

$$\text{Labour Turnover} = \frac{\text{No. of separation in a period}}{\text{Average number of workers in the period}} \times 100$$

2. **Replacement Rate Method** : This method takes into consideration only the actual replacement of labour irrespective how many workers have left during the period.

$$\text{Labour Turnover} = \frac{\text{No. of replacement in a period}}{\text{Average number of workers in the period}} \times 100$$

3. **Flux Rate Method** : This method takes into consideration both the number of workers left as well as number of new workers who have joined.

$$\text{Labour Turnover} = \frac{\text{No. of separation} + \text{No. of replacement}}{\text{Average number of workers}} \times 100$$

Causes of Labour Turnover :

The causes of high labour turnover may be classified in two categories : (i) avoidable, and (ii) unavoidable.

Avoidable Causes :

1. Dissatisfaction with the job, remuneration, contraction in the market or lack of proper planning.
2. Strained relationship with supervisors or fellow workers.
3. Lack of proper amenities like medical and other facilities, recreational centres.

Unavoidable Causes :

- a) Change of service for personal betterment.
- b) Retirement due to old age and ill health.
- c) Death.
- d) In case of female employees, domestic responsibilities, pregnancy or marriage.

Control of Excessive Labour Turnover :

The following steps should be taken for minimising the labour turnover :

1. An adequate and satisfactory wage system.
2. A sound personnel policy for recruitment, induction and training of labour.
3. A satisfactory level of amenities and welfare measures like canteen facilities, medical services, recreation, etc.
4. A satisfactory security scheme like family pension provident fund, accident compensation, etc.
5. A satisfactory policy for transfers and promotions.

Q.6. What do you understand by Time and Motion Study ? In what way it is connected with remuneration of labour ?

Ans. **Time Study** : It may be defined as "the art of observing and recording the time required to do each detailed element of an industrial operation". Its main object is to determine the standard time required to carry out a job most efficiently. Time study is the most important and well-known technique of Work Measurement.

Motion Study : This study deals with one aspect of methods study, i.e. to eliminate unnecessary movements of men and material. "Motion Study is the science of eliminating wastefulness resulting from using unnecessary, ill-directed and inefficient motions." Motion Study is means to increase production.

Time and Motion Study and Remuneration of Labour : When labour is remunerated on piece basis or by some incentive scheme, it is essential to determine the standard time required to complete a job. For this purpose, the Time and Motion Study is the most scientific and accurate method. With this study, each job is split into small motions and each motion is thoroughly studied to cut out any wasteful and unnecessary movements and to arrange the motions in a proper sequence to improve performance. The time allowed for each movement is determined and the aggregate of these gives this standard time required to perform the job or operation.

Q.7. Distinguish between job evaluation and merit rating.

Ans. **Job Evaluation :** Job evaluation may be defined as the rating of various jobs according to the responsibility and skill required for term. The basic object of job evaluation is to ascertain the relative worth of each job through an objective evaluation so that relative remuneration can be fixed for different jobs. The important principle behind job evaluation is that jobs which are of the same relative worth should the same amount of wages or salaries.

The main factors commonly considered for job evaluation are as follows :

1. Knowledge and education required for the job.
2. Skill and experience required.
3. Training needed.
4. Responsibility for equipment handled.
5. Work conditions of the job.

Merit Rating : Just as job evaluation determines the relative worth of jobs, merit rating determines the relative worth of each worker. Merit rating is a systematic evaluation of the personality and performance of each employed by his supervision or some other qualified persons. It is a system by which the performance of an employee is objectively evaluated and compared with that of others in his work group. The various qualities taken into consideration while rating the workers include the following :

- (a) Ability to do the work.
- (b) Knowledge of the job.
- (c) Work habits and personal characteristics.
- (d) Initiative and responsibility.
- (e) Supervisory abilities.

Q.8. What are the merits and demerits of time rate and the piece rate systems of wage payment ? State the situations in which each system is effective and useful.

Ans. **Time Rate System :** In this system time is made the basis of payment. Labour is paid for the time worked irrespective of the volume of production during that time. The formula for calculating wages under this system is :

$$\text{Wages} = \text{Hours worked} \times \text{Rate per hour.}$$

Advantage of Time Rate-System : The main advantages of time system are :

1. The system is simple and calculation of wages is easily understood by the workers.
2. The worker avoids over-speeding and trends to concentrate on quality.
3. The remuneration under this system is certain and workers have a feeling of security.

Disadvantages of Time Rate-System : The main disadvantages are :

1. It offers no positive inducement to workers to improve performance.
2. It does not distinguish between efficient and inefficient workers.
3. It trends to increase labour cost per unit because of low productivity.

Suitability of Time Rate-System : Time Wage System is suitable for the following type of situations :

- i) Where quality of work is more important than quantity, e.g. high class tailoring.
- ii) Where output cannot be measured in quantitative terms.
- iii) Where output is beyond the control of worker.
- iv) Where work is being done in a small scale so that close supervision is possible.

Price Rate System : Under the price rate system, a worker is paid a fixed amount per unit produced without any regard to the time taken. A rate per unit of output is fixed and earnings are calculated as under :

$$\text{Wage} = \text{Number of units produced} \times \text{rate per unit.}$$

Advantages of Piece Rate System :

1. It acts as an incentive to workers to produce more as the remuneration is in direct proportion to worker's effort.
2. Because of high production, overhead per unit is also reduced.
3. It simplifies costing because labour cost per unit is easily known in advance.
4. The method is simple and easily understood by workers.

Disadvantages of Piece Rate System :

1. To maximize earnings, sometimes substandard quality of goods are produced by workers.
2. In their efforts to maximize output, workers may cause excessive wastage of materials, mis-handle and damage machinery and tools.
3. The system is usually opposed by trade as it creates greed and unhealthy rivalries.

Suitability : The piece rate system is suitable :

- a) Where the output of individual workers can be easily measured.
- b) Where work is of standardised and repetitive in nature.
- c) where there is an urgent need to increase the volume of production.

Q.9. What do you understand by "Incentive to workmen" ? What are the principles of a good incentive scheme? Discuss the advantages of incentive scheme.

Ans. An incentive may be monetary, i.e. cash benefit, or non-monetary. It may either be individual to every worker or collective to a group of workers. The primary purpose of incentive wage plan is to induce the worker to produce more, and by producing more to secure a higher wage while saving in production cost per unit. Any incentive scheme should encourage the workers put in their best on their jobs.

Principles of a good incentive scheme : A good incentive scheme should have the following principles :

1. The scheme should be simple and easily understandable by workers so that a worker should be able to calculate his own wage easily.
2. The scheme should be fair to both employer and employee.
3. The cost of operating the scheme should be reasonably low.
4. The standard of performance should be scientifically set and should be within the reasonable reach of an average workers.
5. The scheme should have the approval of workers and the union.
6. No worker should suffer a reduction of earnings for factory beyond his control such as machine breakdown, power failure, etc.
7. The scheme must be relatively permanent and should not be allowed to change every now and then.

Advantages :

- (1) It leads to an increase in production, which results in cost reduction.
- (2) It is beneficial to employers, employees and customers.
- (3) It helps to reduce labour turnover.

Disadvantages :

- 1) It need careful consideration in fixing standards and setting rates which involve extra work, time and expenditure.
- 2) It is difficult to withdraw a scheme once it is introduced if it is uneconomic and weak from the point of view of management.
- 3) As the scheme needs the approval of a union for its success, some times it becomes a source of friction which may lead to strikes and affect morale in the organisation.

Q.10. Write short notes on -

- a) Profit sharing and co-partnership.
- b) Non-monetary incentives.

