

**3. EMPLOYEE COST****PROBLEM NO: 1**

	(₹)
Wages paid to worker during the year{₹ 10,000 + 2,000} × 12}	1,44,000
Add: Employer Contribution to:	
-Provident Fund @ 10%	14,400
-E.S.I. Premium @ 4.75% (6.5 – 1.75)	6,840
Bonus at 2 months' wages (Basic + DA)	24,000
Total	1,89,240

Effective hours per year: 285 days × 8 hours = 2,280 hours

Wage rate per hour (for costing purpose): Rs. 1,89,240/2,280 hours = Rs.83

**PROBLEM NO: 2**

Statement of Labour Cost (per man-day of 8 hours)

Particulars	(Rs.)
(a) Basic Salary	80.00
(b) Dearness Allowance @ 80 paise per every point over 100 cost of living index for a month of 25 days $\frac{(785-100) \times 0.80}{100} \times \frac{1}{25}$	21.92
	101.92
(c) Leave Salary –10% of (a) and (b) $\frac{101.92 \times 10}{100}$	10.19
	112.11
(d) Employer's contribution to Provident Fund 10% of (a), (b) and (c) $\frac{112.11 \times 10}{100}$	11.21
(e) Employer's contribution to State Insurance 2.5% of (a), (b) and (c) $\frac{112.11 \times 2.5}{100}$	2.80
(f) Amenities to labour @ Rs. 30 per head per month of 25 working days $\frac{\text{Rs.30}}{25 \text{ days}}$	1.20
Total	127.32

**PROBLEM NO: 4**

- (i) Effective hourly rate of earnings under Rowan Incentive Plan  
Earnings under Rowan Incentive plan =

$$(\text{Actual time taken} \times \text{wage rate}) + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time taken} \times \text{Wage rate}$$

$$= (5 \text{ hours} \times ₹120) + \left( \frac{1 \text{ hour}}{6 \text{ hours}} \times 5 \text{ hours} \times ₹120 \right)$$

$$= ₹600 + ₹100 = ₹700$$

$$\text{Effective hourly rate} = ₹700/5 \text{ hours} = ₹140/\text{hour}$$

- (ii) Let time taken = X

$$\therefore \text{Effective hourly rate} = \frac{\text{Earnings under Halsay Scheme}}{\text{Time Taken}}$$

Or, Effective hourly rate under Rowan Incentive plan =

$$\frac{(\text{Time taken} \times \text{Rate}) + 50\% \text{ Rate} \times (\text{Time allowed} - \text{Time taken})}{\text{Time Taken}}$$

$$\text{Or, } ₹140 = \frac{(X \times ₹120) + 50\% ₹120 \times (6 - X)}{X}$$

$$\text{Or, } 140X = 120X + 360 - 60X$$

$$\text{Or, } 80X = 360$$

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$$\text{Or, } X = \frac{360}{80} = 4.5 \text{ hours}$$

Therefore, to earn effective hourly rate of ₹140 under Halsey Incentive Scheme worker has to complete the work in 4.5 hours.

### **PROBLEM NO: 5**

From the given data

Time taken = (9hrs + 9hrs + 9hrs + 9hrs + 9hrs + 5hrs) = 50 hrs

Time allowed = Total units produced/No. of units allotted per hour

$$= 600 \text{ units} / 10 \text{ units}$$

$$= 60 \text{ hours}$$

∴ Time saved = Time allowed – Time taken

$$= 60 \text{ hrs} - 50 \text{ hrs}$$

$$= 10 \text{ hrs}$$

∴ Bonus = 40 % of the time saved

$$= 40\% \times \text{Time saved} \times \text{rate per hour}$$

$$= 40\% \times 10 \text{ hrs} \times 0.5 \text{ per hour}$$

$$= \text{Rs.} 2$$

Total Earnings (wages) = (H.W x R.P.H) + 40% (T.S x R.P.H)

$$= (50 \text{ hrs} \times 0.5) + 40\% (10 \text{ hrs} \times 0.5)$$

$$= 25 + 2$$

$$= \text{Rs.} 27$$

Effective rate of earnings per hour = Total earnings/Hours worked

$$= \text{Rs.} 27 / 50 \text{ hrs}$$

$$= \text{Rs.} 0.54 \text{ per hour}$$

### **PROBLEM NO: 6**

#### **Calculation of extra output**

Particulars	No. of units
a) Actual Output (Given)	800
b) Standard Output (80units x 8 hrs)	640
Extra output	160

