296
To Overheads	—	45,144	By Closing WIP	160	4,304
	6,160	2,25,440		6,160	2,25,440

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 4,000

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

(28800 × 25%)

(21600 ÷ 75%)

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

(61675 × 20%)

(49340 ÷ 80%)

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

Process Costing

MCQs

Q(1). The type of process loss that should not be allowed to affect the cost of good unit is:
A. Abnormal loss
B. Normal loss
C. Seasonal loss
D. Standard loss

Q(2). 200 units were introduced in a process in which 20 units is the normal loss. If the actual output is 150 units, then there is:
A. No abnormal loss
B. No abnormal gain
C. Abnormal loss of 30 units
D. Abnormal gain of 30 units

Q(3). 100 units are processed at a total cost of ₹ 160, normal loss is 10%, & scrap units are sold @₹ 0.25 each. If the output is 80 units, then the value of abnormal loss is:
A. ₹ 2.50
B. ₹ 16
C. ₹ 17.50
D. ₹ 17.75

Q(4). When average method is used in process costing, the opening inventory costs are:
A. Subtracted from the new costs
B. Added to the new costs
C. Kept separate from the costs of the new period
D. Averaged with other costs to arrive at total cost

Q(5). Spoilage that occurs under inefficient operating conditions and is ordinarily controllable is called:
A. Normal spoilage
B. Abnormal spoilage
C. Normal defectives
D. None of the above

Q(6). The cost of normal process loss is:
A. Absorbed by good units produced and amount realised by the sale of loss units should be debited to the process account
B. Debited to costing profit and loss account
C. Absorbed by good units produced
D. Debited to costing profit and loss account and amount realized by the sale of loss units should be credited to the process account.

Q(7). The value of abnormal loss is equal to:
A. total cost of materials
B. Total process cost less realizable value of normal loss
C. Total process cost less cost of scrap
D. Total process cost less realizable value of normal loss less value of transferred out goods.

Q(8). Inter-process profit is calculated, because:
A. a process is a cost centre
B. each process has to report profit
C. the efficiency of the process is measured
D. the wages of employees are linked to the process profitability

Q(9). Under Weighted Average (Average) Method:
A. The cost to complete the opening WIP is ignored
B. The cost to complete the opening WIP and other completed units are calculated separately
C. The cost of opening work-in-progress and cost of the current period are aggregated and the aggregate cost is divided by output in terms of complete units.
D. Closing stock of work in process is valued at current cost.

Q(10). A process account is debited by abnormal gain, the value is determined as:
A. equal to the value of normal loss
B. cost of good units less realizable value of normal loss
C. cost of good units less realizable value of actual loss
D. Equal to the value of good units less closing stock

Q(11). Lean Labs develops 55mm film using a four step process that moves progressively through four departments. The company specialized in overnight service and has the largest drug store chain as its primary customer. Currently, direct labour, direct materials, and overhead are accumulated by departments. The cost accumulation system that best describes the system Lean Labs is using is:

A. Operation costing
B. Activity based costing
C. Job-order costing
D. Process costing

Q(12). When compared with normal spoilage, abnormal spoilage:

A. Arises more frequently from factors that are inherent in the manufacturing process
B. Is given the same accounting treatment as normal spoilage
C. Is generally thought to be more controllable by purchase department than production department
D. Is not typically by the "tightness" of production standards

Q(13). Assume 550 units were worked on during a period in which a total of 500 good units were completed. Normal spoilage consisted of 30 units; abnormal spoilage, 20 units. Total production costs were ₹ 2,200. The company accounts for abnormal spoilage separately on the income statement as loss due to abnormal spoilage. Normal spoilage is not accounted for separately. What is the cost of the good units produced?

A. ₹ 2,080
B. ₹ 2,115
C. ₹ 2,200
D. ₹ 2,332

NC P.U. = $\frac{2200 - 0}{550 - 30}$ = 4.230769

Good units = 4.230769 × 500 = 2115.38

Q(14). IC Limited uses process costing systems and inspects its goods post manufacturing. An engineer noticed on May 31st the following:

Good units completed	15,000
Normal spoilage (units)	300
Abnormal spoilage (units)	100

Unit costs were; Material ₹ 2.50 and conversion costs (labour & overheads) ₹ 6.00. The number of units that company would transfer to its finished goods stock and the related cost of these units are:

A. 15,000 units transferred to a cost of ₹ 1,27,500
B. 15,000 units transferred at a cost of ₹ 1,30,050
C. 15,000 units transferred at a cost of ₹ 1,35,000
D. 15,300 units transferred at a cost of ₹ 1,30,050

Total I/P = 15000 + 300 + 100 = 15400

Mat. = 15400 × 2.50 = 38500

CC = 6 × 15400 = 92400

TC = 130900

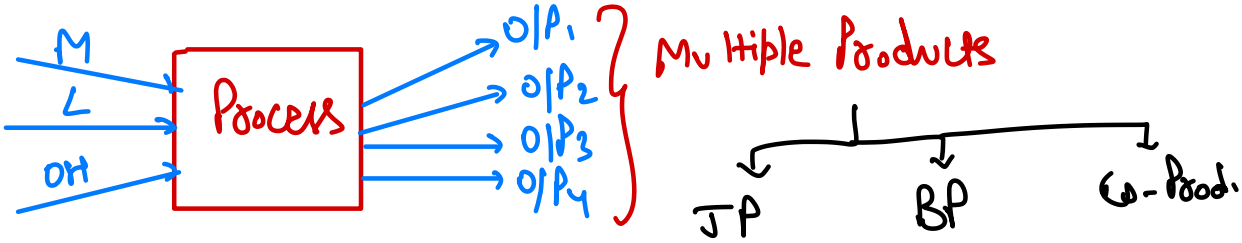
NC P.U. = $\frac{130900 - 0}{15400 - 300}$ = 8.66887

Good units = 8.66887 × 15000

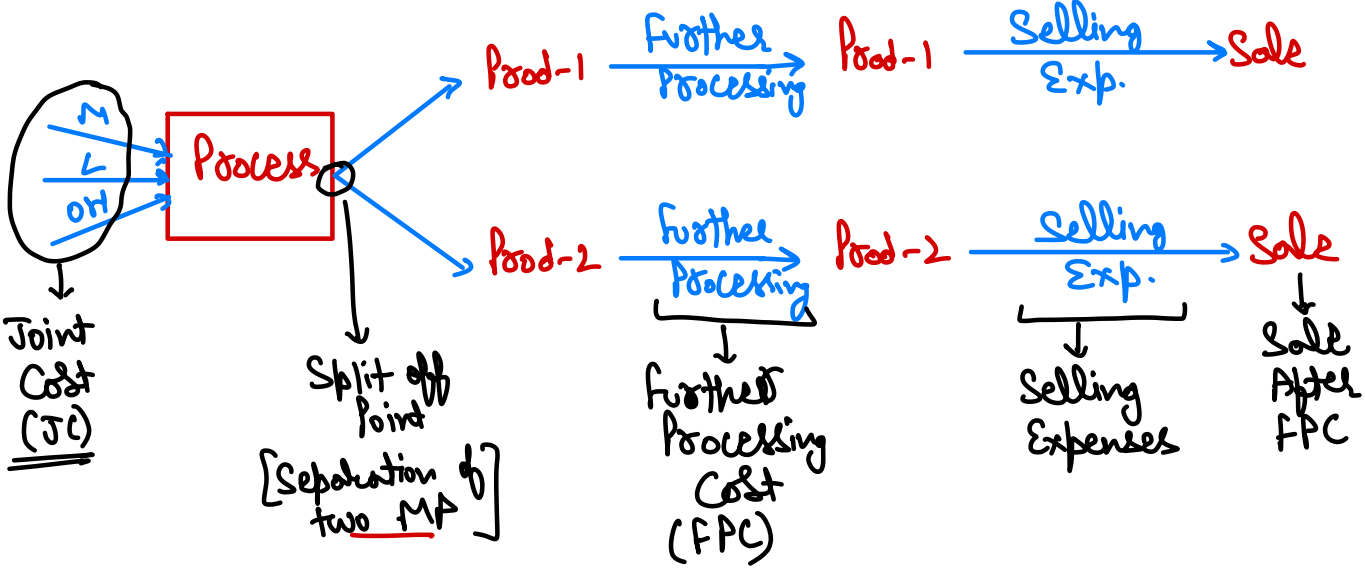
Cost = Rs. 130032

JOINT & BY-PRODUCT - CONCEPTS

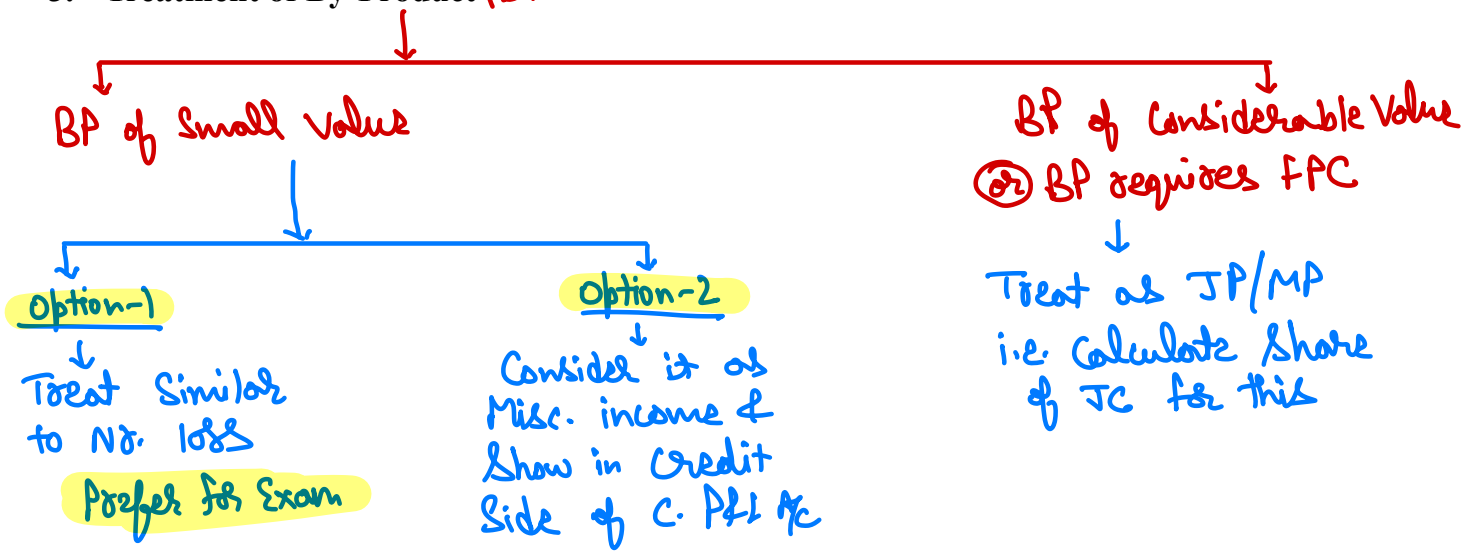
1. Multiple Output



2. Meaning of Basic Terms



3. **Treatment of By-Product (BP)**



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

Cont. = Sales – VC

Distribue 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.

