3 CHAPTER

Employee Cost and Direct Expenses

Labour Cost	• The term labour refers to all human resources of the organization • It may include workers, employees, staff, salesmen etc. • The compensation paid to all labour is known as labour cost • It can be either in monetary terms or non-monetary terms.
Employee Cost	• It is wider term than labour cost. • It includes wages, salary, bonus, incentive etc. paid to an employee and charged to a cost object as labour cost. • In general, both labour cost and employee cost are used interchangeably.
Direct Labour Cost	• Labour which can be readily identified with a specific job, contract or work order. • Its cost is directly charged to the specific job or order and forms part of prime cost. • It generally varies directly with the volume of output i.e. positive relation with output.
Indirect Labour Cost	• Labour which can't be readily identified with a specific job, or order. • Its cost can't be charged directly to specific job or order and is treated as part of overheads. • It may or may not vary directly with the volume of output.
Employee Cost Control	• The ultimate aim should be to keep the wages per unit of output as low as possible and this can be achieved by increasing efficiency.
Factors for Control of Employee Cost	• Correct assessment of manpower requirement • Control over time-keeping and time-booking • Time and motion study • Control over idle time and overtime • Control over employee turnover • Wages and incentive system • Job evaluation and merit rating • Employee productivity
Department Related with Employees	• Personnel Department • Engineering and Works Department • Time-keeping Department • Payroll Department • Cost Accounting Department

Personnel department	• This department is related to recruitment, evaluation performance etc. of employees • Various departments provide their requirement of employees through employee requisition form based on which it searches the right candidate for that department. • It ensures that person on job has the required qualification and skills for the job • It ensures proper training for the workers whether new or existing. • It maintains all records of personal and job related of all employees • It also evaluates performance from time to time.
Engineering and Work Study Department	• It is responsible for preparation of plans and specifications of each job or work. • It provides training and guidance to employees through which they can perform their work in the better way. • It supervises production activities • It conducts motion and time studies • It undertakes job analysis and also job evaluation.
Time-keeping Department	• It is concerned with the maintenance of attendance records i.e. time keeping • It records the time spent by an employee on various jobs i.e. time booking etc.
Payroll Department	• It is responsible for preparation of payroll of the employees. • It disburses salary and wages payment.
Cost Accounting Department	• It is responsible for accumulation and classification of employee costs. • It analyzes and allocate costs to various cost centers or cost objects. • It classifies direct wages which are to be included in direct cost of goods or services • It classifies indirect wages which are to be treated as indirect employee cost and thus becomes part of respective department overheads. • It calculates the cost of idle time or the loss incurred • It calculates the amount of abnormal loss or gain which is to be transferred to P&L
Time Keeping or Attendance Procedure	• It means recording the arrival and departure of each worker. • It is concerned with the attendance and wage calculation of the employees. • It is a way is to record the total time spent by the workmen in a factory. • This job is done by a job keeper. • It includes time booked and lost or idle time.
Objectives of time keeping	• Preparation of payroll • Computation of labour cost including overtime etc. • For ascertaining idle time • For overhead distribution • For disciplinary purpose

Various methods of time book keeping	• **Manual Methods** **(a) Attendance Register** ➢ A register is kept to record the arrival and departure time ➢ It is simple and suitable for small organizations **(b) Metal Disc or Token Method** ➢ It is very old and obsolete in practice now. ➢ Each employee is allotted metal disc or token bearing his identification number. ➢ It is handed to the time keeper who record the token number in register. • **Automated or Mechanical Methods** **(a) Punch Card Attendance** ➢ A punch card contains data related to employee in digital format. ➢ An employee either insert or wave card to a card reader which records the time in and time out of the employee. ➢ This system does not require time keeper and minimize risk of error and manipulation. **(b) Bio-metric Attendance** ➢ In this system, attendance is marked on the basis of physical and behavioral traits of an employee e.g. finger print, eye retina, face etc. ➢ It reduces the risk of time manipulation and proxy attendance. ➢ It is costly thus not suitable for small organizations.
Requisite of a Good Time Keeping System	• System should not allow proxy under any circumstances • System should be able to record time of piece employees • Both arrival and departure time should be recorded by system • System should be mechanical to reduce chances of manipulation • Late comers should record late arrivals • System should be simple, smooth and quick
Time Booking	• It means analyzing, charging or booking the total time spent on various jobs, day-by-day and person-by-person. • It refers to method wherein each activity of an employee is recorded. • For example, if a worker spends 8 hours in a day, the total time may be further analyzed as 3 hours on Job A, 2 hours or Job B, 4 hours on Job C and 1 hour normal idle time due to lunch etc.
Uses of Time Booking	• It is used to compute the cost of the job or activity based on the time spend on that job or activity. • It helps to measure the efficiency of employees by comparing the actual time taken by an employee with the standard time that should have been taken. • It helps to analyze variance in time taken and thereby fixing responsibility for the same.

Methods of time booking	• It can be done through preparing Job Card. • Job card can be of two types: **(a) Analysis of time with reference to job** ➢ A separate job card is maintained for each job. ➢ It records the total time spend on that job or operation. ➢ It helps to compute employee cost of that job quickly **(b) Job card with reference to employee** ➢ It keeps records of time spent by an employee in the organization including the idle time ➢ It helps in reconciliation of employee's job time with attendance time
Payroll Procedure	**Steps involved in payroll procedure are as follows:** • Attendance and time details • List of employees and other details • Computation of wage and other incentive • Payment to employees • Deposit of statutory liabilities
Idle Time	• It is the time during which workers remain idle i.e. no production is carried out. • The employer has to pay for this time though he doesn't derive any benefit of it. • In other words, it is the difference between the time for which workers are paid and the time they actually spend on production or jobs.
Normal idle time	• It is the almost unavoidable time and employer has to bear its cost. • Causes - going from one job to other, personal needs and tea breaks etc. • **Treatment** ➢ It is treated as a part of cost of production. ➢ In case of direct workers normal idle time is considered while setting standard hours or standard rate. ➢ In case of indirect workers, normal idle time is considered for the computation of overhead rate.
Abnormal idle time	• It is avoidable in nature. • Causes – due to strike, machine breakdown, power failure etc. • **Treatment** ➢ It may be treated as a loss and charged to Costing P&L Account. ➢ It should be further analyzed into controllable and uncontrollable ➢ Controllable abnormal time refers to the time that could have been saved had the management been more alert and efficient. ➢ Uncontrollable abnormal time refers to time lost over which management does not have any control.
Overtime	• It the work done beyond normal working hours. • Overtime payment consists of two elements i.e. normal wages for overtime work and premium payment for overtime work. • Overtime payment = Wages paid for overtime at normal rate + Premium for overtime