Ans.

a) **Profit Sharing and Co-partnership :**

Profit-sharing : Profit-sharing schemes are those where there is an agreement between the employer and his workers whereby the employer agrees to pay to workers in addition to their wages, a share of profit at an agreed rate. This scheme is based upon the principle that every worker contributes something towards output and profit.

Co-partnership : This means that workers shall own the business jointly with the shareholders. In other words, workers are given the opportunity to have share in the capital of business and to receive the profits accruing to their share.

Profit sharing and co-partnership based on the premise that workers contribute towards the profit of the organization served by him and allowing him to participate in the profit or the capital of the undertaking so that, they take keen interest in the business activities and improve industrial relations.

- b) **Non-monetary Incentives :** These incentives are given in the form of better amenities or facilities. They are related more to the conditions of employment than to job. These incentives do not form part of workers' pay packets but the provision of which by the employer serves as stimulants to workers to improve their performance. The objective of such incentive is to make conditions of employment more attractive and beneficial to the employee.

Q.11. What are the fringe benefits admitted to the workers in a factory ? How are the expenses on such benefits charged to cost of production ?

Ans. Industrial workers usually enjoy certain benefits in addition to their wages, salaries and other allowances. These benefits, known as fringe benefits, are costs incurred by the employers, which are not related to the quantity of work done by workers. These can be monetary as well as non-monetary. List of such benefits is as below :

Sick Pay

Holiday Pay

Subsidised Conveyance

Subsidised Canteen Facilities

Educational Facility

Medical Care

Free Housing

Treatment : Where the amount of fringe benefit is not substantial, it may be treated as part of production overheads. However, where the amount is quite substantial, it may be recovered as direct charge by means of supplementary wage rate.

Q.12. What is group bonus ? What are its objectives?

Ans. **Meaning :** Group Bonus refers to the bonus paid for the collective efforts made by a group of workers. Such a scheme is introduced generally when individual efficiency cannot be established/measured for the payment of bonus. The quantum of bonus is

determined on the basis of productivity/ output of the team as a whole. Bonus is shared by the individual workers in specified proportions e.g. on proportions of time based wages.

Objectives of Group Bonus Schemes : The objectives of a group bonus scheme are :

- (a) To create collective interest and team spirit among workers.
- (b) To create interest among supervisors to improve performance.
- (b) To reduce wastage in materials and idle time.
- (c) To achieve optimum output at minimum cost.
- (d) To encourage individual members of a team, where only the output of the team as a whole can be measured.

Q.13. What are the principles of good remuneration system?

Ans. The following are accepted principles of remunerating workers :

- (a) It should be on par with the industry standards and in conformity with the general wage-levels prevailing in the locality.
- (b) It should be same for work or jobs involving similar efforts and skill. [i.e. equal pay for equal work]
- (c) It should be related to the degree of skill, effort, initiative and responsibility of the employee.
- (d) It should be reasonable to workers and guarantee them a minimum wage, regardless of their efficiency.
- (e) It should enable workers to maintain a reasonable standard of living.
- (f) It should enable the workers to increase their earnings by making extra effort and by increasing output. As far as possible, there should be no maximum limit for his earnings.

Q.14. Define casual worker and out worker.

Ans. Casual Workers are those workers who are not on the list of regular employees but are engaged casually whenever there is extra workload in the factory or whenever the regular worker is absent from the job for a temporary period because of illness or any other reason.

Outworkers are those workers who work outside the factory premises.

These workers may be –

- (1) Those who are not in regular employment. They are supplied material for execution of work at their own premises.
- (2) Those who are in regular employment. They are sent to perform some specific duties at customer's premises or at any other place as per the directions.

Q.15. Define Job Analysis, Job Description and Job Specification :

Ans.: **Job Analysis :** Job Analysis is a process of gathering and analyzing information regarding the operations, duties and responsibilities of a specific job. There are two major aspects of job analysis – Job Description and Job Specification.

Job Description : Job Description is a statement of the duties and responsibilities of a specific job. It contains information – (a) What is to be done; (b) How is to be done; (c) Why is to be done.

Job Specification : Job specification is a statement of minimum qualities which a person should possess to perform the job effectively. The Job Specification may relate to

- (a) Aptitude and abilities;
- (b) Personality and related characteristics;
- (c) Educational qualifications and training;
- (d) Experience;
- (e) Physical and mental requirements;
- (f) Decision making and judgement.

Q.16. Define Time Booking and how is it different from Time Keeping ?

Ans.: Time Booking is a system of recording the time spent by each worker on various jobs, orders or processes. It is different from Time Keeping on account of following :

1. Time Keeping is a system of recording the arrival and departure time of each worker on various jobs, orders or processes.
2. The objective of Time Keeping is to maintain the attendance record for the purpose of preparation of payroll. The main objective of Time Booking is to ascertain the labour cost of a job, order or process.

Q.17. What are the methods of Time Booking ?

Ans.:

1. **Daily Time Sheet** : It is a daily record for each worker in respect of time spent by him on each job during the day.
2. **Weekly Time Sheet** : It is a weekly record for each worker in respect of time spent by him on each job during the week.
3. **Job Card** : It is a record for each job in respect of time spent by the worker on that particular job.
4. **Combined Time and Job Card** : It is a combined record of attendance time and work time of a worker on a particular job.
5. **Piece Work Card** : This record is maintained when wages are paid to the workers on output achieved by them. It shows the details regarding units produced, rejected and passed along with unit wage rate and total wages payable to the worker.

Q.18. What is Wages Abstract ?

Ans.: Wage Abstract is a record showing details of wages paid to each worker during a particular period for different jobs. It is preferred with the help of Job Card and Piece Work Card.

The main objectives of preparation of Wages Abstract are :

1. To allocate direct wages to various jobs.
2. To apportion indirect wages to Production, Administration and Selling Departments.

Q.19. Suggest different ways of controlling labour cost.

Ans.: The ultimate objective of control over labour cost is to keep the labour cost per unit of the output as low as possible by increasing the labour productivity. For this purpose, there has to be combined effort by all the concerned departments involved in the control of labour cost.

In any organization it is generally seen that following departments are involved in control of labour cost :

Department	Function
1. Personnel Department	a. Recruitment and selection of workers b. Training and development of workers. c. Placement of workers.
2. Time-Keeping Deptt.	a. Recording the arrival and departure time of each worker b. Recording the time spent by each worker on various jobs, orders or processes.
3. Pay roll Department	a. Preparation of pay roll record for each employee b. Issue of pay slip to each employee c. Disbursement of salaries and wages
4. Cost Accounting Deptt.	a. Collection of labour cost data b. Charging of direct labour cost to various jobs. c. Apportionment of indirect labour cost to various departments on some justified basis. d. Analysis of Labour Cost Reports such as Over Time Report, Idle Time Report, Variances, etc.

Revisionary Practical Questions

Q.1. A firm employs five workers at an hourly rate of ₹ 2. During a particular period they worked for four days for a total period of 40 hours each and completed a job for which the standard time was 48 hours for each worker. Calculate the labour cost under the Halsey method and Rowan method of incentive plan payments.

[Ans. Total Labour cost (1) Halsey method ₹ 440 and (2) Rowan method ₹ 467]

Q.2. A worker is allowed 10 hours to complete a job on daily basis. He takes 6 hours to complete the job under the scheme of payment by results. His day rate is ₹ 6 per hour and piece rate is ₹ 60. The material cost of the product is ₹ 40 and the overheads are charged at 150% of labour cost. Calculate the factory cost under –

(i) Piece work plan [Ans.: ₹ 190]

(ii) Rowan Plan [Ans.: ₹ 166]

(iii) Halsey Plan [Ans.: ₹ 160]

Q.3. A worker under Halsey method of remuneration receives ₹ 12 per week of 48 hours plus cost of living bonus of 10 paise per hour worked. He is given an 8 hours task to perform, which he completes in 6 hours. He is allowed 30% of the time saved as premium bonus. What would be his total amount of wages under the Halsey method and what difference would it make if he was paid under Rowan method?