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 Factory is engaged in the production of chemical Bomex and in the course of its manufacture a by-product Cromex is produced which after further processing has a commercial value. For the month of April 2019 the following are the summarized cost data:

	Joint Expenses	Separate Expenses	
	₹	Bomex (₹)	Cromex (₹)
Materials	1,00,000	6,000	4,000
Labour	50,000	20,000	18,000
Overheads	30,000	10,000	6,000
Selling price per unit		100	40
Estimated profit per unit			5
		Units	Units
No. of units produced		2,000	2,000

The factory uses net realizable value method for apportionment of joint cost to by-products. You are required to prepare statements showing:

(i) the joint cost allocable to Cromex

(ii) the product-wise and overall profitability of the factory for April 2019.

Solution

(i) Statement showing Joint Cost Allocation to 'Cromex'

Particulars	Cromex (₹)
Sales (₹ 40 × 2,000 units)	80,000
Less: Post split off costs (4,000 + 18,000 + 6,000)	(28,000)
Less: Estimated profit (₹ 5 × 2,000)	(10,000)
Joint Cost Allocable	**42,000**

(ii) Statement showing product wise and Overall Profitability

Particulars	Bomex (₹)	Cromex (₹)	Total (₹)
Sales	2,00,000	80,000	2,80,000
Less: Share in Joint Expenses	(1,38,000)*	(42,000)	(1,80,000)
Less: Post split off costs	(36,000)	(28,000)	(64,000)
Profit	26,000	10,000	36,000

*This is a balancing figure i.e. 1,80,000 – 42,000 = 1,38,000

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. Sunshine 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

Sunshine 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 sunshine 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

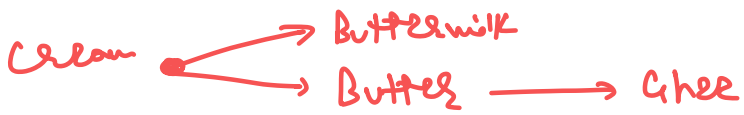
(a) (iii) **Statement of Cost** **(₹ in lakhs)**

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 Factory produces two products, 'A' and 'B' from a single process. The joint processing costs during a particular month are:

Direct material	₹ 30,000
Direct labour	₹ 9,600
Variable Overheads	₹ 12,000
Fixed Overheads	₹ 32,000

Sales: A – 100 units @ ₹ 600 per unit; B – 120 units @ ₹ 200 per unit.

Apportion joint costs on the basis of:

(i) Physical Quantity of each product.
(ii) Contribution Margin method, and
(iii) Determine Profit or Loss under both the methods.

Solution

(i) Statement showing Joint Cost Apportionment (Physical Quantity Basis)

Particulars	A (₹)	B (₹)
Direct Material (30,000 in 100:120)	13,636	16,364
Direct Labour (9,600 in 100:120)	4,364	5,236
Variable Overheads (12,000 in 100:120)	5,455	6,545
Fixed Overheads (32,000 in 100:120)	14,545	17,455
Joint Cost Allocable	**38,000**	**45,600**

(ii) Statement showing Contribution

Particulars	A (₹)	B (₹)
Sales (100 × 600) (120 × 200)	60,000	24,000
Less: Direct Material (30,000 in 100:120)	13,636	16,364
Less: Direct Labour (9,600 in 100:120)	4,364	5,236
Less: Variable Overheads (12,000 in 100:120)	5,455	6,545
Contribution	**36,545**	**(4,145)**

Statement showing Joint Cost Apportionment (Contribution Margin Method)

Particulars	A (₹)	B (₹)
Direct Material (30,000 in 100:120)	13,636	16,364
Direct Labour (9,600 in 100:120)	4,364	5,236
Variable Overheads (12,000 in 100:120)	5,455	6,545
Fixed Overheads	32,000	-
Joint Cost Allocable	**55,455**	**28,145**

(iii) Statement showing Profit or Loss (Under Physical Quantity Basis)

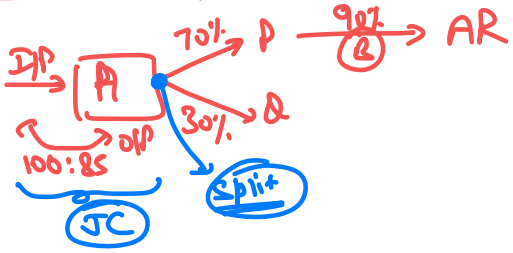
Particulars	A (₹)	B (₹)
Sales (100 × 600) (120 × 200)	60,000	24,000
Less: Joint Cost Allocable	38,000	45,600
Profit or (Loss)	**22,000**	**(21,600)**

Statement showing Profit or Loss (Under Contribution Margin Method)

Particulars	A (₹)	B (₹)
Sales (100 × 600) (120 × 200)	60,000	24,000
Less: Joint Cost Allocable	55,455	28,145
Profit or (Loss)	**4,545**	**(4,145)**

Question – 6

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) [4.76 × 90% × 115]	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

Joint & By-Product

MCQs

Q(1). In sugar manufacturing industries molasses is also produced along with sugar. Molasses may be of smaller value as compared with the value of sugar and is known as:
A. common product
B. By-product
C. Joint product
D. None of them

Q(2). Method of apportioning joint costs on the basis of output of each joint product at the point of split off is:
A. Sales value method
B. Physical unit method
C. Average cost method
D. Marginal cost and contribution method

Q(3). In the Net realisable value method, for apportioning joint costs over the joint products, the basis of apportionment would be:
A. Selling price per unit of each of the joint products
B. Selling price multiplied by units sold of each of the join products
C. Sales value of each joint product less further processing costs for individual products
D. Both (b) and (c)

Q(4). The main purpose of accounting of joint products and by-products is to:
A. Determine the opportunity cost
B. Determine the replacement cost
C. Determine profit or loss on each product line
D. None of the above

Q(5). Under net realizable value method of apportioning joint costs to joint products, the selling & distribution cost is:
A. Added to joint cost
B. Deducted from further processing cost
C. Deducted from sales value
D. Ignored

Q(6). Which of the following is a co-product
A. Diesel and petrol in an oil refinery
B. Edible oils and oil cakes
C. Cured and butter in a dairy
D. Mustard oil and sunflower oil in an oil processing company

Q(7). Which of the following is an example of by-product.
A. Diesel and Petrol in an oil refinery
B. Edible oils and oil cakes
C. Curd and butter in a dairy
D. Mustard seeds and mustard oil

Q(8). Which of following method can be used when the join products are of unequal quantity and used for captive consumption:
A. Technical estimates, using market value of similar goods
B. Net Realisable value method
C. Physical units method
D. Market value at split-off method

Q(9). Which of the following statement is not correct in relation to Co-products:
A. Co-products may also have joint products
B. Costing for co-products are done according to process costing method
C. Co-products do not have any by-products
D. Co-products are treated as a separate cost object for costing purpose.

Q(10). When a by-product does not have any realisable value, the cost of by-product is:
A. Transferred to costing Profit & Loss A/c
B. By-product cost is borne by the good units
C. By-product is ignored
D. By-product cost is determined taking value of similar goods

Q(11). SG Ltd. manufactures two products from a joint milling process. The two products developed are Mine support (MS) and commercial building (CB). A standard production run incurs joint costs of ₹ 1,00,000 and results in 60,000 units of MS and 90,000 units of CB. Each MS sells for ₹ 200 per unit, and each CB sells for ₹ 450 per unit.

Assuming no further processing work is done after the split-off point, the amount of joint cost allocated to commercial building (CB) on a physical quantity allocation basis would be:

A. ₹ 60,000
B. ₹ 1,80,000
C. ₹ 2,25,000
D. ₹ 1,20,000

$1L \times \frac{90}{(60+90)} = 60000$

Q(12). Kay company manufactures two hair care lotions, Livi and Sili, out of a joint process. The join (common) costs incurred are ₹ 6,30,000 for a standard production run that generates 1,80,000 gallons of Livi and 1,20,000 gallons of Sili. Livi sells for ₹ 240 per gallon, and Sili sells for ₹ 390 per gallon.

If additional processing costs beyond the split-off point are ₹ 140 per gallon for Livi and ₹ 90 per gallon for Sili, the amojnt of joint cost of each production run allocated to Livi on a physical-quantity basis is:

A. ₹ 3,40,000
B. ₹ 3,78,000
C. ₹ 2,32,000
D. ₹ 5,80,000

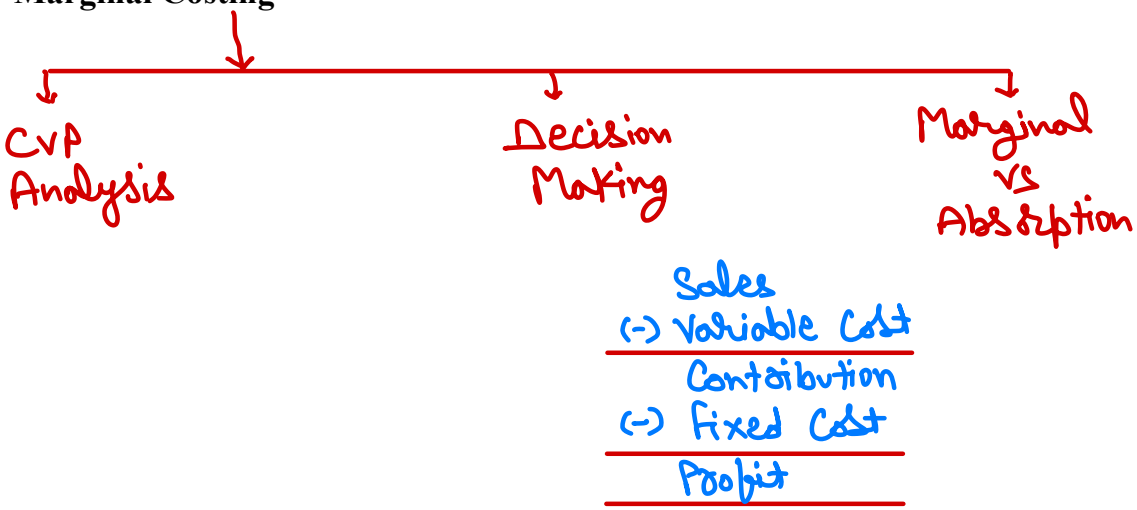
$6.30L \times \frac{1.80L}{(1.80L+1.20L)} = 3.78L$