Overtime Premium	• It is the extra amount of wages paid over the normal rate. • According to Factories Act of 1948, a worker is entitled for overtime at double the rate of his wages if he works more than 9 hours in a day or more than 48 hours in a week.
Treatment of overtime premium	• If it is restored at the desire of the customer, then the entire amount of overtime should be charged to the job directly. • If it is due to a general pressure of work to increase the output, the premium as well as overtime wages may be charged general overheads. • If it is due to the negligence or delay of workers of a particular department, it may be charged to the concerned department. • If it is due to abnormal reasons, it may be charged to costing profit and loss account.
Time rate wage system	• In this system, a worker is paid at a fixed rate per hour or per day or per month for the time devoted by him irrespective of the volume of production during that time. • The time rate may be fixed with reference to rate prevailing in the industry for similar work but should not be less than the minimum wages fixed under the Minimum Wages Act or any other Act for the time being in force. Wages = Actual time devoted × Time rate
Advantages of time wage rate system	• It is easy to understand and simple to operate • It provides guaranteed time wages to workers • Workers concentrate on the quality rather than the quantity of job. • There is reduced damage or rough handling of machines, tools and equipments due to slow and steady pace of the workers.
Disadvantages of time wage rate system	• It does not act as an incentive to workers. • It tends to increase overhead cost and labour production cost per unit. • There develops a tendency to go slow during the normal working hours in the hope of getting overtime wages. • High degree of supervision is required to secure a fair day's work.
Output Based or Piece rate wage system	• Under this system, a worker is paid at a fixed rate per unit produced or job completed. • In this system, time spent on job is not considered for calculating wages. • Wages = Number of units produced × Price rate per unit
Advantages of piece rate wage system	• It is easy to understand and simple to operate • It acts as an incentive to workers to produce more and earn more. • It tends to reduce overhead cost and labour cost per unit because of high production. • It eliminates the tendency of workers to go slow as remuneration is directly linked with performance. • Low degree of supervision is required because the worker themselves take care of the time and output. • It simplifies cost ascertainment because labour cost per unit is available in advance.

Disadvantages of piece rate wage system	• It does not guarantee time wage to workers and hence workers feel insecure. • Workers tend to increase the quantity ignoring the quality thereof. • There may be excessive damage to machines, tools and equipment and excessive wastage of materials due to speedy pace of workers. • The calculation of piece rate is more difficult than time rate. • It is usually opposed by trade unions and workers. • It is detrimental to the long term health and working efficiency of the workers. • It is not suitable for setting up group incentive plans.
Halsey Premium Plan	• This plan was introduced by F.A. Halsey, an American engineer. • In this plan, standard time is fixed for a job and it guarantees the hourly wages to workers for the actual time taken. • Bonus is paid equal to wages of 50% of the time saved. • If the actual time taken is less than the standard time, the worker becomes eligible for bonus. Total Earnings = (H × R) + [50% × (S – H) × R]
Halsey Weir Plan	• Under this method, there is only one difference as compared to the Halsey Plan and that is instead of 50% bonus for the time saved, it is 33.33 % of the time saved. Total Earnings = (H × R) + [33.33% × (S – H) × R]
Advantages of Halsey Method	• It is easy to understand and simple to operate • It guarantees the hourly wages to workers for the actual taken time • It provides an incentive for an efficient worker who completes his work in less than the standard time • It provides an incentive to the employer to provide better production facilities as he receives 50% share in savings achieved.
Disadvantages of Halsey Method	• It is difficult to fix standard time. • Incentive is not so strong as with piece rate system. • The sharing principle may not be liked by employees. • It does not give full protection to employer against wrong rate setting.
Rowan Plan	• This premium bonus plan was introduced by Mr. James Rowan. • Under this system, a standard time allowance is fixed for the performance of a job and bonus is paid if time is saved. • Bonus is that proportion of time wages as time saved bears to the standard time. • Total Earnings = (H × R) + $\left[\left(\frac{S-H}{S}\right)\times H\times R\right]$
Advantages of Rowan Plan	• It guarantees the hourly wages to workers for the actual time taken. • It provides more incentive to moderately efficient workers who save time. • It provides an incentive to the employer to provide better production facilities as he receives a large share in savings achieved. • The sharing principle appeals to the employer as being equitable.

Disadvantages of Rowan Plan	• It is difficult to understand and complex to operate • It is difficult to fix standard time • It does not provide adequate incentive for a very efficient worker who saves time more than 50% of the standard time. • The sharing principle is not generally welcomed by employees.
Absorption Rate of Employee Cost	• For direct workers, rate per hour can be used to charge cost to jobs or units. • Rate per hour = $\frac{\text{Total Estimated Cost}(\text{monetary \& non–monetary})}{\text{Effective Employee Hours}}$ • Effective employee hours = Total Hours – Normal idle time
Efficiency Rating Procedures	• Efficiency is related with performance of employee • Efficiency in % = $\frac{\text{Time allowed as per standard}}{\text{Time taken}} \times 100$ • If the time taken by a worker equals or less than the standard time then he is rated efficient.
Procedure for Efficiency Rating	• Determining standard time or performance standards • Measuring actual performance of workers • Computation of efficiency rating
Need for Efficiency Rating	• Efficiency is directly related with payment of the employee • Efficiency helps in determining manpower requirements
Employee Productivity	• It is determined by the input-output ratio • Productivity = $\frac{\text{Standard time}}{\text{Actual time}}$ • It can be improved by reducing the input for a certain quantity or value of output or by increasing the output from the same given quantity of input.
Factors for Increasing Employee Productivity	• Employing the worker who possess right type of skill • Placing right type of person to a right job • Training young and old workers by providing them the right types of opportunities • Taking appropriate measures to avoid the situation of excess or shortage of employees • Carrying out work study for fixation of wages and for the simplification and standardization of work.
Labour Turnover	• It is the rate of change it the labour force of an organization during a specified period. • This rate of change is compared with a suitable index which acts as there meter to ascertain its reasonableness.

Methods for calculation of Labour Turnover	• **Separation Method** ➢ Under this method, labour turnover is computed on the basis of separations from the organization during a period. ➢ Labour Turnover Rate $= \frac{\text{No. of Seperations}}{\text{Average No. of workers}} \times 100$ • **Replacement Method** ➢ Under this method, labour turnover is computed on the basis of replacements in the organization during a period. ➢ Labour Turnover Rate $= \frac{\text{No. of Replacements}}{\text{Average No. of workers}} \times 100$ • **Flux Method** ➢ Under this method, labour turnover is computed on the basis of both separations and replacement from the organization during a period. ➢ Labour Turnover Rate $= \frac{\text{No. of Seperations + No. of Replacements}}{\text{Average No. of workers}} \times 100$ ➢ Labour Turnover Rate $= \frac{\text{No. of Seperations + No. of Joinee}}{\text{Average No. of worker}} \times 100$
Causes of Labour Turnover	• **Personal causes** ➢ Change of job for betterment ➢ Premature retirement due to ill health or old age ➢ Domestic problems and family responsibility • **Avoidable causes** ➢ Low wages ➢ Bad working conditions ➢ Dissatisfaction with the job s ➢ Lack of training facilities leading to the stagnation • **Unavoidable causes** ➢ Seasonal nature of the business ➢ Change in plant location ➢ Disability, making a worker unfit for work ➢ Disciplinary measures ➢ Shortage of raw material, power, slack market for the product etc.
Effects of High Labour Turnover	• Increased costs of selection of new workers and their training • Increase in scrap, wastes, etc. • Increase in cost of supervision. • Time lost between turnover and new recruitment. • Efficiency of new workers is low • Loss of output • Reduction in sales

Cost of Labour Turnover	• **Preventive Costs** ➢ These cost are incurred to prevent the labour from leaving the job. ➢ These costs are incurred in the form of giving more and more benefits and incentives to workers like free medical facilities, transport facilities, rent free housing etc. • **Replacement Costs** ➢ These costs are incurred after workers have left the company. ➢ Examples, cost of advertising the post, cost of recruitment and selection of workers, loss of production due to the delay in appointing new workers etc.
Steps to Minimize Labour Turnover	• Interview with each outgoing employees, to ascertain the reasons of his leaving the job. • Before recruiting workers, job analysis and evaluation may be carried out to ascertain the requirement of each job. • Scientific system of recruitment, selection, placement and promotion should be used. • The management should take the steps for creating a healthy working atmosphere. • Use of committee to handle issues like control over workers, handling their grievances etc.
Casual Workers (Badli Workers)	• These are employed temporarily for a short duration to cope up with sudden increase in volume of work. • These are generally engaged on daily basis and are paid either at the end of the day or after a periodic interval. • Wages paid are charged as direct or indirect labour cost depending on their identifiability.
Outdoor Workers	• These are the workers who don't carry their work in factory premises. • Generally they carry out assigned work in their homes or a site outside the factory. • Reconciliation of material issued from stores with the output should be prepared to avoid losses. • Completion of output during the stipulated time should be ensured to meet the orders.
Set-up Time	• It is the time incurred before the actual production of goods by machine or labour. • It may be due to changes from one job to another or because of break-downs etc. • It is also called as 'Making machines ready time'. • **Treatment** ➢ Normal setting-up time – It is spread over jobs actually completed by inflating the rate. ➢ Abnormal setting-up time – It is considered as loss & charged to Costing P&L Account.