[Ans.: Amount of wages (a) Halsey method = ₹ 2.25; (b) Rowan method = ₹ 2.475, difference = ₹ 0.225]

Q.4. Bonus is paid on following lines –

<u>Times Saved</u>	<u>Bonus</u>
Upto 25% of time allowed	10% of time saved
Next 10% of time allowed	20% of time saved
Balance	30% of time saved

Calculate the earnings of a worker who takes 50 hours to complete a job where the standard time allowed is 100 hours. The wage rate per hour is ₹ 1.20. [Ans.: ₹ 70.80]

Q.5. Compute total earnings of the worker under straight piece work and differential piece-work method for each of the jobs. Under straight piece work method, the wages are paid at ₹ 2 per unit, whereas under differential piece work method, the rate of wages is Re.0.50 per unit for first 480 units and thereafter increases by Re.0.50 per unit for subsequent 240 units produced.

<u>JOB :</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
UNITS:	720	1,200	480	1,680

[Ans.: ₹ 8,160 (Straight piece work method) and ₹ 4,680 (Differential piece work method)]

Q.6. The employees in a plastic toy-making unit are paid wages at the rate of ₹ 7 per hour for an 8 hours shift. Each employee produces 5 units per hour. The overheads are ₹ 10 per hour.

Employees and the management are considering following piece-rate wage proposal :

<u>Output per day of 8 hours</u>	<u>Labour cost per unit</u>
Up to 45 units	₹ 1.30
From 46 to 50 units	₹ 1.60
From 51 to 55 units	₹ 1.65
From 56 to 60 units	₹ 1.70
Above 60 units	₹ 1.75

The working hours are restricted to 8 hours in a day. The overhead rate does not change with increased production.

Prepare statements showing advantages to the employees and the management at production level of 40, 45, 55 and 60 units.

Ans.:

	40 units	45 units	55 units	60 units
Gain to employees	₹ 4 (loss)	₹ 2.50	₹ 34.75	₹ 46
Gain to Management	₹ 4	₹ 14.50	₹ 16.25	₹ 22

Q.7. In a manufacturing concern, the employees are paid bonus of hours saved in proportion of hours taken to hours allowed. Following are the details regarding the workers X, Y and Z

	X	Y	Z
Wage rate per hour	₹ 4	₹ 5	₹ 6
Units produced	6,000	3,000	4,800
Time allowed for 100 units	0.8 hr.	1.5 hrs.	1 hr.
Actual time taken	42 hrs.	40 hrs.	48 hrs.

Calculate for each employer –

- (1) Bonus [Ans.: X ₹ 21; Y ₹ 22.22; Z NIL]
- (2) Total Wages [Ans.: X ₹ 189; Y ₹ 222.22; Z ₹ 288]
- (3) Wages per 100 units [Ans.: X ₹ 3.15; Y ₹ 7.41; Z ₹ 6]

Q.8. Compute earnings of a worker under (i) Halsey Plan, and (ii) Rowan Plan from the following particulars:

- 1. Hourly rate of wages guaranteed ₹ 0.50 per hour.
- 2. Standard time for producing one dozen articles - 3 hours.
- 3. Actual time taken to produce 20 dozen articles - 48 hours.

[Ans.: (i) ₹ 27, (ii) ₹ 28.80]

Q.9. The following are particulars given to you :

Standard	10 hours per unit.
Time rate	₹ 30 per hour

Prepare a comparative table under Halsey plan and Rowan plan if time taken is 9 hours, 8 hours, 6 hours, 4 hours and 3 hours. The table should clearly show the amount of bonus payable, the amount of total wages and labour cost per hour under the two methods. State at least one point of distinction between Halsey plan and Rowan plan in the light of your calculation.

[Ans.:

	Case I	Case II	Case III	Case IV	Case V
Labour cost per hour					
- Halsey	31.67	33.75	40.00	52.50	65.00
- Rowan	33.00	36.00	42.00	48.00	51.00

Q.10. Standard time for a job is 50 hours and guaranteed hourly time wage is ₹ 15. The worker Garry receives an effective hourly rate of ₹ 20 under Rowan Premium Plan due to efficiency in performance. Another worker Larry has performed the similar job in the same time but he gets wages according to Halsey premium Plan. Ascertain total wages for Larry and his effective hourly rate.
[Ans.: ₹ 625 and ₹ 18.75].

Q.11. John has a factory with 20 workers. He needs to improve productivity to cope with higher demand, market competition and workers' demand for higher wages. With these three objectives in mind he is planning to introduce either Halsey Premium Plan with 50% bonus or Rowan Plan. Figures for the current month are as follows :

= ₹ 15

Guaranteed Hourly Wage Rate		
Average time taken for producing 1 piece by 1 worker at previous performance level, which can be taken as time allowed		1 ½ hour
Number of working days in the month		25
Working hours per day per worker		9
Actual production during the current month		= 3,900 units.

You are required :

(i) Calculate effective hourly earning per worker under Halsey Plan and Rowan Plan.

[Ans.: ₹ 17.25 and ₹ 18.46]

(ii) Calculate savings to John in direct wage cost per piece of production under each of the two schemes.

[Ans. ₹ 2.60 and ₹ 1.20]

Q.12. A company has calculated the labour turnover rates for the quarter ending on March 31, 2003 as 6%, 4% and 10% respectively under separation method, replacement method and flux method. The workers replaced during the quarter is 50. Find out the number of workers recruited and separated during the quarter.

[Ans. 50 and 75].

Q.13. In a factory bonus system, bonus hours are credited to the employee in the proportion of time taken which time saved bears to time allowed. Jobs are carried forward from one week to another. No overtime is worked and payment is made in full for all units worked on, including those subsequently rejected.

From the following information you are required to calculate for each employee:

- a) the bonus hours and amount of bonus;
b) total wages; and (c) the wage cost of each good unit produced.

	A	B	C
Basic wage per hour	₹ 250	₹ 400	₹ 300
Units produced	2,500	2,200	3,600
Time allowed per 100 units	2 hrs. 36 min.	3 hours	1 hr. 30 min.
Time taken	52 hours	75 hours	48 hours
Rejected	100 units	40 units	400 units

[Ans.:

	A	B	C
(a) Bonus hours	13	Nil	6
Bonus amount	₹ 2,600	Nil	₹ 1,600
(b) Total wages	₹ 15,600	₹ 30,000	₹ 16,000
(c) Wage cost for Each good unit].	₹ 6.50	₹ 13.89	₹ 5

Q.14. In a factory Ram and Sham produce the same product using the same input of same material and at the same normal wage rate.

Bonus is paid to both of them as per Rowan Plan. The time allotted to the product is fifty hours. Ram takes thirty hours and Sham takes forty hours to produce the product. The Factory Cost of the product for Ram is ₹ 3,100 and for Sham ₹ 3,280. The Factory Overhead Rate is ₹ 12 per man hour.

Calculate (i) Normal Wage Rate; (ii) Cost of material used for the product; and (iii) the input of material if the unit material cost is ₹ 16.

[Ans.: (i) ₹ 10; (ii) ₹ 2,320; (iii) 145 units].

Q.15. The finishing shop of a company employs 60 direct workers. Each worker is paid ₹ 400 as wages per week of 40 hours. When necessary, overtime is worked upto a maximum of 15 hours per week per worker at time rate plus one-half as premium. The current output on an average is 6 units per man hour which may be regarded as standard output. If bonus scheme is introduced, it is expected that the output will increase to 8 units per man hour and there is no overtime payment.