Q(13). For the purpose of allocating joint costs to join products, the sales price at point of sale, reduced by cost to complete after split-off, is assumed to be equal to the:

A. Joint costs
B. Sales price less a normal profit margin at point of sale
C. Net sales value at split off
D. Total costs

MARGINAL COSTING - CONCEPTS

1. **Marginal Costing**



2. **Cost Volume Profit (CVP) Analysis**

3. **Contribution = Sales – Variable Cost**

4. **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

$$\text{PV Ratio} = \frac{Contribution}{Sales} \times 100 = \frac{Sales - Variable\ Costs}{Sales} \times 100 = \frac{Fixed\ cost + Profit}{Sales} \times 100$$

PV Ratio = 100 – Variable Cost Ratio

$$\text{PV Ratio} = \frac{Change\ in\ Contribution}{Change\ in\ Sales} \times 100 = \frac{Change\ in\ Profit}{Change\ in\ Sales} \times 100$$

(If data of two levels)

VC Ratio = $\frac{VC}{Sales} \times 100$

5. **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.

$$\text{Break-even Point (units of sale)} = \frac{Fixed\ Cost}{Contribution\ per\ unit}$$

$$\text{Break-even Point (in sales value)} = \frac{Fixed\ Cost}{P/V\ Ratio} = \text{Break-even point units} \times \text{Selling price per unit}$$

6. **Cash Break-even Point**

It is level of sales at which cash profit or loss is zero.

$$\text{Cash Break-even Point (units of sale)} = \frac{Cash\ Fixed\ Cost}{Contribution\ per\ unit}$$

$$\text{Cash Break-even Point (in sales value)} = \frac{Cash\ Fixed\ Cost}{P/V\ Ratio}$$

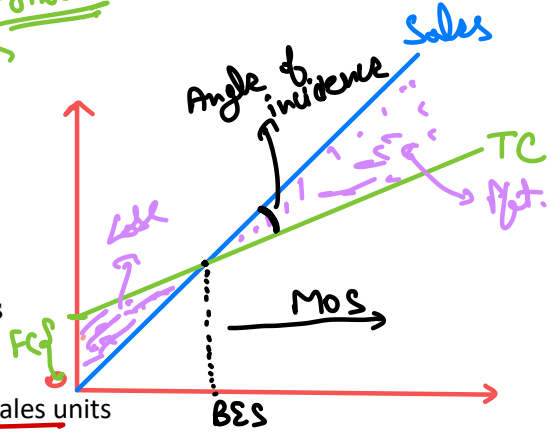
Level of Sales	Situation
Sales > BES	Profit
Sales = BES	Pft./Loss = 0
Sales < BES	Loss

7. Required sales for a given level of profit

Desired Contribution

Sales to earn desired profit (units) = $\frac{Fixed\ cost + Desired\ profit}{Contribution\ per\ unit}$

Sales to earn desired profit (in ₹) = $\frac{Fixed\ cost + Desired\ profit}{P/V\ Ratio}$



8. 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 %) = $\frac{Margin\ of\ safety}{Total\ Sales} \times 100$

Margin of Safety (in %) = 100% - Break-even Sales %

Margin of safety (in ₹) = $\frac{Profit}{P/V\ Ratio}$ ✓

Margin of safety (in units) = $\frac{Profit}{Contribution\ per\ unit}$ ✓

9. 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

10. Dual Selling price or Dual variable cost questions

Dual Contribution per unit

1) Find both Cont. P.v.
2) First calculate total Cont. from 1st option which will be sold first.
3) Recover the required value from this on then calculate the bal. required value.

11. Composite or Overall BEP

This concept is used when company deals in multiple products.

Part.	A	B	C	Total
Sales	✓	✓	✓	✓
(-) VC	(✓)	(✓)	(✓)	(✓)
Contrib.	✓	✓	✓	✓
			(-) Fixed cost	✓
			Profit	✓

(*) weights will be Sales % of each product out of total Sales
(or) Sales mix

Overall Contribution per unit = Weighted average of contribution per unit = $\frac{Total\ Contribution}{Total\ Units}$

Overall P/V Ratio = Weighted average of P/V Ratio = $\frac{Total\ Contribution}{Total\ Sales} \times 100$

Overall Break-even Point (in units) = $\frac{Fixed\ Cost}{Overall\ Contribution\ Per\ unit}$

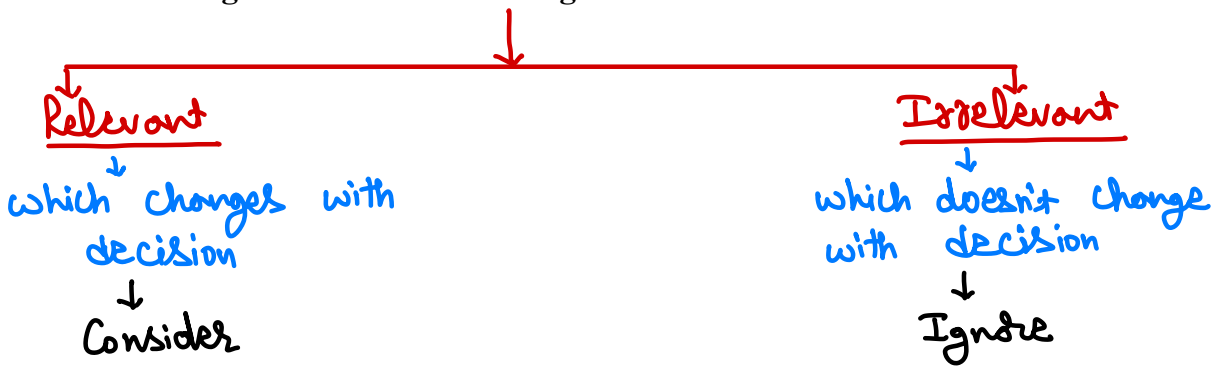
Overall Break-even Point (in ₹) = $\frac{Fixed\ Cost}{Overall\ P/V\ Ratio}$

} for Product wise BEP, distribute this in ratio of Sales mix.

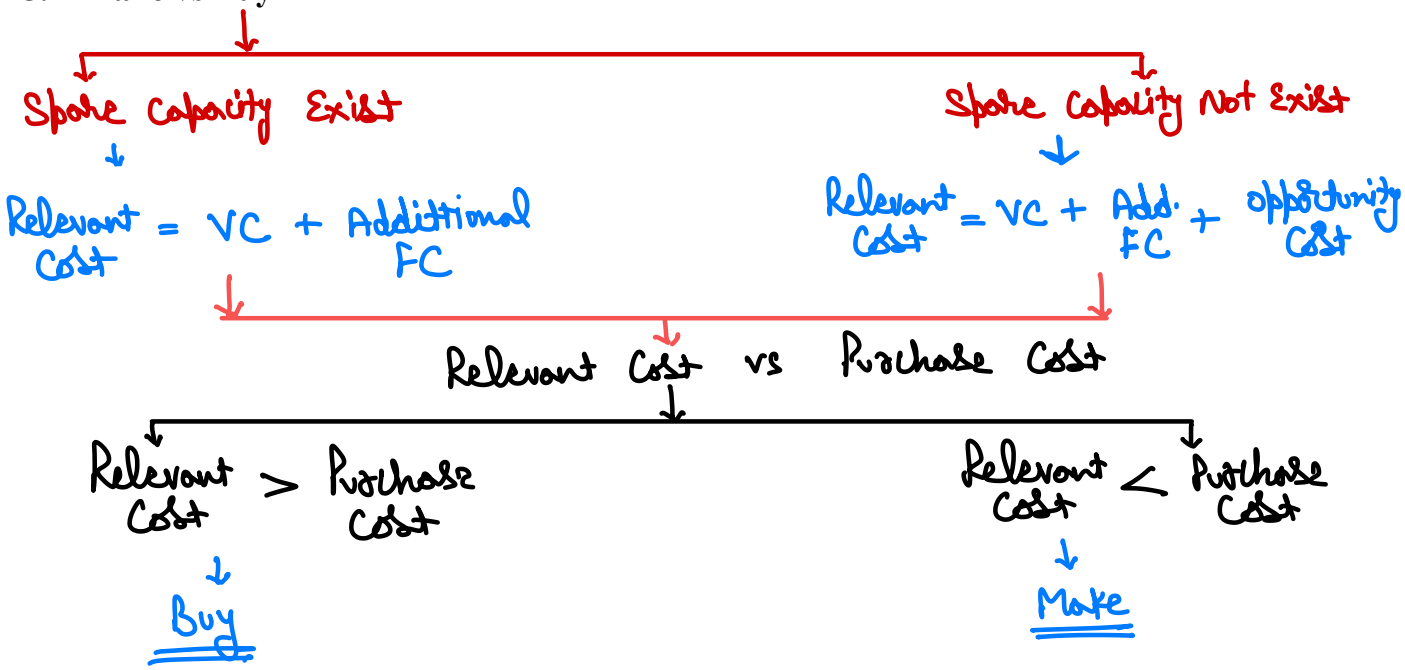
12. **Activity level % at BES** = $\frac{Break-even\ sales}{Total\ Sales\ at\ 100\%\ level} \times 100$

13. **Shut down point** = $\frac{Avoidable\ fixed\ cost}{Contribution\ per\ unit\ or\ PV\ Ratio}$

14. **Cost with regard to decision making**



15. **Make vs Buy**



16. Dropping an existing product for new product

Compare b/w Existing Profits vs New Profits

- Exist. Pft. > New Profit → Not to drop existing Product
- Exist. Pft. < New Pft. → Drop existing product & include new product

17. 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

18. Indifference Level

Level at which cost of two options will be equal

$$\text{Indifference level} = \frac{Difference\ in\ Fixed\ cost}{Difference\ in\ variable\ cost\ per\ unit}$$

option-1) VC_1 P.V. & FC_1 option-2) VC_2 P.V. & FC_2

Let at 'y' units both options cost will be equal.