Direct Expenses	• Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or provision of service and can be directly traced in an economically feasible manner to a cost object. • These form part of the prime cost. • **For example:** ➢ Royalty paid or payable for production or provision of service ➢ Hire charges paid for hiring specific equipment ➢ Cost for product/service specific design or drawing ➢ Cost of product/service specific software ➢ Other expenses which are directly related with the production of goods or provision of service
Measurement of Direct Expenses	• These are measured at invoice price net of rebate or discount and includes duties and taxes (for which input credit is not available). • In case of job work or sub-contracting, these are measured at agreed price. • In case if principal supplies some materials to job worker, the value of such material and other identical expenses are added with the job charges paid to the job workers.

PRACTICE QUESTIONS

1. The following information relates to the personnel Department of a factory for the month of September:

Number of workers on September 1	1950
Number of workers on September 30	1,050
Number of workers who quit the factory in September	10
Number of workers discharged in September	30
Number of workers engaged in September (including 120 on account of expansion scheme)	140

Calculate the labour turnover rate and equivalent annual rate under the different methods.

Ans. Separation – 4%, 48.67%; Replacement – 2%, 24.33%; Flux – 18%, 219%.

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

(a) workers recruited and joined; and

(b) workers left and discharged

(c) equivalent employee turnover rates for the year

Ans. (a) 42; (b) 18; (c) Separation – 12%; Replacement – 20%; Flux = 40%.

3. The management of SK Ltd. is worried about their increasing employee turnover in the factory and before analyzing the causes and taking remedial steps; it wants to have an idea of the profit foregone as a result of employee turnover in the last year. **[SM]**

Last year sales accounted to ₹83,03,300 and the P/V Ratio was 20%. The total number of actual hours worked by the direct labour force was 4.45 lakhs. The actual direct labour hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive. As a result of the delays by the Personnel Department in filling vacancies due to labour turnover, 1,00,000 potentially productive hours (excluding unproductive training hours) were lost.

The cost incurred consequent on labour turnover revealed, on analysis, the following:

Settlement Cost due to leaving	₹43,820
Recruitment Costs	₹26,740
Selection Costs	₹12,750
Training Costs	₹30,490

Assuming that the potential production lost due to labour turnover could have been sold at prevailing prices, find the profit/loss foregone last year on account of labour turnover.

Ans. ₹5,57,930.

4. SK Ltd. is engaged in BPO industry. One of its trainee executives in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method. Following is the data provided by the Personnel department for the last year: **[MTP – Nov 2018]**

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

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

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

You are required to calculate:

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

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

Ans. (a) Replacement – 8.57%; Separation – 16.36%; (b) Flux = 112.46%.

5. In a factory working six days in a week and eight hours each day, a worker is paid at the rate of ₹100 per day basic plus D.A. @120% of basic. He is allowed to take 30 minutes off during his hours shift for meals-break and a 10 minutes recess for rest. During a week, his card showed that his time was chargeable to: **[SM]**

Job X	15 hrs.
Job Y	12 hrs.
Job Z	13 hrs.

The time not booked was wasted while waiting for a job. In cost accounting, state how would you allocate the wages of the workers for the week?

Ans. X = ₹450; Y = ₹360; Z = ₹390; P&L = ₹120.

6. Mr. S an employee of SK Co., gets the following emoluments and benefits: **[SM]**

(a) Basic pay	₹10,000 p.m.
(b) Dearness allowance	₹2,000 p.m.
(c) Bonus	20% of salary and D.A.
(d) Other allowances	₹2,500 p.m.
(e) Employer's contribution to P.F.	10% of salary and D.A.

Mr. S works for 2,400 hours per annum, out of which 400 hours are non-productive and treated as normal idle time. You are required to compute the effective hourly cost of employee Mr. S.

Ans. ₹108.60.

7. A worker is paid ₹10,000 per month and a dearness allowance of ₹2,000 p.m. Worker contribution to provident fund is 10% and employer also contributes the same amount as the employee. The employees state insurance corporation premium is 6.5% of wages of which 1.75% is paid by the employees. It is the firm's practice to pay 2 months' wages as bonus each year. **[SM]**

The number of working days in a year are 300 of 8 hours each. Out of these the worker is entitled to 15 days leave on full pay. Calculate the wage rate per hour for costing purposes.

Ans. ₹83.

8. It is seen from the job card for repair of the customer's equipment that a total of 154 labour hours have been put in as detailed below: **[SM]**

	Worker 'S' paid at ₹200 per day of 8 hours	Worker 'K' paid at ₹100 per day of 8 hours	Worker 'M' paid at ₹300 per day of 8 hours
Monday (hours)	10.5	8.0	10.5
Tuesday (hours)	8.0	8.0	8.0
Wednesday (hours)	10.5	8.0	10.5
Thursday (hours)	9.5	8.0	9.5
Friday (hours)	10.5	8.0	10.5
Saturday (hours)	-	8.0	8.0
Total (hours)	49.0	48.0	57.0

In terms of an award in a labour conciliation, the workers are to be paid dearness allowance on the basis of cost of living index figures relating to each month which works out @ ₹968 for the relevant month. The dearness allowance is payable to all workers irrespective of wages rate if they are present or are on leave with wages on all working days.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 4 hours on Saturdays; the workers are however paid full wages for Saturday (8 hours for 4 hours worked).

Workers are paid overtime twice of ordinary wage rate if a worker works for more than 9 hours a day or 48 hours in a week. Excluding holidays the total number of hours works out of 176 in the relevant month. The company's contribution to Provident Fund and Employees State Insurance Premium are absorbed into overheads. Work out the wages payable to each worker.

Ans. Worker S = ₹16,47; Worker K = ₹864; Worker M = ₹2,666.

9. SK Ltd. Pays the following to a skilled worker engaged in production works. The following are the employee benefits paid to the employee: **[RTP – Nov 2020]**

(a)	Basic salary per day	₹1,000
(b)	Dearness Allowance (DA)	20% of basic salary
(c)	House rent allowance	16% of basic salary
(d)	Transport allowance	₹50 per day of actual work
(e)	Overtime	Twice the hourly rate (considers basic and DA), only if works more than 9 hours a day otherwise no overtime allowance. If works for more than 9 hours a day then overtime is considered after 8th hour.
(f)	Work of holiday and Sunday	Double of per day basic rate provided works atleast 4 hours. The holiday and Sunday basic is eligible for all allowances and statutory deductions.