The company is considering introduction of either Halsey Scheme or Rowan Scheme of Wage Incentive System. The budgeted weekly output is 19,200 units. The selling price is ₹ 11 per unit and the Direct Material Cost is ₹ 8 per unit. The variable overheads amount to ₹ 0.50 per direct labour hour and the fixed overhead is ₹ 9,000 per week.

Prepare a Statement to show the effect on the company's weekly profit of the proposal to introduce (a) Time Rate Wage, (b) Halsey Scheme, and (c) Rowan Scheme.
 [Ans.: Amount of Profit (a) ₹ 11,000; (b) ₹ 19,400; (c) ₹ 17,400].

Q.16. XYZ Ltd. Employs its workers for a single shift of 8 hours for 25 days in a month. The Company has recently fixed the standard output for a mass production item and introduced an incentive scheme to boost output. Details of wages payable to the workers are as follows :

- (i) Basic wages/piece work wages @ ₹ 2 per unit subject to a guaranteed minimum wages of ₹ 60 per day.
- (ii) Dearness allowance at ₹ 40 per day.
- (iii) Incentive bonus :

Standard output per day per worker : 40 units ;
 Incentive bonus up to 80% efficiency : Nil ;
 Incentive bonus for efficiency above 80% : ₹ 50 for every 1% increase above 80%
 The details of performance of four workers for the month of April 1998 are as follows :

Worker	No. of days worked	Output (units)
A	25	820
B	18	500
C	25	910
D	24	780

Calculate the total earnings of each of the workers.

Ans. [A ₹ 2740 ; B ₹ 1,800 ; C ₹ 3,370; D ₹ 2,750]

Q.17. Calculate the amount of wages and bonus by a workman from the following particulars:
 Job commenced : Monday, 24th December at 8.00 A.M.
 Job finished Saturday, 29th December at 1.00 P.M.
 Quantity of work turned out : 638 pieces; Quantity of pieces passed : 600 ;
 Worker's rate : ₹ 50 per hour; Time allowed : 10 pieces per hour;
 Bonus : 40% of time saved.

Assume that the employee worked for 9 hours a day and there is no overtime. Bonus is to be paid for units passed only. **Ans. [₹ 2,700]**

Q.18. On the basis of the following information, calculate the earnings of A, B, C and D under Merrick Differential Piece Rate System :

Standard production per hour : 12 units
 Normal rate per unit : ₹ 0.60

In an 8-hour day :

A produced	64 units	C produced	84 units
B produced	96 units	D produced	100 units

Ans. [A ₹ 38.40 ; B ₹ 63.36 ; C ₹ 55.44 and D ₹ 72]

Q.19. During first week of April, 2012 the workman Mr. Kalyan manufactures 300 articles. He receives wage for a guaranteed 48 hours week at the rate of ₹ 4 per hour. The estimated time to produce one article is 10 minutes and under incentive scheme the time allowed is increased by 20%. Calculate his gross wages according to :

- (a) Piece work with a guaranteed weekly wage,
- (b) Rowan premium bonus, and
- (c) Halsey premium bonus : 50% to workman.

Ans. [(a) ₹ 240; (b) ₹ 230.40; (c) ₹ 216]

COST ACCOUNTING

7.22

- Q.20.** 'A' an employee of XYZ Co., gets the following emoluments and benefits:
- | | |
|---|------------------------|
| (a) Salary | ₹ 250 per month |
| (b) Dearness Allowance | ₹ 400 |
| on 1 st ₹ 100 of salary | ₹ 100 |
| on next ₹ 100 of salary | ₹ 50 or part thereof |
| on balance every ₹ 100 | 8% of Salary and D.A. |
| (c) Employer's Contribution to Provident Fund | 4% of Salary and D.A. |
| E.S.I. | 20% of Salary and D.A. |
| (d) Bonus | ₹ 2,725 per annum |
| (e) Other Allowances | |
- A works for 2,400 hours per annum, out of which 400 hours are non-productive but treated as normal idle time. A worked for 18 effective hours on Job No. 13, where the cost of direct materials equal A's earnings and the overhead applied is 100% of Prime Cost. The sale value of the job is quoted to earn a profit of 10% on such value:
- You are requested to find out :
- (a) Effective hourly cost of 'A'. [Ans. ₹ 7.50]
 (b) The expected sale value of Job No.13. [Ans. ₹ 600]

- Q.21.** Ascertain the labour cost per hour if a worker is paid ₹ 3,000 per month in addition to Dearness Allowance of ₹ 1,000 per month. In addition he gets a bonus @ 10% of basic wage. Employer contributes 10% of basic wage towards provident fund and 1% towards ESI. Equal amount is contributed by employees. The employer is also maintaining a canteen to which monthly subsidy amounts to ₹ 10,000 per month approximately. The average days in a month are 25 of 8 hours each. Normal idle time amounts to 20%. A total of 100 employees are working. Each employee is entitled to one day leave with pay for every 20 days work. (Ans. ₹ 31.12)

- Q.22.** A direct worker is paid ₹ 1,600 p.m. as basic wages and ₹ 400 as D.A. p.m. Employer's contribution to P.F. is 10% of his basic pay and D.A. Employer's E.S.I. contribution is 5% on basic. Cost of non-monetary benefits to him is estimated as ₹ 200. Actual number of working days (of 8 hours working per day) after adjustment for weekly off, holidays and leaves entitlement are estimated at 250 per year. Normal Idle time is 10%. Calculate wage rate per hour for costing purposes. (Ans. ₹ 16.53)

- Q.23.** From the following particulars, prepare a statement of labour cost showing the cost per day. (8 hours)
- | | |
|---|----------------------------|
| (a) Monthly Salary | – ₹ 900 |
| (b) Leave Salary | – 5% of (a) |
| (c) Employer's contribution to provident fund | – 8½% of (a) and (b) |
| (d) Employer's contribution to E.S.I. | – 3% of (a) and (b) |
| (e) Expenditure on amenities to labour | – ₹ 112 per head per month |
| (f) Number of working hours in a month of 25 days | – 8 hours per day |
- (Ans. ₹ 46.63)

- Q.24.** From the following particulars you are required to calculate according to 'Average Wage Rate' the labour cost chargeable to Job No. P-301 which was completed in 2001. Basic wage rate is ₹ 15 per hour and overtime rates are as follows:
- | | |
|-------------------------------|---------------------------|
| Before or after working hours | – 150% of basic wage rate |
| Sundays and other holidays | – 200% of basic wage rate |
- During the year 2001 the following labour hours were worked :

	Hours
Normal time	4,00,000
Overtime before or after working hours	50,000
Overtime on Sundays and holidays	40,000
Total	4,90,000

For Job No. P-301, 4,000 hours were spent as follows:

CA R. K. MEHTA

Normal time	3,000
Before or after working hours	700
Sundays and holidays	300

(Ans. ₹ 67,960)

Q.25. From the following data, calculate Work Cost for jobs performed by Ajay and Saurav:

	Ajay	Saurav
Time allowed (per 100 units)	40 hrs.	42 hrs.
Rate per unit	₹ 3	₹ 4
Rate per hour	₹ 8	₹ 12
Actual time taken	48 hrs.	70 hrs.
Actual units produced	150 units	200 units
Material cost for jobs	₹ 668	₹ 1,020
Bonus Plan	Halsey	Rowan
Factory Overhead	150% of wages	100% of wages

(Ans. ₹ 1,748 and ₹ 2,980)

Q.26. The standard labour time required for the production of a certain component has been fixed as 4 hours. An incentive scheme was introduced recently to raise labour productivity. The relevant details of the scheme are as follows :

Efficiency	Incentive as a percentage of basic wages
Below 100%	No incentive
100% (i.e. 4 hrs./unit)	10%
Above 100%	1% additional incentive for every 1% increase in efficiency above 100%, fraction excluded.