TC of option-1 = TC of option-2

$(y)(VC_1) + FC_1 = (y)(VC_2) + FC_2$

$(y)(VC_1) - (y)(VC_2) = FC_2 - FC_1$

$$y = \frac{FC_2 - FC_1}{VC_1 - VC_2} = \frac{\text{Diff. in FC}}{\text{Diff. in VC P.V.}}$$

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

19. 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	-

20. Income statement under Absorption Costing

Particulars	Amount
Revenue (A)	-
Direct Material	-
Direct Labour	-
Direct expenses	-
Variable manufacturing overheads	-
Fixed manufacturing overheads	-
GFC/NFC/COP	-
Add: Opening stock of finished goods	-
Less: Closing stock of finished goods	-
COGS	-

Particulars	Amount
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)	-

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 Rs. 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

PV Ratio = $\frac{8}{24} \times 100 = 33.333\%$

BES = $\frac{8}{33.333\%} = 24$

(ii) Present profit-volume ratio = $\frac{Contribution}{Selling\ price} \times 100 = \frac{8}{24} \times 100 = 33.33\%$

(iii) New Selling price per unit = 24 – 10% = ₹ 21.60

New contribution per unit = 21.60 – 16 = ₹ 5.60

Revised PV ratio = $\frac{5.60}{21.60} \times 100 = 25.93\%$

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~~ 40000.

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 = $\frac{Fixed\ cost}{P/V\ Ratio}$ = ~~₹ 4,00,000~~ = $\frac{(52500-40000)}{25\%}$ = Rs. 50,000

Question – 3

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%

$\frac{Variable\ cost}{Sales}$ = 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 = $\frac{Fixed\ Cost}{P/V\ Ratio}$

Fixed cost = Breakeven sales × P/V Ratio = 5,00,000 × 37.5% = ₹ 1,87,500

Question – 4

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 – 5

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% + 20% Fix
Factory Overheads	1,20,000	60% + 40% Fix
Administration Expenses	52,000	35% + 65% Fix

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 – 6

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 = $\frac{\text{Sales} - \text{Variable Cost}}{\text{Sales}} \times 100 = \frac{(185 \times 5{,}000) - 4{,}31{,}000}{185 \times 5{,}000} \times 100 = 53.41\%$

(a) Break-Even Sales = $\frac{\text{Fixed Costs}}{\text{P/V ratio}} = \frac{3{,}69{,}000}{53.41\%} =$ ₹ 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 (%) = $\frac{\text{Sales} - \text{Breakeven}}{\text{Sales}} \times 100 = \frac{9{,}25{,}000 - 6{,}90{,}882}{9{,}25{,}000} \times 100 = 25.31\%$

(d) Profit if sales were 10% less than the actual sales
= 90% (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000 = ₹ 75,600

Question – 7

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

$\frac{Break\text{–}even\ sales\ in\ units}{Actual\ sales\ units} = \frac{40}{100}$

$\frac{60{,}000}{Actual\ sale\ units} = 0.40$

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 – 8

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

$\frac{\text{Diff. in FC}}{\text{Diff. in V.C P.U.}} = \frac{2l}{5} = 40000$

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 – 9

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 – 10

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 = $\frac{55,20,000}{75}$ = 73,600 units

Thus, Break-even point = 20,000 + 73,600 = 93,600 units

Question – 11

SK ltd. manufactures automobiles accessories and parts. The following are the total cost of processing 2,00,000 units:

Direct material cost	→	₹ 375 per unit
Direct labour cost	→	₹ 80 per unit
Variable factory overhead	→	₹ 16 per unit
Fixed factory overhead	→	₹ 500 lakhs

→ 471

(Ign.)

485 – 471 = 14

× 20

280

The purchase price of the component is ₹ 485. The fixed overhead would continue to be incurred even when the component is bought from outside. Required:

(a) Should be part be made or bought from outside considering that the present facility when released following a buying decision would remain idle?

(b) In case the released capacity can be rented out to another manufacturer for ₹ 32,00,000 having good demand. What should be the decision?

Solution

(a) The decision shall be made comparing the marginal cost of making and buying the component. Here the variable cost of making the component is ₹ 471 as compared to buying cost of ₹ 485. The component shall be made by suing own production facility as it would save the company ₹ 14 per unit.

(b) If by releasing the production facility the company can earn a rental income of ₹ 32,00,000, then the additional cost of buying from outside and the rental income from releasing the capacity shall be compared for making decision.

Additional cost of buying = ₹ 14 × 2,00,000 units = ₹ 28,00,000

Rental income to be received = ₹ 32,00,000

Additional benefit = ₹ 4,00,000

The component should be bought from outside as it would save the company ₹ 4,00,000 in fixed cost.

Question – 12

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 – 13

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 × $\frac{110}{100}$ × $\frac{104}{100}$]	5,72,000
(-) Variable cost [(2,50,000 + 1,00,000 + 40,000) × $\frac{110}{100}$ × $\frac{98}{100}$]	4,20,420
Contribution	1,51,580
(-) Fixed Overheads (68,000 × $\frac{98}{100}$)	58,800
Profit	92,780

Profit as % of capital employed = $\frac{92,780}{4,00,000}$ × 100 = 23.195%

Since the profit as % of capital employed is increasing, thus it is recommended to accept the proposal.

Question – 14

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 × 0.35) + (50 × 0.35) + (40 × 0.30) = 47%

Total Contribution = Sales × Overall PV Ratio = 60,00,000 × 47% = ₹ 28,20,000

Total Profit = Contribution – Fixed Cost = 28,20,000 – 18,00,000 = ₹ 10,20,000

Break-even Sales = $\frac{Fixed\ Cost}{Pverall\ PV\ Ratio} = \frac{18,00,000}{47\%}$ = ₹ 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 × 0.50) + (50 × 0.25) + (50 × 0.25) = 50%

Total Contribution = Sales × Overall PV Ratio = 64,00,000 × 50% = ₹ 32,00,000

Total Profit = Contribution – Fixed Cost = 32,00,000 – 18,00,000 = ₹ 14,00,000

Break-even Sales = $\frac{Fixed\ Cost}{Pverall\ PV\ Ratio} = \frac{18,00,000}{50\%}$ = ₹ 36,00,000

Question – 15

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	$\frac{3,60,000}{2,00,000\times90\%}$ ×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.

Reconciliation St.

Pft. as per Absorption	2,59,375
(+) Over valued op. St. in abs.	20,000
(-) Over valued Cl. St. in abs.	(40,000)
Pft. as per Marginal	2,39,375

Marginal Costing

MCQs

Q(1). Under marginal costing the cost of product includes:
A. Prime cost only
B. Prime cost and variable overheads
C. prime cost and fixed overheads
D. Prime cost and factory overheads

Q(2). Reporting under marginal costing is accomplished by:
A. Treating all costs as period costs
B. Eliminating the work-in-progress inventory account
C. Matching variable costs against revenue and treating fixed cost as period costs
D. including only variable costs in income statement

Q(3). Period costs are:
A. Variable costs
B. fixed costs
C. Prime costs
D. Overhead costs

Q(4). When sales and production (in units) are same then profit under:
A. Marginal costing is higher than that of absorption costing
B. Marginal costing is lower than that of absorption costing
C. Marginal costing is equal to that of absorption costing
D. None of the above

Q(5). When sales exceed production (in units) then profit under:
A. Marginal costing is higher than that of absorption costing
B. Marginal costing is lower than that of absorption costing
C. Marginal costing is equal to that of absorption costing
D. None of the above

Q(6). The difference between marginal costing and absorption costing is regarding the treatment of:
A. Prime cost
B. Fixed overheads
C. Direct materials
D. Variable overheads

Q(7). Under profit volume ratio, the term profit
A. Means the sales proceeds in excess of total costs
B. Means the same thing as is generally understood
C. It is a misnomer, it in fact refers to contribution i.e. (sales revenue – variable costs)
D. None of the above

Q(8). Factors which can change the break-even point:
A. Change in fixed costs
B. Change in variable costs
C. Change in the selling price
D. All of the above

Q(9). If PV ratio is 40% of sales then what about the remaining 60% of sales:
A. Profit
B. Fixed cost
C. Variable cost
D. Margin of safety

Q(10). The PV ratio of a product is 0.6 and profit is ₹ 9,000. The margin of safety is:
A. ₹ 5,400
B. ₹ 15,000
C. ₹ 22,500
D. ₹ 3,600

$MOS = \frac{\text{Profit}}{PV}$

$= \frac{9000}{0.6} = 15000$

BUDGET & BUDGETARY CONTROL - CONCEPTS

1. **Types of budget**

(A) Master Budget → Summary Budget of entire Org.

(B) Period – Wise Budget

Long term budget – Beyond 3 years

Short term budget – 1 to 3 years

Current budget – Upto 1 year

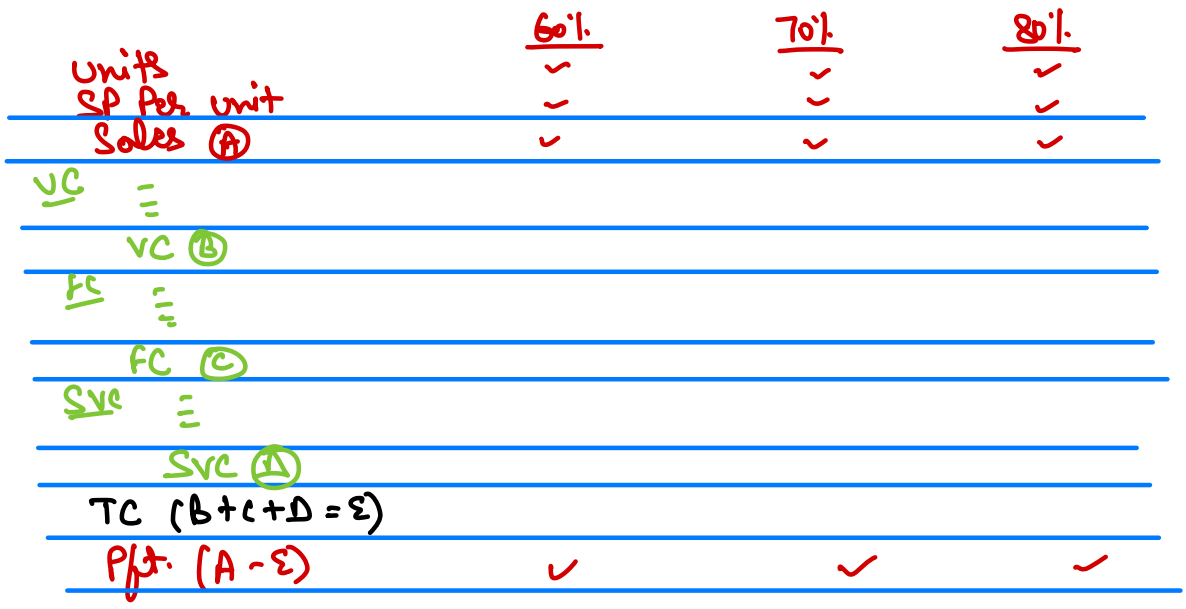
(C) Fixed Budget – Doesn't change with change in units or output