(g)	Earned leave & Casual leave	These are paid leave
(h)	Employer's contribution to Provident Fund	12% of basic and DA
(i)	Employer's contribution to Pension fund	7% of basic and DA

The company normally works 8-hour a day and 26-day in a month. The company provides 30 minutes lunch break in between.

During the month of August 2020, Mr. P works for 23 days including 15th August and a Sunday and applied for 3 days of casual leave. On 15th August and Sunday he worked for 5 and 6 hours respectively without lunch break. On 5th and 13th August, he worked for 10 and 9 hours respectively.

During the month Mr. P worked for 100 hours on Job no. SK103. You are required to calculate:

(i) Earnings per day

(ii) Effective wages rate per hour of Mr. P

(iii) Wages to be charged to Job no. SK103

Ans. (i) ₹1,638; (ii) ₹269.70; (iii) ₹26,970.

10. In a factory, the basic wage rate is ₹100 per hour and overtime rates are as follows: **[SM]**

Before and after normal working hours	:	175% of basic wage rate
Sundays and holidays	:	225% of basic wage rate
During the previous year the following hours were worked	:	
Normal hours	:	1,00,000 hours
Overtime before and after working hours	:	20,000 hours
Overtime on Sundays and holidays	:	5,000 hours
Total	:	1,25,000 hours
The following hours have been worked on job 'S'		
Normal	:	1,000 hours
Overtime before and after working hours	:	100 hours
Sundays and holidays	:	25 hours
Total	:	1125 hours

You are required to calculate the labour cost chargeable to job 'S' and overhead in each of the following instances:

(a) Where overtime is worked regularly throughout the year as a policy due to the labour shortage

(b) Where overtime is worked irregularly to meet the requirements of production.

(c) Where overtime is worked at the request of the customer to expedite the job.

Ans. (a) ₹1,31,625; (b) ₹1,12,500; (c) ₹1,23,125.

11. Calculate the earnings of S and K from the following particulars for a month and calculate the labour cost to each job A, B and C. **[SM, Similar Nov 2020]**

	S	K
Basic Wages	₹10,000	₹16,000
Dearness allowance	50%	50%
Contribution of provident fund (on basis wages)	8%	8%
Contribution of employee's state insurance (on basic wages)	2%	2%
Overtime (hours)	10	---

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

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

Overtime was done on Job B.

Ans. Net Wages S = ₹15,500; K = ₹22,400; Labour cost of A = ₹19,200; B = ₹11,420; C = ₹12,480.

12. Calculate the earnings of a worker under Halsey system and Rowan system. The relevant data is as below: **[SM]**

Time rate (per hour)	₹60
Time allowed	8 hours
Time taken	6 hours
Time saved	2 hours

Ans. Halsey = ₹420; Rowan = ₹450.

13. M/s SK Private Limited allotted a standard time of 40 hours for a job and the rate per hour is ₹75. The actual time taken by a worker is 30 hours. You are required to calculate the total earnings under the following plans: **[May 2019]**

(i) Halsey Premium Plan (Rate 50%)
(ii) Rowan Plan
(iii) Time wage system
(iv) Piece Rate System

Ans. (i) ₹2,625; (ii) ₹2,813; (iii) ₹2,250; (iv) ₹3,000.

14. A skilled worker in SK Ltd. is paid a guaranteed wage rate of ₹30 per hour. The standard time per unit for a particular product is 4 hours. Mr. S, a machine man has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of ₹37.50 on the manufacture of that particular product. **[MTP May 2024]**

What could have been his total earnings and effective hourly rate, had he been put on Halsey Incentive Scheme (50%)?

Ans. ₹105.

15. Two workmen, 'S' and "K', produce the same product using the same material. Their normal wage rate is also the same. 'S' is paid bonus according to the Rowan system, while 'K' is paid bonus according to the Halsey system. The time allowed to make the product is 50 hours. 'S' takes 30 hours while 'K' takes 40 hours to complete the product. The factory overhead rate is ₹5 per man-hour actually worked. The factory cost for the product for 'S' is ₹3,490 and 'K' it is ₹3,600. Required: **[SM, Similar Nov 2019]**

(a) Compute the normal rate of wages

(b) Compute the cost of materials cost

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

Ans. (a) ₹20; (b) ₹2,500.

16. Mr. S is working by employing 10 skilled workers. He is considering the introduction of some incentive scheme - either Halsey Scheme (with 50% bonus) or Rowan Scheme - of wage payment for increasing the labour productivity to cope with the increased demand for the product by 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and he has accordingly given this assurance to the workers. **[SM, Similar Jan 2021]**

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

Hourly rate of wages (guaranteed)	₹40.00
Average time for producing 1 piece by one worker at the previous performance (This may be taken as time allowed)	2 hours
No. of working day in the month	25
No. of working hours per day for each worker	8
Actual production during the month	1,250 units

Required:

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

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

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

Ans. (a) Halsey = ₹45; Rowan = ₹48; (b) Halsey = ₹8; Rowan = ₹3.20; (c) Rowan.

17. Wage negotiations are going on with the recognized employees' union and the management wants you as an executive of the company to formulate an incentive scheme with a view to increase productivity. **[SM]**

The case of three typical workers A, B and C who produce respectively 180, 120 and 100 units of the company's product in a normal day of 8 hours is taken up for study.

Assuming that day wages would be guaranteed at ₹75 per hour and the piece rate would be based on a standard hourly output of 10 units, calculate the earnings of each of the three workers and the employee cost per 100 pieces under (i) Day wage, (ii) Piece rate, (iii) Halsey scheme and (iv) Rowan scheme.

Also calculate under the above schemes the average cost of labour for the company to produce 100 pieces.

Ans. (i) ₹333.33; ₹500; ₹600; ₹450; (ii) ₹750; ₹750; ₹750; ₹750; (iii) ₹541.67; ₹625; ₹675; ₹600; (iv) ₹518.33; ₹666.67; ₹720; ₹613.25.

18. SK Ltd. is an engineering manufacturing company producing job order on the basis of specification given by the customers. During the last month it has completed three jo works namely A, B and C. The following are the items of expenditures which are incurred apart from direct materials and direct employee cost: **[SM]**

(i) Office and administration cost - ₹3,00,000
(ii) Product blueprint cost for job A - ₹1,40,000
(iii) Hire charges paid for machinery used for job work B - ₹40,000
(iv) Salary to office attendants - ₹50,000
(v) One time license fee paid for software used to make computerized graphics for Job C - ₹50,000
(vi) Salary paid to marketing manager - ₹1,20,000.

Required to calculate direct expenses attributable to each job.

Ans. ₹1,40,000; ₹40,000; ₹50,000.

PRACTICE QUESTIONS

19. From the following information, calculate employee turnover rate using – (a) Separation Method, (b) Replacement Method, (c) New Recruitment Method, and (d) Flux Method:

[RTP – May 2020]

No. of workers as on 01.04.2020 = 3,600

No. of workers as on 31.03.2021 = 3,790

During the year, 40 workers left while 120 workers were discharged. 350 workers were recruited during the year, of these 150 workers were recruited because of exists and the rest were recruited in accordance with expansion plans.

Ans. (a) 4.33%; (b) 4.06%; (c) 5.41%; (d) 13.80%.

20. The information regarding number of employees on roll in a shopping mall for the month of December 2017 are given below: **[May – 2018]**

Number of employees as on 01-12-2017	900
Number of employees as on 31-12-2017	1100

During December, 2017, 40 employees resigned and 60 employees were discharged. 300 employees were recruited during the month. Out of these 300 employees, 225 employees were recruited for an expansion project for the mall and rest were recruited due to exit of employees.