Four workers A, B, C and D produced 16, 12, 14 and 10 units respectively in a particular week of 48 hours. The basic wages of all these workers is ₹ 15 per hour.

Calculate the efficiency, total earnings and labour cost per unit in respect of each of the above four workers.

Q.27. The profitability position of M/s. Pioneer Industries Ltd. for a year is as under :

	₹ (Lakhs)	₹ (Lakhs)
Annual Turnover		200.00
Variable costs		150.00
Marginal contribution		50.00
Fixed Overheads		10.00
Profit for the year		<u>40.00</u>

The profit for the year did not match with company's expectation and Works Management attributed it to labour turnover.

Analysis of the data revealed the following :

Permanent workmen worked during the year	9,60,000 direct labour hours
Trainee workmen worked	<u>80,000</u> direct labour hours
	<u>10,40,000</u> direct labour hours

The effectiveness of direct labour hours put in by trainee workmen was 50% and delay in replacing against separations during the year resulted in loss of 20,000 direct labour hours.

Calculate the loss of profit on account of loss of production from labour turnover.

Ans. ₹ 3,00,000.

Q.28. The management of a company are worried about their increasing labourturnover in the factory and before analysing the causes and taking remedial steps, they want to have an idea of the profit foregone as a result of labour turnover in the last year.

Last year sale amounted ₹ 83,03,300 and the profit-volume ratio was 20 per cent. The total number of actual hours worked by the Direct Labour Force was 4.45 lakhs. As a result of the delay by the Personnel Department in filling vacancies due to labour turnover, 1,00,000 potentially productive hours were lost. The actual direct labour hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive.

The costs incurred consequent on labour turnover revealed on analysis the following :

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

Assuming that the potential production lost as a consequence of labour turnover could have been sold at prevailing prices. Find the profit foregone last year on account of labour turnover.

Ans. ₹ 5,57,930

Q.29. Calculate the total monthly remuneration of three workers P, Q and R who are working in a factory, based on the following data :

- (i) Standard production per month per worker : 2,000 units
 (ii) Piece work rate ₹ 0.50 per unit
 (iii) Production bonus to be given as follows :

Upto 85% efficiency	Nil
Between 85% and 100% efficiency	Incentive bonus at ₹ 40 for every 5% increase above 85%.
Above 100% efficiency	Incentive bonus at ₹ 40 for every 5% increase above 85% plus 20% additional bonus on the incentive earned.

- (iv) P, Q and R had a production of 1,600 units, 2,000 units and 2,200 units, respectively during January, 2013.

Ans. ₹ 800 (Worker P), ₹ 1,120 (Worker Q) and ₹ 1,340 (Worker R).

Q.30. The standard time required per unit for a product is 20 minutes. If in a day of 8 working hours, a worker gives an output of 30 units, calculate his earnings under Rowan Bonus Scheme. He gets a time rate of ₹ 20 per hour.

Ans. ₹ 192.

Q.31. A worker is allowed 60 hours to complete a job on a guaranteed wage of ₹ 10 per hour. He completes the job in 48 hours. For the same saving in time, how much will he get under Hasley Premium Plant (@ 50% Bonus) ?

Ans. ₹ 540

Q.32. 2 hours allowed to a worker to produce 5 units and wages has been paid @ 25 per hour. In a 48 hours week the worker proudded 170 units.

You are required to calculate the total earnings of the worker under the following incentive wage systems :

- (1) Halsay system; (2) Rowan system; (3) Emerson's system; (4) Barth system.

Ans. (1) ₹ 1,450; (2) ₹ 1,553; (3) ₹ 1,940; (4) ₹ 1,428.

Q.33. The standard time for a job is 50 hours. The hourly rate of guaranteed wages is ₹ 9. Because of saving in time, a worker X gets an effective hourly wage of ₹ 10.80 under Rowan Premium Bonus System. For the same saving in time, calculate the hourly rate of wages a worker Y will get under Halsey Premium Bonus System, assuming 50% bonus to worker.

Ans. ₹ 10.125

Q.34. Two workers 'A' and 'B' produce the same product using the same material. Their normal wage rate is also the same. 'A' is paid bonus according to Rowan scheme while 'B' is paid bonus according to Halsey scheme. The time allowed to make the product is 50 hours. 'A' takes 30 hours while 'B' takes 40 hours to complete the product. The factory overhead rate is ₹ 5 per person-hour actually worked. The factory cost of product manufactured by 'A' is ₹ 3,490 and for product manufactured by 'B' is ₹ 3,600.

Required :

- (i) Compute the normal rate of wages.
- (ii) Compute the material cost.

Ans. (i) ₹ 20 and (ii) ₹ 2,500.

Q.35. Apex Ltd. has its factories at two locations. Rowan Plan is in use at location A and Halsey Plan at location B. Standard time and basic rate and basic rate of wages are same for a job which is similar and is carried out on similar machinery. Time allowed is 60 hours.

Job at location A is completed in 36 hours, while at B, it has taken 48 hours.

Conversion cost at respective places are ₹ 2,448 and ₹ 3,000. Overheads account for ₹ 40 per hour.

Find out the Normal Wage Rate.

Ans. ₹ 20 per hour.

Q.36. A workman executes a piece of work in 120 hours as against 150 hours allowed to him. His hourly rate is ₹ 25 and he gets a dearness allowance of ₹ 100 per day of 8 hours work in addition to his wages. What earning will a workman receive under the following incentive schemes ?

- (i) Halsey premium plan, 50% bonus to workers;
- (ii) Rowan plan; and
- (iii) Emerson's efficiency plan.

Ans. (i) ₹ 4,875; (ii) ₹ 5,100; (iii) ₹ 5,850

Solutions to Revisionary Problems

Answer to Q. No. 1 :

Time allowed	=	48 hours per worker
Time taken	=	40 hours per worker
Time saved	=	48-40 = 8 hours per worker

Computation of Labour cost under Halsey Method

	₹
	400
Time wages (2 × 40) × 5 workers	<u>40</u>
(+) Bonus $\left[\frac{50}{100} \times 8 \times 2 \right] \times 5$ workers	<u>440</u>

Computation of Labour cost under Rowan Plan

	₹
	400
Time wages (2 × 40) × 5 workers	<u>67</u>
(+) $\left[\frac{40}{48} \times 8 \times 2 \right] \times 5$ workers	<u>467</u>

Answer to Q. No. 2 :

Piece wage rate = ₹ 60 (10 hrs. × ₹ 6 per hrs)
Hourly wage rate = ₹ 6.

Computation of Labour Cost

(i) Piece work plan = ₹ 60

(ii) Rowan Plan

	₹
Time wages (6 × 6)	36
(+) Bonus $\left(\frac{6}{10} \times 4 \times 6 \right)$	<u>14.40</u>
	<u>50.40</u>

(iii) Halsey Plan

	₹
Time Wages	36
(+) Bonus $\left(\frac{50}{100} \times 4 \times 6 \right)$	<u>12</u>
	<u>48</u>

Computation of Factory Cost

	<u>Piece Work Plan</u>	<u>Rowan Plan</u>	<u>Halsey Plan</u>
Materials Cost	₹ 40	40	40
Labour Cost	<u>60</u>	<u>50.40</u>	<u>48</u>
Prime Cost	₹ 100	90.40	88
(+) Factory overheads (150% of Labour Cost)	90	75.60	72
Factory Cost	<u>190</u>	<u>166</u>	<u>160</u>

Answer to Q. No. 3 :

Standard time = 8 hours
 Time taken = 6 hours
 Time saved = 2 hours

Payment of Wages under Halsey Method

Time wages [6 hrs. × ₹ 0.25 / hr]

(+) Bonus $\left[\frac{30}{100} \times 2 \times 0.25 \right]$ ₹ 1.50

(+) Cost of living bonus (6 × 0.10) 0.15

0.60

₹ 2.25

Payment of Wages under Rowan Method

Time wages

₹

(+) Bonus $\left(\frac{6}{8} \times 2 \times 0.25 \right)$

1.50

(+) Cost of living bonus

0.375

0.60

2.475

Difference in the amount of wages

= 2.475 – 2.25

= ₹ 0.225.