(D) Flexible Budget – Can be changed with change in units or output

Cost → VC, FC, SVC

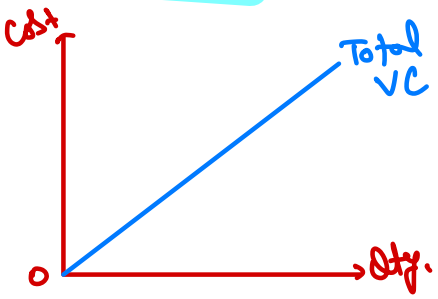
(E) Function wise Budget

- 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

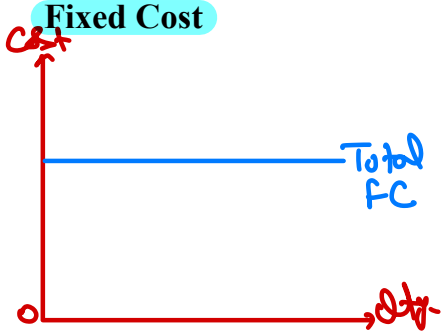


2. **Type of Costs**

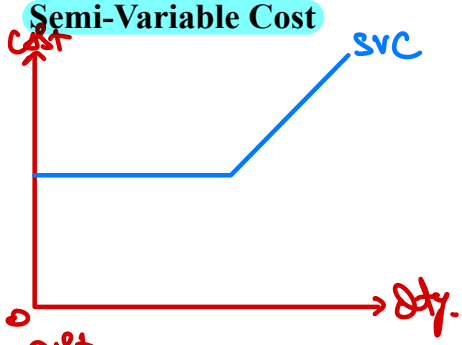
Variable Cost

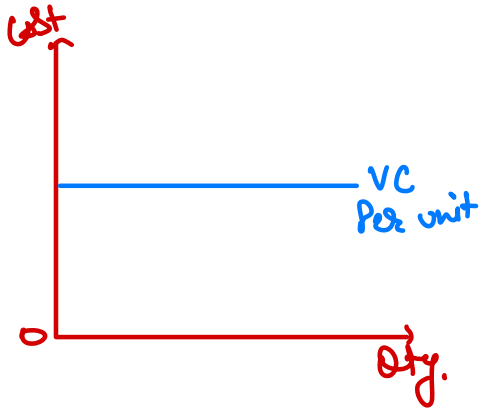


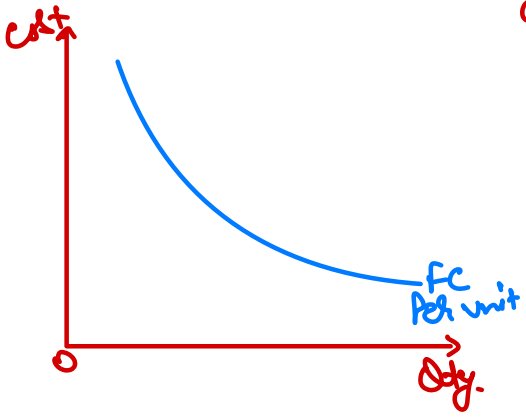
Fixed Cost

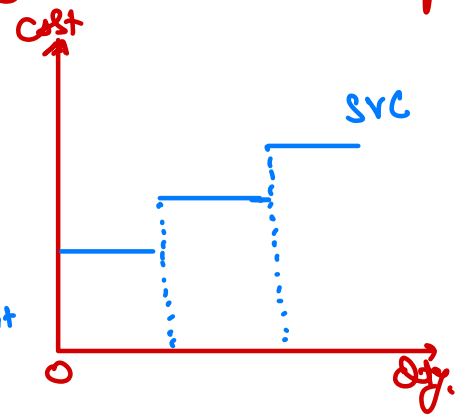


Semi-Variable Cost









3. **Total Cost = No. of units × Cost per unit**

Quantity effect — Price effect

4. **Quantity & Price Effect**

	Total Variable Cost	Total Fixed Cost
Quantity Effect	Yes	No
Price Effect	Yes	Yes

5. Points to Remember (PTRs)

A) 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

B) Wages $\propto \frac{1}{Efficiency}$ and Efficiency $\propto$ Output

6. Distribution of Semi-Variable Cost

if given at two or more levels

Variable cost per unit out of SVC $= \frac{Difference\ in\ cost}{Difference\ in\ units} = \frac{SVC_1 - SVC_2}{V_1 - V_2}$

Fixed cost out of SVC = Total cost – Total variable cost

(Do at any 1 level)

7. Sales, Production, Consumption and purchase budget

Sales Budget

Product	Qty.	SP P.v.	Sales
A	✓	✓	–
B	✓	✓	–
C	✓	✓	–
	✓		✓

Sales = op. St. + Production – Cl. Stock

Production = Sales + Cl. Stock – op. St.

Production Bud.

Part.	Pr. A	Pr. B	Pr. C
Sales	✓	✓	✓
(+) Cl. Stock	✓	✓	✓
(–) op. Stock	✓	✓	✓
Prod.	✓	✓	✓

RM Consumption Bud.

Product	Prod. Qty.	RM Cons. P.v.	RM Cons.
A	✓	✓	–
B	✓	✓	✓
C	✓	✓	–
	✓		✓

RM Cons. = op. St. + RM Purch. – Cl. Stock

RM Purch. = RM Cons. + Cl. St. – op. Stock

RM Purchase Bud.

Part.	April	May	June
RM Cons.	✓	✓	✓
(+) Cl. St.	✓	✓	✓
(–) op. St.	✓	✓	✓
RM Purch.	✓	✓	✓

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

SK Limited has prepared its expense budget for 50,000 units in its factory for the year 2021-22 as detailed below:

	₹ per unit
Direct materials	125
Direct labour	50
Variable overhead	40
Direct expenses	15
Selling expenses (20% fixed)	25
Factory expenses (100% fixed)	15
Administration expenses (100% fixed)	8
Distribution expenses (85% variable)	20
Total	298

Prepare an expense budget for the production of 35,000 units and 70,000 units.

Solution

Expenses Budget

Particulars	35,000 units	70,000 units
Direct material	35,000 × 125 = 43,75,000	70,000 × 125 = 87,50,000
Direct labour	35,000 × 50 = 17,50,000	70,000 × 50 = 35,00,000
Variable overheads	35,000 × 40 = 14,00,000	70,000 × 40 = 28,00,000
Direct expenses	35,000 × 15 = 5,25,000	70,000 × 15 = 10,50,000
Selling expenses – variable	35,000 × 25 × 80% = 7,00,000	70,000 × 25 × 80% = 14,00,000
Selling expenses – fixed	50,000 × 25 × 20% = 2,50,000	50,000 × 25 × 20% = 2,50,000
Factory expenses – fixed	50,000 × 15 = 7,50,000	50,000 × 15 = 7,50,000
Administration expenses – fixed	50,000 × 8 = 4,00,000	50,000 × 8 = 4,00,000
Distribution expenses – variable	35,000 × 20 × 85% = 5,95,000	70,000 × 20 × 85% = 11,90,000
Distribution expenses – fixed	50,000 × 20 × 15% = 1,50,000	50,000 × 20 × 15% = 1,50,000
Total	**1,08,95,000**	**2,02,40,000**

Question – 3

SK Ltd. company, requires you to prepare the master budget for the next year from the following information:

Sales:	
Acrylic finish wooden sheets	₹ 70,00,000
Lacquer finish wooden sheets	₹ 30,00,000
Direct material cost	65% of sales
Direct wages	25 workers @ ₹ 1,500 per month
Factory overheads:	
Indirect labour-	
Work manager	₹ 5,500 per month
Foreman	₹ 4,500 per month
Stores and spares	2.5% on sales
Depreciation on machinery	₹ 1,26,000
Light and power (fixed)	₹ 30,000
Repairs and maintenance	₹ 80,000
Other sundries	10% on direct wages
Administration, selling and distribution expenses	₹ 3,99,000 p.a.

Solution

Master Budget for the year ending

Particulars	**(₹)**	**(₹)**	**(₹)**
Sales:			
Acrylic finish wooden sheets			70,00,000
Lacquer finish wooden sheets			30,00,000
Total Sales			1,00,00,000
Less: Cost of production:			
Direct materials (65% of ₹ 1,00,00,000)		65,00,000	
Direct wages (25 workers × ₹ 1,500 × 12 months)		4,50,000	
Prime Cost		69,50,000	
Fixed Factory Overhead:			
Works manager's salary (5,500 × 12 months)	66,000		
Foreman's salary (4,500 × 12 months)	54,000		
Depreciation	1,26,000		
Light and power	30,000	2,76,000	
Variable Factory Overhead:			
Stores and spares (2.5% of ₹ 1,00,00,000)	2,50,000		
Repairs and maintenance	80,000		
Sundry expenses	45,000	3,75,000	
Works Cost			76,01,000
Gross Profit (Sales – Works cost)			23,99,000

Less: Adm., selling and distribution expenses			3,99,000
Net Profit			20,00,000

Question – 4

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 × 30 = ~~1,10,250~~ 94500	~~2,11,050~~ 195300

Less: Fixed OHs	40,000 + 5% = 42,000	30,000 + 5% = 31,500	73,500
Profit	2,77,200	~~1,56,450~~ 172 200	~~4,33,650~~ 449400

Question – 5

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 – 6

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 – 7

SK Ltd. manufactures and sells a single product and has estimated sales revenue of ₹ 302.40 lakh during the year based on 20% profit on selling price. Each unit of product requires 6 kg of material a and 3 kg of material B and processing time of 4 hours in machine shop and 2 hours in assembly shop. Factory overheads are absorbed at a blanket rate of 20% of direct labour. Variable selling & distribution overheads are ₹ 60 per unit sold and fixed selling & distribution overheads are estimated to be ₹ 69,12,000.