Assuming 365 days in a year, calculate Employee Turnover Rate and Equivalent Annual Employee Turnover Rate by applying the following:

(i) Replacement Method
(ii) Separation Method
(iii) Flux Method

Ans. (i) 7.5%, 88.31%; (ii) 10%, 117.74%; (iii) 40%, 470.97%.

21. Following information is given of a newly setup organization for the year ended on 31st March, 2021: **[July 2021]**

Number of workers replaced during the period	50
Number of workers left and discharged during the period	25
Average number of workers on the roll during the period	500

You are required to:
(i) Compute the employee turnover ratios using Separation Method and Flux Method.
(ii) Equivalent employee Turnover Rates for (i) above, given that for the organization was setup on 31st January, 2021.

Ans. (i) 5%; 15%; (ii) 30%; 90%.

22. PQR Limited has replaced 72 workers during the quarter ended 31st March, 2022. The labour rates for the quarter are as follows: **[May 2022]**

Flux Method	16%
Replacement Method	8%
Separation Method	5%

You are required to ascertain:
(i) Average number of workers on roll (for the quarter),
(ii) Number of workers left and discharged during the quarter,
(iii) Number of workers recruited and joined during the quarter,
(iv) Equivalent employee turnover rates for the year.

Ans. (i) 900; (ii) 45; (iii) 99; (iv) 64%; 32%; 20%.

23. The rate of change of labour force in a company during the year ending 31st March, 2013 was calculated as 13%, 8% and 5% respectively under 'Flux Method', 'Replacement Method' and 'Separation Method'. The number of workers separated during the year is 40. You are required to calculate:

(a) Average number of workers on roll
(b) Number of workers replaced during the year
(c) Number of new accessions i.e. new recruitment
(d) Number of workers at the beginning of the year

Ans. (a) 800; (b) 64; (c) 64; (d) 788.

24. SK Ltd. wants to ascertain the profit lost during the year 2020-21 due to increased labour turnover. For this purpose, they have given you the following information: **[RTP – May 2018]**

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

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

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

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

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

(6) Recruitment cost was ₹1,56,340

(7) Training cost was ₹1,13,180

You are required to calculate the profit lost by the company due to increased labour turnover during the year 2020-21.

Ans. ₹9,00,000.

25. Calculate the employee hour rate of a worker S from the following data: **[SM]**

Basic pay	₹10,000 p.m.
D.A.	₹3,000 p.m.
Fringe benefits	₹1,000 p.m.

Number of working days in a year 300. 20 days are availed off as holidays on full pay in a year. Assume a day of 8 hours.

Ans. ₹75.

26. Following data have been extracted from the books of M/s ABC Private Limited: **[Nov – 2018]**

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

You are required to calculate:

(1) Annual cost of each employee

(2) Employee cost per hour

(3) Cost of abnormal idle time, per employee

Ans. (1) ₹5,07,780; (2) ₹234; (3) ₹11,700.

27. A total of 108 labour hours have been put in a particular job card for repair work engaging a semi-skilled and skilled labour (Mr. Deep and Mr. Sam respectively). **[RTP – May 2022]**

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

Monday	Tuesday	Wednesday	Thursday	Friday
10.5	8.0	10.5	9.5	10.5

The skilled labour also worked on Saturday for 10 hours.

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

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

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

Ans. Deep = ₹3,240; Sam = ₹5,850.

28. A worker takes 15 hours to complete a piece of work for which time allowed is 20 hours His wage rate is ₹5 per hour. Following additional information are also available: **[May 2018]**

Material cost of work	₹50
Factory overheads	100% of wages

Calculate the factory cost of work under the following methods of wage payments:

(i) Rowan Plan

(ii) Halsey Plan

Ans. (i) ₹237.50; (ii) ₹225.

29. A skilled worker in PK Ltd. is paid a guaranteed wage rate of ₹15.00 per hour in a 48-hour week. The standard time to produce a unit is 18 minutes. During a week, a skilled worker – Mr. 'A' has produced 200 units of the product. The company has taken a drive for cost reduction and wants to reduce its labour cost. **[Nov 2022]**

You are required to:

(i) Calculate wages of Mr. 'A' under each of the following methods:

  (a) Time rate

  (b) Piece rate with a guaranteed weekly wage

  (c) Halsey Premium plan

  (d) Rowan Premium Plan

(ii) Suggest which bonus plan i.e. Halsey Premium plan or Rowan Premium Plan the company should follow.

Ans. (i) (a) ₹720; (b) ₹900; (c) ₹810; (d) ₹864; (ii) Halsey plan.

30. SMC Company Limited is producing a particular design of toys under the following existing incentive system: **[May 2023]**

Normal working hours in the week	48 hours
Late shift hours in the week	12 hours
Rate of payment	Normal working: ₹150 per hour
	Late shift: ₹300 per hour

Average output per operatior for 60 hours per week (including late shift hours): 80 toys

The company's management has now decided to implement a system of labour cost payment with either the Rowan Premium plan or the Halsey Premium Plan in order to increase output, eliminate late shift overtime and reduce the labour cost.

The following information is obtained:

The standard time allotted for ten toys is seven and half hours

Time rate: ₹150 per hour (as usual).

Assuming that the operator works for 48 hours in a week and produces 100 toys, you are required to calculate the weekly earnings for one operator under:

(i) The existing time rate

(ii) Rowan premium plan

(iii) Halsey premium plan (50%)

Ans. (i) ₹10,800; (ii) ₹9,792; (iii) ₹9,225.

31. A skilled worker is paid a guaranteed wage rate of ₹150 per hour. The standard time allowed for a job is 10 hours. He took 8 hours to complete the job. He has been paid the wages under Rowan Incentive Plan. **[Dec 2021]**

You are required to:

(i) Calculate an effective hourly rate of earnings under Rowan Incentive Plan.

(ii) Calculate the time in which he should complete the job, if the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings.

Ans. (i) ₹180; (ii) 7.14 hours.

32. A job can be executed either through workman S or K. S takes 32 hours to complete the job while K finishes it in 30 hours. The standard time to finish the job is 40 hours.

The hourly wage rate is same for both the workers. In addition, workman S is entitled to receive bonus according to Halsey plan (50% sharing) while K is paid bonus as per Rowan plan. The works overheads are absorbed on the job at ₹7.50 per labour hour worked. The factory cost of the job comes to ₹2,600 irrespective of the workman engaged.

Interpret the hourly rate and cost of raw materials input. Also show cost against each element of cost included in factory cost.

Ans. Hourly rate of wage = ₹10; Cost of material = ₹2,000.

33. SK Pvt. Ltd. manufactures a product which requires skill and precision in work to get quality products. The company has been experiencing high labour cost due to slow speed of work. The management of the company wants to reduce the labour cost but without compromising with the quality of work. It wants to introduce a bonus scheme but is indifferent between the Halsey and Rowan scheme of bonus. **[RTP – Nov 2019]**

For the month of March 2021, the company budgeted for 24,960 hours of work. The workers are paid ₹80 per hour. Required to calculate and suggest the bonus scheme where the time taken (in %) to time allowed to complete the works is (a) 100% (b) 75% (c) 50% & (d) 25% of budgeted hours.

Ans. Earning per hour under Halsey = ₹80; ₹93.33; ₹120; ₹200; Under Rowan = ₹80; ₹100; ₹120; ₹140.