Answer to Q. No. 4 :

Standard time = 100 hours

Actual time = 50 hours

Time saved = 100 – 50 = 50 hours.

Percentage of time saved = $\frac{50}{100} \times 100$

= 50% of time allowed.

₹

60

Wage payment for actual hours worked (50 × 1.20)

(+) Bonus

First 25% of time allowed

$100 \times \frac{25}{100} \times \frac{10}{100} \times 1.20$

3

Next 10% of time allowed

$100 \times \frac{10}{100} \times \frac{20}{100} \times 1.20$

2.4

Balance 15% of time allowed

$100 \times \frac{15}{100} \times \frac{30}{100} \times 1.20$

5.4

70.80

Answer to Q. No. 5 :Computation of Earnings under straight

	<u>Piece-work method</u>	
Job A = 720 units × ₹ 2 per unit		₹ 1,440
Job B = 1,200 units × ₹ 2 per unit		2,400
Job C = 480 units × ₹ 2 per unit		960
Job D = 1,680 units × ₹ 2 per unit		3,360
Total		8,160

Computation of earnings underDifferential Piece – work method

	<u>Differential Piece – work method</u>	
<u>Job A</u> First 480 units × ₹ 0.50 = 240	= 240	₹ 480
Next 240 units × ₹ 1 = 240	= 240	
<u>Job B</u> First 480 units × ₹ 0.50 = 240	= 240	
Next 240 units × ₹ 1 = 240	= 240	
Next 240 units × ₹ 1.50 = 360	= 360	
Next 240 units × ₹ 2 = 480	= 480	1,320
<u>Job C</u> First 480 units × ₹ 0.50 = 240	= 240	240
<u>Job D</u> First 480 units × 0.50 = 240	= 240	
Next 240 units × 1 = 240	= 240	
Next 240 units × 1.50 = 360	= 360	
Next 240 units × 2 = 480	= 480	
Next 240 units × 2.5 = 600	= 600	
Next 240 units × 3 = 720	= 720	2,640
Total		4,680

Answer to Q. No. 6 :

Labour Cost per hour	= ₹ 7
Overheads per hour	= ₹ 10
Hours per day	= 8
Daily labour cost	= 7 × 8 = ₹ 56
Daily overheads cost	= 10 × 8 = ₹ 80
Units per hour	= 5
Labour cost/unit	= $\frac{\text{Rs.7}}{\text{Rs.5}} = ₹ 1.40$
Overheads cost/unit	= $\frac{10}{5} = ₹ 2$

Statement showing gain to the employee

<u>Particulars</u>	<u>Daily production (units)</u>			
	<u>40</u>	<u>45</u>	<u>55</u>	<u>60</u>
Wages under new system	40 × 1.30 = ₹ 52	45 × 1.30 = ₹ 58.5	55 × 1.65 = ₹ 90.75	1.70 × 60 = ₹ 102
(-) Wages under existing system	₹ 56	₹ 56	₹ 56	₹ 56
Gain	(-)4	2.5	34.75	46

Statement showing gain to the employer under the new system

	₹
(a) When 40 units are produced in a day	
Saving in overheads	NIL
(-) Extra labour cost (40 units × 0.10)	(-) [(-) 4]
Gain	<u>₹ 4</u>
(b) When 45 units are produced	
Saving in Overheads [5 units × ₹ 2]	10
(-) Extra labour cost [45 units × 0.10]	(-) [(-) 4.50]
Gain	<u>14.50</u>
(c) When 55 units are produced	
Saving in overheads [15 units × ₹ 2]	30
(-) Extra labour cost [55 units × 0.25]	13.75
Gain	<u>16.25</u>
(d) When 60 units are produced	
Saving in overheads [20 units × 2]	₹ 40
(-) Extra labour cost [60 units × 0.30]	₹ 18
Gain	<u>₹ 22</u>

Answer to Q. No. 7 :

Particulars	X	Y	Z
Units completed	<u>6,000</u>	<u>3,000</u>	<u>4,800</u>
Unit allowed per 100 units	0.8 hr.	1.5 hrs.	1 hour
Total time allowed	6,000 × 0.8 = 48 hrs.	45 hrs.	48 hrs.
Actual time taken	42 hrs.	40 hrs.	48 hrs.
Time saved	6 hrs.	5 hrs.	NIL
	₹	₹	₹
Normal wage per hour	4	5	6
Wage for actual Time worked	42 × 4 = 168	40 × 5 = 200	48 × 6 = 288
Amount of bonus	$\frac{42}{48} \times 6 \times 4$ = ₹ 21	$\frac{40}{45} \times 5 \times 5$ = 22.22	NIL
Total wages	₹ 189	222.22	288
Wage cost per 100 units	$\frac{189}{6,000} \times 100$ = 3.15	$\frac{222.22}{3,000} \times 100$ = 7.41	$\frac{288}{4,800} \times 100$ = 6

Answer to Q. No. 8 :

Actual time taken = 48 hours

Actual output = 20 dozen articles.

Budgeted time to produce on dozen articles = 3 hrs.

Hence, budgeted time to produce 20 dozen articles = 20 × 3 = 60 hrs.

Time saved = 60 - 48 = 12 hours.

Computation of Total wages under Halsey Method

Time wages (48 × 0.50)	₹ 24
(+) Bonus	
$\frac{50}{100} \times \text{Time saved} \times \text{wage cost / hr.}$	<u>3</u>
$\left(\frac{50}{100} \times 12 \times 0.50 \right)$	<u>27</u>

Computation of Total wages under Rowan Plan

Time wages (48 × 0.50)	₹ 24
(+) Bonus	
$\left(\frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Wage cost per hour} \right)$	<u>4.80</u>
$\left(\frac{48}{60} \times 12 \times 0.50 \right)$	<u>28.80</u>

Answer to Q. No. 9 :**Comparative wages under Halsey and Rowan Plans**

Scheme	Time allowed (Hrs.)	Time taken (Hrs.)	Time wage ₹	Time saved (Hrs.)	Bonus ₹	Total wages ₹	Labour cost per hour ₹
Case I							
Halsey	10	9	270	1	15	285	31.67
Rowan	10	9	270	1	27	297	33.00
Case II							
Halsey	10	8	240	2	30	270	33.75
Rowan	10	8	240	2	48	288	36.00
Case III							
Halsey	10	6	180	4	60	240	40.00
Rowan	10	6	180	4	72	252	42.00
Case IV							
Halsey	10	4	120	6	90	210	52.50
Rowan	10	4	120	6	72	192	48.00
Case V							
Halsey	10	3	90	7	105	195	65.00
Rowan	10	3	90	7	63	153	51.00

A major point of distinction is clear from the above table that when the time saved is less than 50% of the time allowed, Rowan Plan allows higher amount of bonus than Halsey Plan. If time saved is more than 50% of time allowed, Halsey Plan allows higher amount of bonus.