The other relevant details are as under:

Purchase Price:	Material A	₹ 160 per kg
	Material B	₹ 100 per kg
Labour Rate:	Machine shop	₹ 140 per hour
	Assembly Shop	₹ 70 per hour

	Finished Stock	Material A	Material B
Opening Stock	2,500 units	7,500 kg	4,000 kg
Closing Stock	3,000 units	8,000 kg	5,500 kg

Required:

(i) Calculate number of units of product proposed to be sold and selling price per unit

(ii) Prepare production budget in units

(iii)Prepare material purchase budget in units

Solution

Working Note:

Statement showing Total Variable Cost

Particulars	Amount (₹)
Estimated sales Revenue	3,02,40,000
Less: Desired Profit margin on sales @ 20%	60,48,000
Total cost	2,41,92,000
Less: fixed selling and distribution overheads	~~2,41,92,000~~ 69,12,000
Total Variable cost	1,72,80,000

Statement showing variable cost per unit

Particulars	Amount (₹)
Direct materials:	
A: 6kg × ₹ 160	960
B: 3kg × ₹ 100	300
Labour cost	
Machine shop: 4 hours × ₹ 140	560
Assembly shop: 2 hours × ₹ 70	140
Factory overheads: [20% × (560 + 140)]	140
Variable selling and distribution expenses	60
Total variable cost per unit	2,160

(i) Number of units sold $= \frac{Total\ Variable\ Cost}{Variable\ Cost\ per\ unit} = \frac{1,72,80,000}{2,160} = 8,000$ units

Selling price per unit $= \frac{Sales}{Number\ of\ units} = \frac{3,02,40,000}{8,000} =$ ₹ 3,780

(ii) **Production Budget (units)**

Particulars	**Units**
Budgeted Sales	8,000
Add: closing stock	3,000
Less: opening stock	(2,500)
Required Production	8,500

(iii) **Materials Purchase Budget (Kg)**

Particulars	**Material A**	**Material B**
Requirement for production	8,500 × 6kg = 51,000	8,500 × 3kg = 25,500
Add: Desired closing Stock	8,000	5,500
Less: Opening Stock	(7,500)	(4,000)
Quantity to be purchased	51,500	27,000

Question – 8

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 – 9

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 = $\frac{Fixed\ Cost}{Contribution\ per\ unit} = \frac{1,80,000}{\left(\frac{2,76,750}{61,500}\right)}$ = 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 – 10

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.

Required:

(i) Calculate the number of shirts and shorts to be produced per month in the first quarter of financial year 2022-23 to maximize company's profit.

(ii) Prepare the following budgets on a monthly basis for July, August and September 2022:
   (a) Sales budget showing sales units and sales revenue for each product.
   (b) Production budget (in units) for each product.

Solution

(i) Statement of contribution per unit

Particulars	Shirt (₹)	Short (₹)
Selling price per unit (A)	60	44
Fabric cost per unit	24	12
Dyes & Cotton per unit	6	4
Direct labour per unit	8	4
Variable cost per unit (B)	38	20
Contribution per unit (A – B = C)	22	24
Labour hours per unit	$\frac{8}{8} = 1$	$\frac{4}{8} = 0.5$
Contribution per labour hour	$\frac{22}{1} = 22$	$\frac{24}{0.5} = 48$

Since contribution per labour hour is higher in case of short, thus it is advisable to produce it first.

Let number of shorts to be produced = y
Labour hours required used to produce shorts = 0.5y
Labour hours available for shirts = 12,000 – (0.5y)
Number of shirts that can be produced = $\frac{12,000-0.5y}{1}$ = 12,000 – 0.5y
As per condition of 25% given in question,
Production of shirt = 25% of production of short
12,000 – 0.5y = 25% × y
12,000 – 0.5y = 0.25y
12,000 = 0.75y
y = 16,000
Thus, number of shorts to be produced = y = 16,000
and, number of shirts to be produced = 12,000 – 0.5(16,000) = 4,000

(ii) (a) Sales budget

Particulars	Shirt			Short		
	July	August	September	July	August	September
Sale units	15,000	16,500	18,150	20,000	22,000	24,200
S.P. per unit	60	60	60	44	44	44
Total Sales	9,00,000	9,90,000	10,89,000	8,80,000	9,68,000	10,64,800

(ii) (b) Production Budget

Particulars	Shirt			Short		
	July	August	September	July	August	September
Sale units	15,000	16,500	18,150	20,000	22,000	24,200
(+) Closing Stock (40% of next month sale)	6,600	7,260	7,986*	8,800	9,680	10,468*
(-) Opening stock	-	(6,600)	(7,260)	-	(8,800)	(9,680)
Total Production	21,600	17,160	18,876	28,800	22,880	24,988

*Closing stock for September

Closing stock of shirts = Sales of October × 10% = (18,150 × 110%) × 40% = 7,986

Closing stock of shorts = Sales of October × 10% = (24,200 × 110%) × 40% = 10,468

Budget & Budgetary Control

MCQs

Q(1). If a company wishes to establish a factory overhead budget system in which estimated costs can be derived directly from estimates of activity levels, it should prepare a:
A. Master budget
B. Cash budget
C. Flexible budget
D. Fixed budget

Q(2). The classification of fixed and variable cost is useful for the preparation of:
A. Master budget
B. Flexible budget
C. Cash budget
D. Capital budget

Q(3). Budget manual is a document:
A. Which contains different type of budgets to be formulated only
B. Which contains the details about standard cost of the products to be made
C. Setting out the budget organization and procedures for preparing a budget including fixation of responsibilities, formats and records required for the purpose of preparing a budget and for exercising budgetary control system.
D. None of the above

Q(4). The budget control organization is usually headed by a top executive who is known as:
A. General manager
B. Budget director/ budget controller
C. Accountant of the organization
D. None of the above

Q(5). "A favourable budget variance is always an indication of efficient performance." Do your agree, give reason?
A. A favourable variance indicates, saving on the part of the organization hence it indicates efficient performance of the organization.
B. Under all situations, a favourable variance of an organization speaks about its efficient performance.
C. A favourable variance does not necessarily indicate efficient performance, because such a variance might have been arrived at by not carrying out the expenses mentioned in the budget
D. None of the above

Q(6). A budget report is prepared on the principle of exception and thus-
A. Only favourable variances should be shown
B. Only favourable variance should be shown
C. Both favourable and unfavourable variances should be shown
D. None of the above

Q(7). Purchase budget and materials budget are same:
A. Purchase budget is a budget which includes only the details of all materials purchased
B. Purchases budget is a wider concept and thus includes not only purchases of materials but also other item's as well
C. Purchases budget is different from materials budget; it includes purchases of other items only
D. None of the above

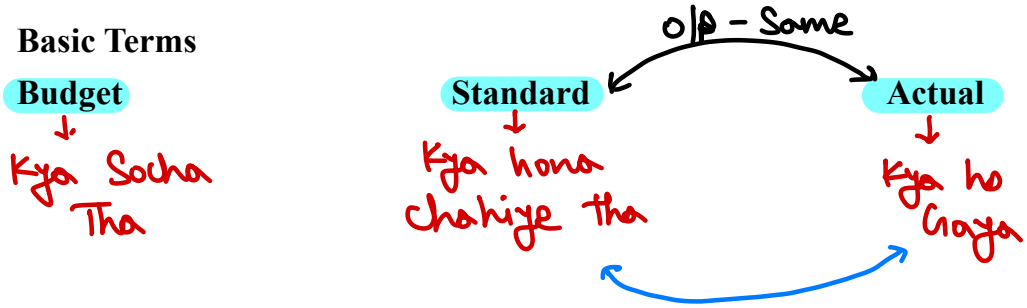
Q(8). Efficiency ratio is:
A. The extent of actual working days avoided during the budget period
B. Activity ratio/ capacity ratio
C. Whether the actual activity is more or less than budgeted activity
D. None of the above

Q(9). Activity ratio depicts:
A. Whether actual capacity utilized exceeds or falls short of the budgeted capacity
B. Whether the actual hours used for actual production were more or less than the standard hours
C. Whether actual activity was more or less than the budgeted capacity
D. None of the above

Q(10). Which of the following is usually a short-term budget:
A. Capital expenditure budget
B. Research and development budget
C. Cash budget
D. Sales budget

STANDARD COSTING - CONCEPTS

1. **Basic Terms**



2. **Always calculate standard data on the basis of actual output**

3. **Variances** →
   - +ve, favourable ⇒ (F)
   - -ve, Adverse ⇒ (A)

4. **Material Variance**

MCV = SC - AC

MPV = (SP - AP) × AQ Purch.

MUV = (SQ - AQ Consume) × SP

MMV = (RSQ - AQ) × SP

MYV = (SQ - RSQ) × SP

or

MYV = (AY - SY) × Std. Cost p.v. of output

where. SC = Std. Cost
AC = Actual cost
SP = Std. Price
AP = Actual Price
AQ = Actual Qty. ↪ Purch. / Consume
SQ = Std. Qty.
RSQ = Revised Std. Qty. = Actual Input in Std. Ratio
AY = Actual Yield
SY = Standard Yield = $\frac{\text{Std. O/P}}{\text{Std. I/P}} \times$ Actual I/P

Std. Cost p.v. of O/P = $\frac{\text{Total Std. Cost}}{\text{Total output}}$

5. **Material Cost Variance (MCV)**
   MCV = Standard cost – Actual Cost

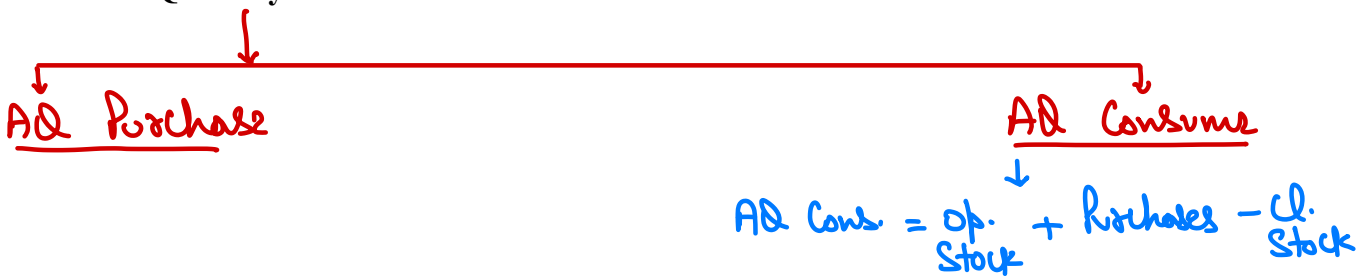
6. **Material Price Variance (MPV)**
   MPV = (SP – AP) × Actual quantity