34. You are given the following information of a worker: **[May 2011]**

(a)	Name of worker	:	'S'
(b)	Ticket No.	:	002
(c)	Work started	:	1 April at 8am
(d)	Work finished	:	5 April at 12 noon
(e)	Work allotted	:	Production of 2,160 units
(f)	Work done and approved	:	2,000 units
(g)	Time and units allowed	:	40 units per hour
(h)	Wage rate	:	₹25 per hour
(i)	Bonus	:	40% of time saved
(j)	Worker S worked 9 hours a day		

You are required to calculate the remuneration of the worker on the following basis:

(a) Halsey plan and

(b) Rowan plan

Ans. (a) ₹1,100; (b) ₹1,200.

35. (a) Bonus paid under the Halsey Plan with bonus at 50% for the time saved equals the bonus paid under the Rowan System. When will this statement hold good? (Your answer should contain the proof). **[SM]**

(b) The time allowed for a job is 8 hours. The hourly rate is ₹8. Prepare a statement showing:

(i) The bonus earned

(ii) The total earnings of employee and

(iii) Hourly earnings

Under the Halsey System with 50% bonus for time saved and rowan System for each hour saved progressively.

Ans. (a) AH = 50% of SH; (b) (ii) Halsey = ₹64; ₹60; ₹56; ₹52; ₹48; ₹44; ₹40; ₹36; Rowan = ₹64; ₹63; 60; ₹55; ₹48; ₹39; ₹28; ₹15.

36. A factory having the latest sophisticated machines wants to introduce an incentive scheme for its workers, keeping in view the following: **[SM]**

(i) The entire gains of improved production should not go to the workers

(ii) In the name of speed, quality should not suffer

(iii) The rate setting department being newly established are liable to commit mistakes.

You are required to prepare a suitable incentive scheme and demonstrate by an illustrative numerical example how your scheme answers to all the requirements of the management.

Ans. Rowan Plan.

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

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

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

Required:

(i) Calculate the loss incurred due to incorrect rate selection.

(ii) Calculate the loss incurred due to incorrect rate selection, had Rowan scheme of bonus payment followed.

(iii) Calculate the loss/savings if Rowan scheme of bonus payment had followed.

(iv) Discuss the suitability of Rowan scheme of bonus payment for SK Ltd.

Ans. (i) ₹1,320; ₹1,848; (ii) ₹1,400; ₹1,960; (iii) ₹80; ₹112.

38. A Company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three workers. Which are under consideration of the management. **[MTP May 2024]**

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in ₹)	40	50	60
Production in units:			
Product S	210	-	600
Product K	360	-	1350
Product M	460	250	-

Standard time allowed per unit of each product is:			
	S	**K**	**M**
Minutes	15	20	30

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

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

(a) Guaranteed hourly rate basis

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

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

Ans. (a) ₹15,200; ₹5,000; ₹32,400; (b) ₹24,150; ₹7,500; ₹36,000; (c) ₹16,050; ₹6,000; ₹35,640]

39. The following expenditures were incurred in SK Ltd. for the month of March: **[SM]**

		(₹)
(i)	Paid for power & fuel	4,80,200
(ii)	Wages paid to factory workers	8,44,000
(iii)	Bill paid to job workers	9,66,000
(iv)	Royalty paid for production	8,400
(v)	Fee paid to technician hired for the job	96,000
(vi)	Administrative overheads	76,000
(vii)	Commission paid to sales staff	1,26,000

You are required to calculate direct expenses for the month.

Ans. ₹15,50,600.

40. If the amount of wages under Halsey plan is ₹420, total time allowed is 8 hours and the guaranteed time rate is ₹60 per hour. What is the total time saved by the worker? **[MTP May-2024]**

(a) 2 hours (b) 3 hours (c) 6 hours (d) 3.5 hours

Ans. (a) 2 hours

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

1. Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit. **[RTP May 2024]**
2. 20% of the output during training period was defective. Cost of rectification of a defective unit was ₹25.
3. Potential productive hours lost due to delay in recruitment were 1,00,000 hours.
4. Selling price per unit is ₹180 and P/V ratio is 20%.
5. Settlement cost of the workers leaving the organization was ₹1,83,480.
6. Recruitment cost was ₹1,56,340
7. Training cost was ₹1,13,180

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

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

(a) 10,000 units (b) 8,000 units (c) 12,000 units (d) 12,600 units

(ii) How much loss in the form of contribution, the company incurred due to labour turnover?

(a) ₹4,32,000 (b) ₹4,20,000 (c) ₹4,36,000 (d) ₹4,28,000

(iii) What is the cost repairing of defective units?

(a) ₹75,000 (b) ₹15,000 (c) ₹50,000 (d) ₹25,000

(iv) Calculate the profit lost by the company due to increased labour turnover.

(a) ₹7,50,000 (b) ₹15,00,000 (c) ₹5,00,000 (d) ₹9,00,000

(v) How much quantity of output is lost due to inexperience of the new worker?

(a) 1,000 units (b) 2,600 units (c) 2,000 units (d) 12,600 units

Ans. (i) - (c), (ii) - (a), (iii) - (b), (iv) - (d), (v) - (c).

SOLUTION OF PRACTICE QUESTIONS

19. Average number of workers = $\frac{3,600+3,790}{2}$ = 3,695

(a) Separation Method:

$$\text{Labour turnover rate} = \frac{\text{No. of separations}}{\text{Average number of workers}} \times 100 = \frac{40+120}{3,695} \times 100 = 4.33\%$$

(b) Replacement Method:

$$\text{Labour turnover rate} = \frac{\text{No. of replacements}}{\text{Average number of workers}} \times 100 = \frac{150}{3,695} \times 100 = 4.06\%$$

(c) New Recruitment Method:

$$\text{Labour turnover rate} = \frac{\text{No. of newly recruited workers}}{\text{Average number of workers}} \times 100 = \frac{350-150}{3,965} \times 100 = 5.41\%$$

(d) Flux Method:

$$\text{Labour turnover rate} = \frac{\text{No. of separations+No. of workers recruited}}{\text{Average number of workers}} \times 100 = \frac{160+350}{3,695} \times 100$$
$$= 13.80\%$$

20. Average number of workers = $\frac{900+1100}{2}$ = 1000

(i) Replacement Method:

$$\text{Labour turnover rate} = \frac{\text{No. of replacements}}{\text{Average number of workers}} \times 100 = \frac{75}{1000} \times 100 = 7.5\%$$

Equivalent Annual Labour turnover rate = $\frac{7.5\times365}{31}$ = 88.31%

(ii) Separation Method:

Labour turnover rate = $\frac{\text{No. of separations}}{\text{Average number of workers}}\times100 = \frac{40+60}{1000}\times100$ = 10%

Equivalent Annual Labour turnover rate = $\frac{10\times365}{31}$ = 117.74%

(iii) Flux Method:

Labour turnover rate = $\frac{\text{No. of separations+No. of workers recruited}}{\text{Average number of workers}}\times100 = \frac{100+300}{1000}\times100$

= 40%

Equivalent Annual Labour turnover rate = $\frac{40\times365}{31}$ = 470.97%

21. (i) Employee turnover ratio by separation method = $\frac{\text{No. of seperations}}{\text{Average no. of workers}}\times100$

$= \frac{25}{500}\times100$ = 5%

Employee turnover ratio by flux method = $\frac{\text{No. of seperations \& replacement}}{\text{Average no. of workers}}\times100$

$= \frac{(25+50)}{500}\times100$ = 15%

(ii) Equivalent employee turnover ratio under separation method = $\frac{5}{2}\times12$ = 30%

Equivalent employee turnover ratio under flux method = $\frac{15}{2}\times12$ = 90%