Answer to Q. No. 10 :

Standard Time = 50 hours

Hourly Wage Rate = ₹ 15

Worker Garry

Assume actual hours = x

Hence,

Time Wages (x hrs. × ₹ 15/hr.)

₹

15x

Bonus (Rowan Plan) $\frac{x}{50} \times (50 - x) \times 15$

₹

$\frac{3}{10} x(50 - x)$

Total Earnings

$$15x + \frac{3}{10}x(50 - x)$$

We are given that
Effective hourly rate = ₹ 20

$$\frac{15x + \frac{3}{10}x(50 - x)}{x} = 20$$

$$15 + \frac{3}{10}(50 - x) = 20$$

Solving, we get $x = 33 \frac{1}{3}$ hours.

Hence, actual hours taken by worker Garry are $33 \frac{1}{3}$ hours.

Worker Garry

Time Wages ($33 \frac{1}{3}$ hrs. × ₹ 15/hr.)	₹ 500
(+) Bonus (Halsey Plan) $\frac{50}{100}(50 - 33 \frac{1}{3})$ hrs. × ₹ 15/hr.	<u>125</u>
Total Earnings	<u>625</u>
Effective hourly rate = $\frac{₹ 625}{33 \frac{1}{3} \text{ hrs.}}$	
= ₹ 18.75	

Answer to Q. No. 11:

	Plan	
	Halsey	Rowan
(i) Time Wages (20 × 25 × 9 × 15)	67,500	67,500
(+) Bonus	10,125	15,577
Total Earnings	77,625	83,077
Total Actual hours (20 × 25 × 9)	4,500	4,500
Effective earnings per hour	17.25	18.46

Computation of Bonus

Standard time
→ 1 unit = 1.5 hours
→ 3,900 units = 3900 × 1.5
= 5,850 hours
Actual hours = 4,500 hours
Time Saved = 1,350 hours

Hence, bonus under Halsey Plan is

$$\frac{50}{100} \times \text{Time Saved} \times \text{Wage Rate}$$

$$\frac{50}{100} \times 1350 \text{ hours} \times ₹ 15/\text{hr.} = ₹ 10,125$$

The bonus under Rowan Plan is $\frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time Saved} \times \text{Wage Rate}$

$$= \frac{4500}{5850} \times 1,350 \text{ hrs.} \times ₹ 15/\text{hr.}$$

$$= ₹ 15,577$$

(ii) Labour Cost per piece

→ Straight piece – rate = 1.5 hrs. × ₹ 15 per hour = ₹ 22.50

→ Halsey Plan = $\frac{₹ 77,625}{3900 \text{ units}}$ = ₹ 19.90

→ Rowan Plan = $\frac{₹ 83,077}{3,900 \text{ units}}$ = ₹ 21.30

Saving per piece

→ Halsey Plan = 22.50 – 19.90 = ₹ 2.60

→ Rowan Plan = 22.50 – 21.30 = ₹ 1.20

Answer to Q. No. 12:

Computing of average number of workers on roll during the quarter

Labour Turnover Rate (Replacement Method) = $\frac{\text{Number of Replacement}}{\text{Average no. of workers}}$

$$= \frac{50}{\text{Average no. of workers}}$$

$$\therefore \text{Average no. of workers} = 50 \times (100 \div 4) = 1,250$$

Calculation of total number of workers who left during the quarter

Labour Turnover Rate (Separation Method) = $\frac{\text{Total No. of Separations}}{\text{Average no. of workers}} = 6\%$

$$= \frac{\text{Total No. of Separations}}{1,250}$$

$$\therefore \text{Total workers who left} = 1,250 \times (6 \div 100) = 75$$

Labour Turnover Rate (Flux Method) = $\frac{\text{Total Separations} + \text{Total Recruitment}}{\text{Average no. of workers}} = 10\%$

$$\frac{75 + \text{Total Recruitment}}{1,250}$$

$$\therefore \text{Total recruitment} = 1,250 \times (10 \div 100) - 75 = 125 - 75 = 50$$

* Note : It is assumed that there is no recruitment due to expansion.

Answer to Q. No. 13:

	A	B	C
(i) Units Produced	2,500	2,200	3,600
(ii) Units Rejected	100	40	400
(iii) Units accepted = (i) – (ii)	<u>2,400</u>	<u>2,160</u>	<u>3,200</u>
(iv) Time Allowed (Hours) for total units produced	65	66	54
(v) Time Taken (Hours)	52	75	48
(vi) Time Saved = (iv) – (v)	13	Nil	6
	₹	₹	₹
Amount of time wages A 52 × ₹ 250; B 75 × ₹ 400; C 48 × ₹ 300	13,000	30,000	14,400
Amount of Bonus : A = $\frac{13}{65} \times 52 \times ₹ 250$; B Nil; C $\frac{6}{54} \times 48 \times ₹ 300$	2,600	Nil	1,600
Total wages	15,600	30,000	16,000
Wage Cost of each good unit 16,000 + 3,200 = ₹ 5	15,600 + 2,400 = ₹ 6.50	30,000 + 2,160 = ₹ 13.89	

- (a) Bonus hours
- Bonus amount
- (b) Total Wages
- (c) Wage Cost of each good unit

	13		
	₹ 2,600	Nil	6
	₹ 15,600	Nil	₹ 1,600
	₹ 650	₹ 30,000	₹ 16,000
		₹ 13.89	₹ 5

Answer to Q. No. 14:

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

	Factory Cost of output of Ram	Factory Cost of output of Sham
Material	x	Material
Time Wages	30 y	Time Wages
Bonus (30 y × 20/50)	12 y	Bonus (40 y × 10/50)
Overheads 30 hrs × ₹ 20	<u>360</u>	Overheads 40 hrs × ₹ 20
Factory Cost	<u>x + 42 y + ₹ 360</u>	<u>480</u>
		<u>x + 48 y + 480</u>

Factory cost of product of Ram is ₹ 3,100 and of Shyam is ₹ 3,280.

The two equations are :

$$X + 42 y + 360 = ₹ 3,100$$

$$X + 48 y + 480 = ₹ 3,280$$

....(i)

... (ii)

Solving, we get X = ₹ 2,320 and Y = ₹ 10.

Thus: (i) Normal Wage Rate is ₹ 10 per hour

(ii) Cost of material used for the product is ₹ 2,320 for each worker

(iii) Input of material in units = 2,320 ÷ 16 = 145 units used by each worker

Answer to Q. No. 15:

(a) Time Rate Wage System

$$\text{Hourly wage rate} = \frac{₹ 400}{40 \text{ hours}} = ₹ 10$$

Overtime rate = 15

Total output = 19,200 units

Output per hour = 6 units

$$\text{Total Hours} = \frac{19,200}{6} = 3,200 \text{ hours}$$

Normal hours = 60 workers × 40 hours = 2,400 hours

Overtime = 3,200 - 2,400 = 800 hours

Total Wages

→ Normal time (2,400 × 10)

₹ 24,000

→ Overtime (800 × 15)

₹ 12,000

₹ 36,000

(b) Halsey Plan

Here, the workers will produce 19,200 units by working only 2,400 hours whereas 3,200 hours would have been used under time rate wage system. It leads to saving of 800 labour hours. Hence, total wages is computed below :

Time wages	24,000
(2400 hours × ₹ 10 / hr.)	
Bonus $\left(\frac{50}{100} \times 800 \text{ hours} \times ₹ 10 / \text{hour} \right)$	4,000
	<u>28,000</u>

(c) Rowan Plan	24,000
Time Wages	
(2400 hours × ₹ 10 / hr.)	6,000
Bonus $\left(\frac{2400 \text{ hrs.}}{3200 \text{ hrs.}} \times 800 \text{ hrs.} \times ₹10 \right)$	<u>30,000</u>