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

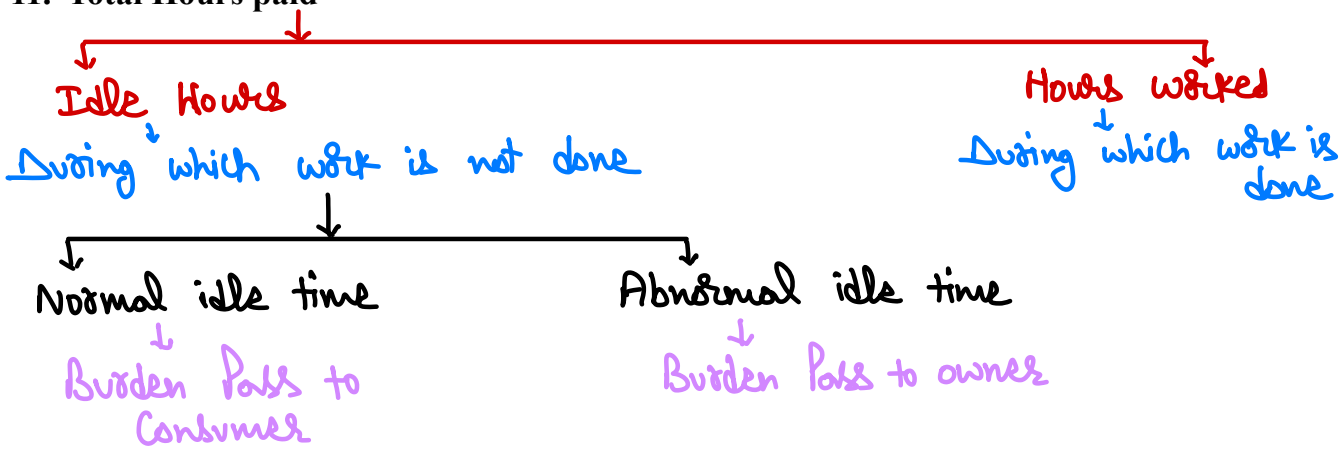
10. **Actual Quantity**



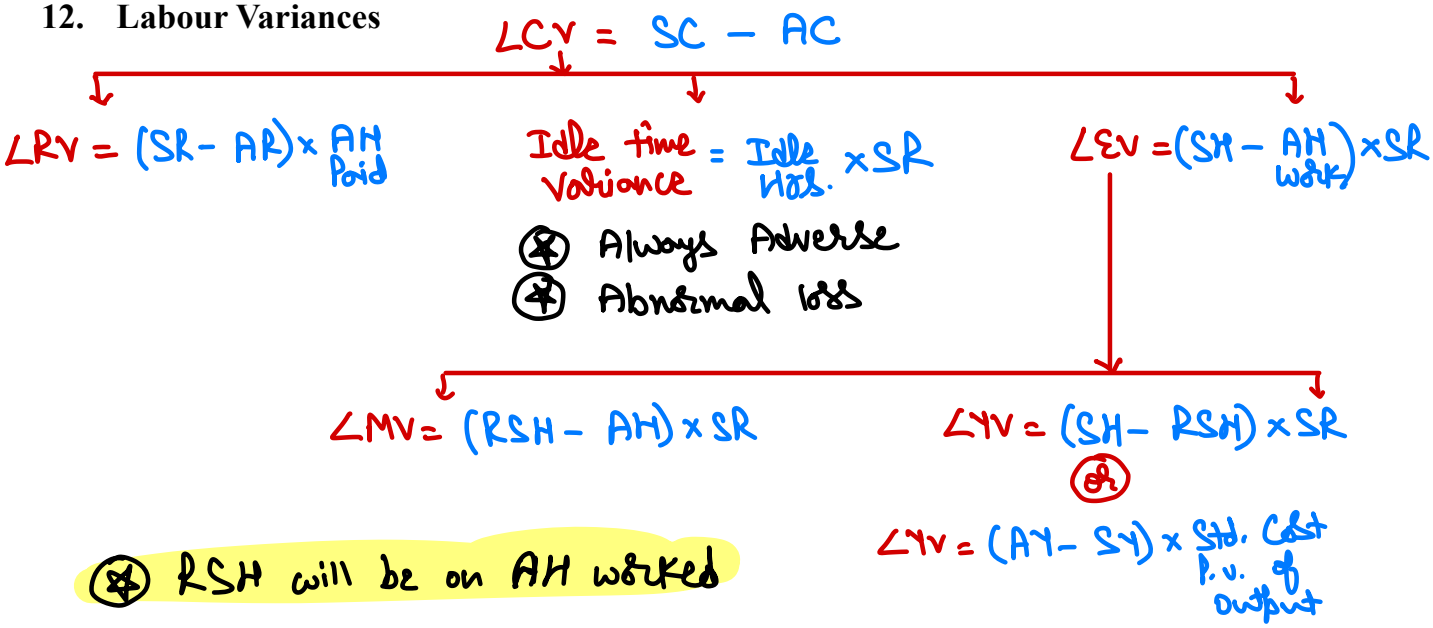
✱ If op. Stock rate is not given then Consider it at Std. price

✱ Unless otherwise provided, FIFO method is used

11. Total Hours paid



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

} Always Adverse
Abnormal loss

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**

V. OH Cost Var. = Recovered OHs – Actual OHs

V. OH Expd. Var. = (RR – AR) × AH worked

V. OH Efficiency Var. = (SH – AH work) × RR

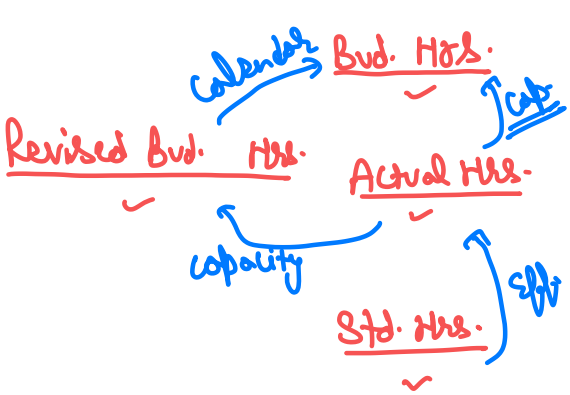
Var. OHs are always on Hours worked

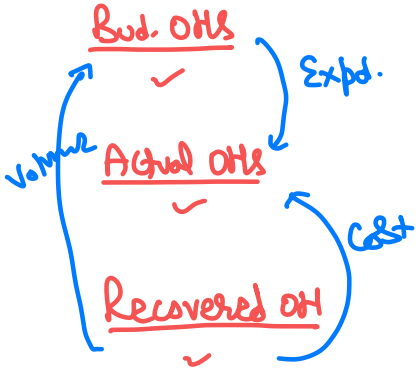
20. **Variable OH Cost Variance (VOCV)**
VOCV = Recovered OHs – Actual OHs

21. **Variable OH Expenditure Variance (VOEV)**
VOEV = (Recover Rate – Actual Rate) × Actual horus 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** / Control Ratios

Efficiency Ratio = $\frac{Standard\ hours}{Actual\ hours} \times 100$

Activity Ratio = $\frac{Standard\ hours}{Budgeted\ hours} \times 100$

Calendar Ratio = $\frac{Actual\ working\ days}{Budgeted\ Working\ Days} \times 100 = \frac{Revised\ budgeted\ hours}{Budgeted\ hours} \times 100$

Actual usage of Budgeted Capacity Ratio = $\frac{Actual\ hours}{Budgeted\ hours} \times 100$

Standard Capacity Ratio = $\frac{Budgeted\ hours}{Maximum\ possible\ hours\ in\ budget} \times 100$

Actual Capacity Usage Ratio = $\frac{Actual\ hours}{Maximum\ possible\ working\ hours} \times 100$

Eff. Ratio × Cap. Ratio = Activity Ratio

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 = ₹ 6,900 (A)

B = 20,400 – 13,000 = ₹ 7,400 (F)

MCV = ₹ 500 (F)

1. Material Price Variance = (SP – AP) × AQ

A = (50 – 60) × 540 = ₹ 5,400 (A)

B = (60 – 50) × 260 = ₹ 2,600 (F)

MPV = ₹ 2,800 (A)

2. Material Usage (or Quantity) Variance = (SQ – AQ) × SP

A = (510 – 540) × 50 = ₹ 1,500 (A)

B = (340 – 260) × 60 = ₹ 4,800 (F)

MUV = ₹ 3,300 (F)

3. Material Mix Variance = (RSQ - AQ) × SP

A = (480 – 540) × 50 = ₹ 3,000 (A)

B = (320 – 260) × 60 = ₹ 3,600 (F)

MMV = ₹ 600 (F)

4. Material Yield Variance = (SQ - RSQ) × SP

A = (510 – 480) × 50 = ₹ 1,500 (F)

B = (340 – 320) × 60 = ₹ 1,200 (F)

MYV = ₹ 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.

125 − 25 = 100

1/5 1/4

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	= ₹	24,500 (A)
Y = 21,000 – 12,000	= ₹	9,000 (F)
Z = 7,000 – 9,000	= ₹	2,000 (A)
	MCV = ₹	17,500 (A)

2. Material Price Variance = (SP – AP) × AQ

X = (20 – 21) × 4,500	= ₹	4,500 (A)
Y = (10 – 8) × 1,500	= ₹	3,000 (F)
Z = (5 – 6) × 1,500	= ₹	1,500 (A)
	MPV = ₹	3,000 (A)

Material Price Variance = (SP – AP) × AQ

(On purchase qty.)

X = (20 – 21) × 5,000	= ₹	5,000 (A)
Y = (10 – 8) × 2,000	= ₹	4,000 (F)
Z = (5 – 6) × 1,200	= ₹	1,200 (A)
	MPV = ₹	2,200 (A)

3. Material Usage (or Quantity) Variance = (SQ – AQ) × SP

X = (3,500 – 4,500) × 20	= ₹	20,000 (A)
Y = (2,100 – 1,500) × 10	= ₹	6,000 (F)
Z = (1,400 – 1,500) × 5	= ₹	500 (A)
	MUV = ₹	14,500 (A)

4. Material Mix Variance = (RSQ - AQ) × SP

X = (3,750 – 4,500) × 20	= ₹	15,000 (A)
Y = (2,250 – 1,500) × 10	= ₹	7,500 (F)
Z = (1,500 – 1,500) × 5	= ₹	NIL
	MMV = ₹	7,500 (A)

5. Material Yield Variance = (SQ - RSQ) × SP

X = (3,500 – 3,750) × 20	= ₹	5,000 (A)
Y = (2,100 – 2,250) × 10	= ₹	1,500 (A)
Z = (1,400 – 1,500) × 5	= ₹	500 (A)
	MYV = ₹	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)

A. I/P = $\frac{1480}{90\%}$ = 1644.44

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 × SP) – (AQ × AP)

175 (F) = (AQ × SP) – 59,825

175 = (AQ × SP) – 59,825

AQ × 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 × 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) × SP

Material A	= (886 – 900) × 45	= ₹ 630 (A)
Material B	= (664 – 650) × 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	40×40 = 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	40×10 = 400	60	24,000	$\frac{480}{1,760}\times1980$ = 540
Unskilled	$\frac{40\times10}{2,000}\times1600$ = 320	50	16,000	40×5 = 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

25 units → 1×100 w.Hrs.
1 unit → $\frac{100}{25}$ = 4 w.Hrs.