22. (i) Replacement Method - Labour turnover rate = $\frac{\text{No. of replacements}}{\text{Average number of workers}}\times100$

$8 = \frac{72}{\text{Average number of workers}}\times100$

Average number of workers = 900

(ii) Searation Method - Labour turnover rate = $\frac{\text{No. of sepearations}}{\text{Average number of workers}}\times100$

$5 = \frac{\text{No. of sepearations}}{900}\times100$

Number of separations (left and discharged) = 45

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

$$16 = \frac{45 + \text{No. of recruitments \& joinee}}{900} \times 100$$

Number of workers recruited & joined = 99

(iv) Equivalent Employee turnover rate

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

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

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

23. Separation Method - Labour turnover rate = $\frac{\text{No. of separations}}{\text{Average number of workers}} \times 100$

$$5 = \frac{40}{\text{Average number of workers}} \times 100$$

Average number of workers = 800

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

$$8 = \frac{\text{No. of replacements}}{800} \times 100$$

Number of workers replaced = 64

Flux Method - Labour turnover rate = $\frac{\text{No. of separations+No. of workers accessions}}{\text{Average number of workers}} \times 100$

$$13 = \frac{40+\text{No. of workers accessions}}{800} \times 100$$

Number of workers accessions = 64

Let workers at the beginning = y

Average number of workers = $\frac{\text{Workers at the begining+Workers at the end}}{2}$

$$800 = \frac{y+(y+\text{new accessions-separations})}{2}$$

$$1,600 = y + (y + 64 - 40)$$

$$1,600 = 2y + 24$$

$$y = 788 \text{ workers}$$

24. Output by experienced workers in 50,000 hours = $\frac{50,000}{10}$ = 5,000 units

$\therefore$ Output by new recruits = 60% of 5,000 = 3,000 units

Loss of output = 5,000 – 3,000 = 2,000 units

Total loss of output = Due to delay recruitment + Due to inexperience

= 10,000 + 2,000 = 12,000 units

Contribution per unit = 20% of ₹180 = ₹36

Total contribution lost = ₹36 × 12,000 units = ₹4,32,000

Cost of repairing defective units = 3,000 units × 0.2 × ₹25 = ₹15,000

Profit forgone due to labour turnover

Particulars	Amount (₹)
Loss of Contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 2017-18	**9,00,000**

25. (i) Effective working days in a year 300

Less: Leave days on full pay 20

Effective working days 280

Total effective working hours = 280 days × 8 hours = 2,240

(ii) Total wages paid in a year (₹)

Basic pay	1,20,000
D.A.	36,000
Fringe benefits	12,000
Total wages	1,68,000

(iii) Hourly rate = $\frac{1,68,000}{2,240}$ = ₹75.00

26. Calculation of effective hours

Total working hours (310 × 8) 2,480

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

Statement of employee cost per hour

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

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

27.

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

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

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

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

Friday	10.5	8	1	1.5	3	12
Saturday	10	5	3 + 1 = 4	1	2	11
Total	**59**	**45**	**8**	**6**	**12**	**65**

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

Wages Payable

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

28. Wages in Rowan plan = (Actual time × wage rate) + $\left(\frac{\text{Std. time - Actual time}}{\text{Std. time}}\right)$ × Actual time ×wage rate

$$= (15 \times 5) + \left(\frac{5}{20}\right) \times 15 \times 5 = ₹93.75$$

Wages in Halsey plan = (Actual time× wages rate) + [50%×(Std. Time - Actual time)×wage rate]

$$= (15 \times 5) + \frac{50}{100} \times (20 - 15) \times 5 = ₹87.5$$

Statement showing computation of factory cost

Particulars	Rowan Plan	Halsey Plan
Direct Materials	50	50
Direct Wages	93.75	87.5
Prime Cost	143.75	137.5
Overheads @ 100% of wages	93.75	87.5
Factory Cost	237.5	225

29. (i) (a) Time Rate wages = Hours worked × rate per hour = 48 hours × ₹15 = ₹720

(b) Piece rate wages = Units produced × Rate per unit = 200 units × ₹4.50 = ₹900

$$\text{(Rate per unit} = \frac{18 \text{ minutes}}{60 \text{ minutes}} \times ₹15 = ₹4.50)$$

(c) Halsey plan wages = (H × R) + [(S – H) × R × 50%] = (48 × 15) + [(60 – 48) × 15 × 50%] = ₹810

(Standard hours = S = $\frac{18 \text{ minutes}}{60 \text{ minutes}} \times 200 \text{ units} = 60 \text{ hours}$

(d) Rowan plan wages = (H × R) + [(S – H) × R × $\frac{H}{S}$] = (48 × 15) + [(60 – 48) × 15 × $\frac{48}{60}$] = ₹864

(ii) The company may follow Halsey premium plan over Rowan plan as the total wages paid is lower.

30. (i) Weekly earning for one operator under existing time rate

= (48 hours × ₹150) + (12 hours × ₹300) = ₹10,800

(ii) Weekly earning for one operator under Rowan premium plan

= (H × R) + [(S – H) × R × $\frac{H}{S}$] = (48 × 150) + [(75 – 48) × 150 × (48 ÷ 75)] = ₹9,792

(iii) Weekly earning for one operator under Halsey premium plan

= (H × R) + [(S – H) × R × 50%] = (48 × 150) + [(75 – 48) × 150 × 50%] = ₹9,225

31. (i) Total earnings = (H × R) + [(S- H) × R × $\frac{H}{S}$] = (8 × 150) + $\left[(10-8)150\frac{8}{10}\right]$ = ₹1,440

Effective hourly rate of earning = $\frac{1,440}{8}$ = ₹180

(ii) Let actual time = y

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

(y)(180) = (y × 150) + [(10 – y) × 150 × 50%]

180y = 150y + 750 – 75y

105y = 750

y = 7.14 hours

∴ Required actual hours = 7.14

32. Let hourly wage rate ₹X and let Cost of raw material ₹Y

Cost Sheet

	S	K
Cost of Raw Material	Y	Y
Normal wages	32X	30X
Bonus	(1/2 × 8 × X) = 4X	(10 × 3/4 × X) = 7.5X
Factory Overheads	(7.5 × 32) = 240	(7.5 × 30) = 225
Factory Cost	2600	2600

Y + 36X + 240 = 2,600 ..... (1)

Y + 37.5X + 225 = 2,600 ....(2)

Y = 2,360 – 36X

By Putting Y's value in equation (2)

2,360 – 36X + 37.5X + 225 = 2,600

1.5X = 15

X = 10

Y = 2,360 – 36 × 10 = Y = ₹2,000

Cost Sheet

	S	K
Cost of Raw Material	2,000	2,000
Normal wages	320	300
Bonus		
A = (1/2 × 8 × 10)	40	
B = (10 × 3/4 × 10)		75
Factory Overheads		
(7.5 × 32)	240	
(7.5 × 30)		225
Factory Cost	2600	2600

33. The cost of labour under the bonus schemes are tabulated as below:

Time Allowed	Time Taken	Wages	Bonus		Total wages		Earning per hour	
			Halsey	Rowan	Halsey	Rowan	Halsey	Rowan
(1)	(2)	(3) = (2)×80	(4)	(5)	(6) = (3)+(4)	(7) = (3)+(5)	(8) = (6)÷(2)	(9) =(7)÷(2)
24,960	24,960	19,96,800	–	–	19,96,800	19,96,800	80.00	80.00
24,960	18,720	14,97,600	2,49,600	3,74,700	17,47,200	18,72,000	93.33	100.00
24,960	12,480	9,98,400	4,99,200	4,99,200	14,97,600	14,97,600	120.00	120.00
24,960	6,240	4,99,200	7,48,800	3,74,400	12,48,000	8,73,600	200.00	140.00

* Bonus under Halsey Plan = 50% of (Time Allowed – Time Taken) × Rate per hour

** Bonus under Rowan Plan = $\frac{\text{Time taken}}{\text{Time allowed}}$ × Time saved × Rate per hour

Rowan scheme of bonus keeps checks on speed of work as the rate of incentive increases only upto 50% of time taken to time allowed but the rate decreases as the time taken to time allowed comes below 50%. It provides incentives for efficient workers for saving in time but also puts check on careless speed. On implementation of Rowan scheme, the management of ADV Pvt. Ltd. would resolve issue of the slow speed work while maintain the skill and precision required maintaining the quality of product.