	Profit statement under three wage Schemes Time wage 3200 hours ₹ 2,11,200	Halsey Plan 2400 hours ₹ 2,11,200	Rowan Plan 2400 hours ₹ 2,11,200
Sales 19200 units @ ₹ 11 (a)	1,53,600	1,53,600	1,53,600
Direct Material @ ₹ 8	36,000	28,000	30,000
Direct Wage	1,600	1,200	1,200
Variable overheads @ ₹ 0.50 per labour hour	9,000	9,000	9,000
Fixed Overhead	2,00,200	1,91,800	1,93,800
Total Cost (b)	<u>₹ 11,000</u>	<u>₹ 19,400</u>	<u>₹ 17,400</u>
Profit (a) – (b)			

Answer to Q. No. 16: Statement of Total Earnings of each worker in the April 1998

Workers	Days worked	Output in units	Basic wages (iv) = (iii) × ₹ 2	Dearness Allowance (v) = (ii) × ₹ 40	Incentive (vi)	Total Earnings (vii) = (iv) + (v) – (vi)
A	25	820	1,640	1,000	100	2,740
B	18	500	1,080	720	-	1,800
C	25	910	1,820	1,000	550	3,370
D	24	780	1,560	960	50	2,750

Working Notes : (i) The worker B has been given guaranteed minimum wages @ ₹ 60 per day for 18 days, since his piece work wage is only $500 \times ₹ 2 = ₹ 1,000$: In case of A, C and D their piece wage is higher than guaranteed wage.

Computation of incentive

Worker	Efficiency	Incentives @ ₹ 50 for each 1% Increase in efficiency above 80%
A	$\frac{820}{25 \times 40} = 82\%$	$2 \times ₹ 50 = ₹ 100$
B	$\frac{500}{18 \times 40} = 69.4\%$	No Incentive
C	$\frac{910}{25 \times 40} = 91\%$	$11 \times ₹ 50 = ₹ 550$
D	$\frac{780}{24 \times 40} = 81.25\%$	$1 \times ₹ 50 = ₹ 50$

It is assumed that the workers do not get incentive payment for a fraction of 1% efficiency improvement.

Answer to Q. No. 17: Time Taken :

Monday to Friday : 5 days @ 9 hours per day

Saturday 8 AM to 1 P.M.

Total hours worked

Standard time for 600 pieces at 10 pieces per hour

Time Saved = 60 = 50 =

45 hours

5 hours

50 hours

60 hours

10 hours

Wages for hours worked = 50 hours @ ₹ 50 per hour =	
Bonus 40% of time saved = 10 hours × ₹ 50 × $\frac{40}{100}$ =	₹ 2,500
Total Wages	200
	₹ 2,700

Answer to Q. No. 18: Statement showing the earnings of workers as per merrick differential piece rate system

Particulars	A	B	C	D
Standard production per hour (in units)	12	12	12	12
Standard production per day (in units)	96	96	96	96
Actual production (in units)	64	96	96	96
Efficiency %	66.67	96	84	100
Piece rate applicable (in ₹)	0.60	100	87.50	104.17
Total earnings (in ₹)	38.40	63.36	55.44	72.00

Note : According to Merrick Differential Piece Rate System, different rates are applicable according to efficiency. The rates are as follows :
 Up to 83%, Ordinary piece rate.
 83% to 100%, 110% of ordinary piece rate.
 Over 100%, 120% of ordinary piece rate.

Answer to Q. No. 19 **GROSS WAGES DUE TO MR. KALYAN**

(a) Piece work with a guaranteed weekly wages :	₹	₹
Amount of Wages = Time Wages (48 Hrs. × ₹ 4/hr.)		
Or		
Output Wages (300 units × 0.80/ unit) whoever is more	240.00	
Rate per hour worked : ₹ 240 ÷ 48	5.00	
(b) Rowan Premium Bonus Plan :		
Wages for 48 hours @ ₹ 4 per hour	192.00	
Bonus : $\frac{\text{Time Taken}}{\text{Time allowed}} \times \text{Time Saved} \times \text{Wage Rate} = \frac{48}{60} \times 12 \times 4$	38.40	230.40
Rate per hour worked : ₹ 230.40 ÷ 48		4.80
(c) Halsey Premium Bonus Plan :		
Wages for 48 hours	192.00	
Bonus : 50% of the wages for time saved	24.00	216.00
Rate per hour worked ₹ 216 ÷ 48		4.50

Working Notes : Standard time for producing 300 articles :
 Estimated time for one article 10 minutes
 Add : 20% increase under incentives scheme 2 minutes
 Total for one article 12 minutes
 Total for 300 articles 3,600 minutes or 60 hours
 Time taken 48 hours
 Time Saved 12 hours

Answer to Q. No. 20 **XYZ & Co.**
 (a) STATEMENT SHOWING EFFECTIVE HOURLY COST OF A.

(i) Earnings of A		250
Salary per month	400	
Dearness Allowance per month:	100	
On 1 st ₹ 100 of salary	25	525
On next ₹ 100 of salary		<u>775</u>
On balance of ₹ 50 salary		
Salary and D.A. per month		

COST ACCOUNTING

7.36

	9,300
	744
	372
	1,860
	<u>2,725</u>
	<u>15,001</u>
Salary and D .A. per annum (775 × 12)	
Provident Fund @ 8% of Salary & D.A.	
ESI @ 4% of Salary and D.A.	
Bonus @ 20%	
Other Allowances	
Total Earning per annum	2,400
(ii) Working Hours :	400
Gross hours	<u>2,000</u>
Less: Normal Idle Time	
Effective Working hours	
Effective hourly cost of A = 15,001/2,000 = ₹ 7.50 per hour.	
EXPECTED SALES VALUE OF JOB NO. 13:	₹ 135
Direct Material (equivalent to A's wages)	<u>135</u>
Direct Labour (A for 18 hours @ ₹ 7.50)	270
Prime Cost	<u>270</u>
Add : Overheads @ 100% of Prime Cost	540
Total Cost	<u>60</u>
Add : Profit 10% of Sales Value or 1/9 th of cost	<u>₹ 600</u>
Sales Value	

Answer to Q. No. 21 : Monthly Labour Cost Details per Employee:

Basis Wage	₹ 3,000	Total working days in month	25
Dearness Allowance	1,000	Total working hours in a day	<u>×8</u>
Bonus 10% of wage = 3,000 × (10+100)	300		200
Employer's Contribution to P.F. 3,000 × (10 + 100)	300	Less Paid Leave (Note)	<u>-10</u>
Employer's Contribution to ESI 3,000 × (1+ 100)	30		190
Canteen Subsidy per employee 10,000 × (1 + 100)	100	Less 20% Normal Idle Time 190 × (20+100)	<u>-38</u>
Total monthly labour cost per employee	4,730	Effective hours in a month	<u>152</u>

Hourly Labour cost per employee or Hourly Rate of Charge = $\frac{\text{Monthly labour cost per employee}}{\text{Effective hours in a month}}$

$$= \frac{4,730}{152} \text{ For the employee's work} = ₹ 31.12 \text{ per hour.}$$

Note: Leave allowed is 1 day out of 20 days. Since there are 8 hrs. per day, it can be concluded that leave allowed is 8 hours out of 160 hours. Hence, if total hours are 200, leave allowed is

$$= \frac{8}{160} \times 200 = 10 \text{ hours.}$$

Answer to Q. No. 22 :**Calculation of wages**

	Per month (₹)
Basic wages	1600
D.A.	400
Contribution to P.F. (10% of Basic + D.A.)	200
Contribution to E.S.I. (5% of Basic)	80
Cost of non-monetary benefits	200
Total wages	<u>2,480</u>