Solution

Labour Efficiency Variance = (SH – AH worked) × SR

$$240\ (F) = \left[\left(960 \times \frac{100}{25}\right) - \{(10 + 30 + 60) \times (40 - 5\%)\}\right] \times SR$$

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 ÷ 90% = 1,644		1,26,810	1,550		1,19,650	1,550
(-) Loss	164			70 (B/F)			155
Output	1,480			1,480			1395

Same

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

Std. Hrs. work × Actual O/P / Std. O/P

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 25	**Recovery Rate** 5,00,000 ÷ 25 = 20,000	**Budgeted Overheads** 5,00,000
Actual Days 23		**Actual Overheads** 4,90,000
Standard Days $\frac{25}{5,000} \times 4,800 = 24$	**Recovery Rate** 20,000	**Recovered Overheads** 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

In a manufacturing company the standard units of production of the year were fixed at 1,20,000 units and overhead expenditures were estimated to be:

Fixed → ₹ 12,00,000 Variable → ₹ 6,00,000
Semi-variable → ₹ 1,80,000

Actual production during the June, 2021 of the year was 8,000 units. Each month has 20 working days.

During the month there was one public holiday. The actual overheads amounted to:

Fixed → ₹ 1,10,000 Variable → ₹ 48,000

Semi-variable → ₹ 19,200

Semi-variable charges are considered to include 60 per cent expenses of fixed nature and 40 per cent of variable character.

Calculate the following:

(a) Overhead cost variance
(b) Fixed overhead cost variance
(c) Variable overhead cost variance
(d) Fixed overhead volume variance
(e) Fixed overhead expenditure variance
(f) Calendar variance

Solution

Basic Calculations:

(1) Fixed overheads out of semi-variable overheads = 1,80,000 × 60% = ₹ 1,08,000

∴Total Fixed overheads p.a. = 12,00,000 + 1,08,000 = ₹ 13,08,000

Total Fixed overheads per month = 13,08,000 ÷ 12 = ₹ 1,09,000

Fixed overheads per unit = $\frac{1,09,000}{1,20,000 \div 12}$ = ₹ 10.90

(2) Variable overheads out of semi-variable overheads = 1,80,000 × 40% = ₹ 72,000

∴Total variable overheads p.a. = 6,00,000 + 72,000 = ₹ 6,72,000

Total variable overheads per month = 6,72,000 ÷ 12 = ₹ 56,000

Variable overheads per unit = $\frac{56,000}{1,20,000 \div 12}$ = ₹ 5.60

(3) Variable overheads recovered = 8,000 × 5.60 = ₹ 44,800

(4) Total actual fixed overheads = 1,10,000 + (19,200 × 60%) = ₹ 1,21,520

Total actual variable overheads = 48,000 + (19,200 × 40%) = ₹ 55,680

(5) For Fixed Overheads

	Budgeted Units 10,000	**Recovery Rate** 10.90	**Budgeted OHs** 1,09,000
Revised Bud. Units $\frac{10,000}{20} \times 19 = 9,500$	**Actual Units** 8,000		**Actual OHs** 1,21,520
	Standard Units 8,000	**Recovery Rate** 10.90	**Recovered OHs** 87,200

Calculation of Variances

(a) Overhead Cost Variance = Recovered Overheads – Actual Overheads
= (87,200 + 44,800) – (1,21,520 + 55,680) = ₹ 45,200 (A)

(b) Fixed OHs Cost Variance = Recovered Fixed OHs – Actual Fixed OHs
= 87,200 – 1,21,520 = ₹ 34,320 (A)

(c) Variable OHs Cost Variance = Recovered Variable OHs – Actual Variable OHs
= 44,800 – 55,680 = ₹ 10,880 (A)

(d) Fixed OHs Volume Variance = Recovered Fixed OHs – Budgeted Fixed OHs
= 87,200 – 1,09,000 = ₹ 21,800 (A)

(e) Fixed OHs Expenditure Variance = Budgeted overhead – Actual overhead
= 1,09,000 – 1,21,520 = ₹ 12,520 (A)

(f) Calendar Variance = (Revised Bud. units – Budget units) × Recovery rate
= (9,500 – 10,000) × 10.90 = ₹ 5,450 (A)

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:

(i) Fixed overhead expenditure variance
(ii) Actual overheads incurred
(iii) Actual hours for actual production
(iv) Fixed overhead capacity variance
(v) Standard hours for actual production
(vi) Fixed overhead efficiency variance

Solution

Computation of required variances for February 2019:

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 = $\frac{Actual\ Overheads\ Incurred}{Actual\ Rate\ of\ Recovery\ Overhead\ Per\ Hour} = \frac{12,800}{8}$ = 1,600 hours
4. Overheads Capacity Variance = Std rate of OH rate (Actual hrs for actual production – Budgeted hours)
= ₹ 5 × (1,600 – 2,400) = ₹ 5 × (- 800) = ₹ 4,000 Adverse

* Standard rate of Overhead recovery = $\frac{Budgetary\ Overheads}{Budgeted\ hours} = \frac{12,000}{2,400\ hours}$ = ₹ 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 = - $\frac{2,000}{5}$

   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) × 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

SK Ltd. manufactures a commercial product for which the standard cost per unit is as follows:

Material:	5 kg. @ ₹ 4 per kg.	20.00
Labour:	3 hours @ ₹ 10 per hour	30.00
Variable Overhead:	3 hours @ ₹ 1	3.00
Fixed Overhead:	3 hours @ ₹ 0.50	1.50
Total		54.50

During May 2021, 600 units of the product were manufactured at the cost shown below:

		₹
Materials purchased:	5,000 kg. @ ₹ 4.10 per kg	20,500
Materials used:	3,500 kg	
Direct Labour:	1,700 hours @ ₹ 9	15,300
Variable overhead		1,900
Fixed overhead		900
Total		38,600

The flexible budget required 1,800 direct labour hours for operation at the monthly activity level used to set the fixed overhead rate.

Calculate:

(a) Material price variance
(b) Material Usage variance
(c) Labour rate variance
(d) Labour efficiency variance
(e) Variable overhead expenditure variance
(f) Variable overhead efficiency variance
(g) Fixed overhead expenditure variance
(h) Fixed overhead volume variance
(i) Fixed overhead capacity variance
(j) Fixed overhead efficiency variance

Part.	Std. (O/P = 600)			Actual (O/P = 600)		
	Q	R	A	Q	R	A
Mat.	600×5 = 3000	4	12000	3500	4.10	14350
Labour	600×3 = 1800	10	18000	1700	9	15300
V. OHs	600×3 = 1800	1	1800	1700	$\frac{1900}{1700}$ = 1.1176	1900

Solution

(a) Material price variance = (Standard price – Actual Price) × Actual quantity
= (₹ 4 – ₹ 4.10) × 5,000 = ₹ 500(A)

(b) Material usage variance = (Std. quantity for actual output – Actual qty.) × Std. price
= (600 × 5 – 3,500) × 4 = ₹ 2,000(A)

(c) Labour Rate Variance = (Standard rate – Actual rate) × Actual hours
= (₹ 10 – ₹ 9) × 1,700 = ₹ 1,700(F)

(d) Labour Efficiency Variance = (Standard hrs for actual output – Actual hrs) × Standard rate
= (600 × 3 – 1,700) × ₹ 10 = ₹ 1,000(F)

(e) Variable OHs Expenditure Variance = (Actual Hrs x Standard Rate) – Actual Overhead
= (1700 x ₹ 1) – ₹ 1900 = ₹ 200(A)

(f) Variable Overhead Efficiency Variance = Std. hrs for actual output – Actual hrs) × Std. rate
= (600 × 3 – 1,700) × ₹ 1 = ₹ 100(F)

(g) Fixed Overhead Expenditure Variance = (Budgeted overhead – Actual overhead)
= (1,800 × 0.50 – 900) = Nil

(h) Fixed Overhead Volume Variance = (Std. hrs for actual output – Bud. hrs.) × Std. rate
= (600 × 3 – 1,800) × ₹ 0.50 = Nil

(i) Fixed Overhead Capacity Variance = (Budgeted hours – Actual Hours) × Standard rate
= (1,800 – 1,700) × ₹ 0.50 = ₹ 50(A)

(j) Fixed Overhead Efficiency Variance = (Std. hrs. for actual output – Actual hrs.) × Std rate
= (600 × 3 – 1,700) × ₹ 0.50 = ₹ 50(F)

Question – 12

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 (AH)
Standard hours earned in the four week period	8,800 hours (SH)

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 = $\frac{Actual\ hours}{Budgeted\ Days} \times 100 = \frac{7,500}{8,000} \times 100 = 93.75\%$

Standard Costing

MCQs

Q(1). Under standard cost system the cost of the product determined at the beginning of production is its:
A. Direct cost
B. Pre-determined cost
C. Historical cost
D. Actual cost

Q(2). The deviations between actual and standard cost is known as:
A. Multiple analysis
B. Variable cost analysis
C. Variance analysis
D. Linear trend analysis

Q(3). The standard which is attainable under favourable conditions is:
A. Theoretical standard
B. Expected standard
C. Normal standard
D. Basic standard

Q(4). The standard most suitable from cost control point of view is:
A. Nor mal standard
B. Theoretical standard
C. Expected standard
D. Basic standard

Q(5). Overhead cost variance is:
A. The difference between overheads recovered on actual output – actual overheads incurred
B. The difference between budgeted overhead cost and actual overhead cost.
C. Obtained by multiplying standard overhead absorption rate with the difference between standard hours for actual output and actual hours worked.
D. None of the above

Q(6). Which of the following variance arises when more than one material is used in the manufacture of a product:
A. Material price variance
B. Material usage variance
C. Material yield variance
D. Material mix variance

Q(7). If standard hours for 100 units of output are 400 @ ₹ 2per hour and actual hours take are 380 @ ₹ 2.25 per, then the labour rate variance is:
A. ₹ 95 (adverse)
B. ₹ 100 (adverse)
C. ₹ 25 (favourable)
D. ₹ 120 (adverse)

$(2 - 2.25) \times 380$
$= -95 = 95\ (A)$

Q(8). Controllable variances are best disposed-off by transferring to:
A. Cost of goods sold
B. Cost of goods sold and inventories
C. Inventories of work-in-progress and finished goods
D. Costing profit & loss account

Q(9). Idle time variance is obtained by multiplying:
A. The difference between standard and actual hours by the actual rate of labour pe hour
B. The difference between actual labour hours paid and actual labour hours worked by the standard rate
C. The difference between standard and actual hours by the standard rate of labour per hour
D. None of the above

Q(10). Basic standards are:
A. Those standards, which require high degree of efficiency and performance
B. Average standards and are useful in long term planning
C. Standards, which can be attained or achieved
D. Assuming to remain unchanged for a long time.