34. Remuneration under Halsey Plan = (40 × 25) + (40% × 10 × 25) = 1,000 + 100 = ₹1,100

Remuneration under Rowan Plan = (40 × 25) + (10 × 25 × 40 / 50) = 1,000 + 200 = ₹1,200

Working note:

Time worked 1.4.11 = 9 hours

2.4.11 = 9 hours
3.4.11 = 9 hours
4.4.11 = 9 hours
5.4.11 = 4 hours
40 hours

Time allowed = 50 hours (2,000/40)
Time taken = 40 hours
Time saved = 10 hours

35. (a) Bonus under Halsey plan = Bonus under Rowan plan

$$50\% \times (SH - AH) \times R = \frac{AH}{SH} \times (SH - AH) \times R$$

$$50\% = \frac{AH}{SH}$$

$50\% \times SH = AH$

Hence, when the actual time (AH) taken is 50% of the time allowed (SH), the bonus under Halsey and rowan plan is equal.

(b) **Statement of Earnings**

SH	AH	Time Saved	Basic Wages (AH× 8)	Bonus Under Halsey (50%×C×8)	Bonus under Rowan $\left(\frac{B}{A} \times C \times 8\right)$	Total Earnings under Halsey (D + E)	Total Earnings under Rowan (D + F)	Hourly Earnings under Halsey (G ÷ B)	Hourly Earnings under Rowan (H ÷ B)
A	B	C = (A – B)	D	E	F	G	H	I	J
8	8	-	64	-	-	64	64	8	8
8	7	1	56	4	7	60	63	8.57	9
8	6	2	48	8	12	56	60	9.33	10
8	5	3	40	12	15	52	55	10.40	11
8	4	4	32	16	16	48	48	12	12
8	3	5	24	20	15	44	39	14.67	13
8	2	6	16	24	12	40	28	20	14
8	1	7	8	28	7	36	15	36	15

36.

(i) Rowan scheme of premium bonus (variable sharing plan) is suitable incentive scheme for the workers of the factory. If this scheme is adopted, the entire gains due to time saved by a worker will not pass to him.

➢ **Illustration**

- Time allowed = 4 hours
- Time taken = 3 hours
- Time saved = 4 – 3 = 1 hour
- Rate = ₹5 per hour
- Bonus = $\frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate} = \frac{3}{4} \times 1 \times 5 = ₹3.75$
- In the above data, 1 hour saved results in gain of ₹5 out of which ₹3.75 is passed on to the worker in form of bonus and the balance ₹1.25 remains with the management. In other words, worker is given with 75% of the time saved in form of bonus.

(ii) Another feature of this scheme is that a worker cannot increase his earnings or bonus by merely increasing its work speed. The reason for this is that the bonus under Rowan Scheme is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore, they work at such a speed which helps them to maintain the quality of output too.

- **Illustration**
- Assume above illustration data:
- Bonus when time taken is 2 hours = $\frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate} = \frac{2}{4} \times 2 \times 5 = ₹5$
- Bonus when time taken is 1 hours = $\frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate} = \frac{1}{4} \times 3 \times 5 = ₹3.75$
- The above data shows that when time taken is half of the time allowed, the bonus is maximum. When the time take is reduced from 2 to 1, the bonus amount decreases by ₹1.25.

(iii) Lastly, Rowan system provides a safeguard in the case of any loose fixation of the standards by the rate-setting department. It may be observed from the following illustration that in the Rowan Scheme the bonus paid will be low due to any loose fixation of standards. Workers cannot take undue advantage of such a situation.

- **Illustration**
- Assume in above illustration that if the rate setting department erroneously sets the time allowed as 10 hours instead of 4 hours, than bonus will be as follows:
- Bonus = $\frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate} = \frac{3}{10} \times 7 \times 5 = ₹10.50$
- The above data shows that bonus paid for saving 7 hours is ₹10.50 which is approximately equal to 2 hours wages. In other words, bonus paid to the worker is low.

37. Basic Calculation

Particulars	S	K

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

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

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

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

Particulars	S	K
Wages due @ ₹60 (A)	$(100\times60) + (20\times60\times\frac{100}{120}) = 7,000$	$(140\times60) + (28\times60\times\frac{140}{168}) = 9,800$
Wages paid @ ₹72 (B)	$(100\times72) + (20\times72\times\frac{100}{120}) = 8,400$	$(140\times72) + (28\times72\times\frac{140}{168}) = 11,760$
Extra wages paid (B – A)	1,400	1,960

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

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

(iv) Rowan scheme of incentive payment has the following benefits which is suitable with the nature of business in which SK ltd. operates:

(a) Under Rowan scheme, workers cannot increase their earnings or bonus by merely increasing its work speed. Bonus under Rowan is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore they work at such a speed which helps them to maintain the quality of output too.

(b) It the rate setting department commits any mistake in setting standards for time to be taken to complete the words, the loss incurred will be relatively low.]

38.

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

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

III	540	60	32,400

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

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

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

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

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

Working Notes:

(1) Piece rate per unit

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

(2) Time allowed to each worker

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

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

Bonus of worker -II under Rowan = $\frac{540}{600} \times 60 \times 60 = 1,000$

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

39. Calculation of Direct Expenses

		(₹)
(i)	Paid for power and fuel	4,80,200
(ii)	Bill paid to job workers	9,66,000

(iii)	Royalty paid for production	8,400
(iv)	Fee paid to the technician	96,000
	Total direct expenses	**15,50,600**

40. (TT × 60) + [0.50 × (8 – TT) × 60] = 420 TT* = 6 hours
Time saved = 8 – 6 = 2
* TT = Total Time Taken.

41.(i)-(c) Output by experiences worker in 50,000 hours $= \frac{50,000}{10}$

$= 5,000$ units

∴ Output by new recruits = 60% of 5,000 = 3,9000 units

Loss out output =5,000 – 3,000 = 2,000 units

Total loss of output = Due to delay recruitment + Due to inexperience

= 10,000 + 2,000 =**12,000 units**

(ii) (a) Contribution per unit = 20% of ₹180 = ₹36

Total contribution lost = ₹36 × 12,000 units = **₹4,32,000**

(iii) (b) Cost of repairing defective unit = 3,000 units × 0.2 × ₹25

= **₹15,000**

(iv) (d) Calculation loss of profit due to labour turnover

	(₹)
Loss of Contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 2022-23	9,00,000

(v) (c) Output by experienced workers in 50,000 hours = $\frac{50,000}{10}$

= 5,000 units

∴ Output by new recruits = 60% of 5,000 = 3,000 units

Loss of output = 5,000 – 3,000 = **2,000 units**

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