∴ Bonus payable on 160 units

$$\text{Bonus payable} = 100 \text{ units} + 60 \text{ units}$$

$$= \text{Rs.} 15 + \frac{60 \text{ units}}{100 \text{ units}} \times 15$$

$$= \text{Rs.} 24/-$$

c) Total wages = Rs.50 (Given) + Rs.24 (Bonus)

$$= \text{Rs.} 74/-$$

d) Total wages under piece rate basis = (No. of pieces produced x Rate per piece)

$$= 800 \text{ units} \times \text{Rs.} 0.078125$$

$$= \text{Rs.} 62.5$$

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**e) Calculation of time saved**

$$1. \text{ Time allowed (standard) (800 units/ 80 units) } = 10 \text{ hrs}$$

$$2. \text{ Time taken } = 8 \text{ hrs}$$

$$3. \text{ Time saved } = 2 \text{ hrs (10 - 8)}$$

$$\begin{aligned} \text{f) Total Earnings under Halsey premium system} &= (H.W \times R.P.H) + \left(\frac{1}{2}\right) (T.S \times R.P.H) \\ &= (8 \text{ hrs} \times \text{Rs } 6.25) + \left(\frac{1}{2}\right) (2 \times 6.25) \\ &= \text{Rs.} 56.25 \end{aligned}$$

**g) Total Earnings under Rowan premium system**

$$\begin{aligned} &= (H.W \times R.P.H) + \left(\frac{T.S}{T.A}\right) (H.W \times R.P.H) \\ &= (8 \text{ hrs} \times \text{Rs.} 6.25) + \frac{2 \text{ hours}}{10 \text{ hours}} (8 \text{ hours} \times \text{Rs. } 6.25) \\ &= \text{Rs.} 60/- \end{aligned}$$

Note: Piece rate per piece

$$\begin{aligned} &= \frac{\text{Wage for a definite period}}{\text{Standard output for the same definite period}} \\ &= \frac{\text{Rs.} 50 (8 \text{ hrs})}{640 \text{ units} (8 \text{ hrs})} \\ &= \text{Rs.} 0.078125 \end{aligned}$$

**PROBLEM NO: 7**

Given

$$\text{Standard time (S)} = 90 \text{ hours.}$$

$$\text{Rate per hour (R)} = 50$$

$$\text{Given effective rate of earnings} = 60$$

$$\Rightarrow \frac{\text{Earnings (E)}}{\text{Time taken (T)}} = 60$$

$$\text{Earnings} = 60T$$

We know that

$$\text{Earnings} = (T \times R) + \frac{T.S}{S.T} (T \times R)$$

$$60T = T (50) + \left(\frac{90 - T}{90}\right) 50T$$

$$\frac{60T - 50T}{50T} = \frac{90 - T}{90} = \frac{10T}{50T} = \frac{90 - T}{90}$$

$$18 = 90 - T$$

$$T = 90 - 18 = 72$$

**Halsay system:**

$$\begin{aligned} E &= TR + 40\% (TS)R \\ &= 72 \times 50 + 40\% (18) 50 \\ &= 3600 + 360 \\ &= 3960 \end{aligned}$$

$$\text{ERE} = 3960/72 = 55.$$

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**PROBLEM NO: 8**

- (a) Increase in hourly rate of wages under Rowan Plan is ₹ 30 i.e. (₹180 – ₹ 150)

$$\frac{\text{Time Saved}}{\text{Time Allowed}} \times ₹ 150 = ₹ 30 \text{ (Please refer Working Note)}$$

$$\text{Or, } \frac{\text{Time Saved}}{50 \text{ hours}} \times ₹ 150 = ₹ 30$$

$$\text{Or, Time saved} = \frac{1,500}{150} = 10 \text{ hours}$$

Therefore, Time Taken is 40 hours i.e. (50 hours – 10 hours)

Effective Hourly Rate under Halsey System:

$$\text{Time saved} = 10 \text{ hours}$$

$$\text{Bonus @ 50\%} = 10 \text{ hours} \times 50\% \times ₹ 150 = ₹ 750$$

$$\text{Total Wages} = (₹150 \times 40 \text{ hours} + ₹ 750) = ₹ 6,750$$

$$\text{Effective Hourly Rate} = ₹ 6,750 \div 40 \text{ hours} = ₹ 168.75$$

**Working Note:**

$$\text{Effective hourly rate} = \frac{(\text{Time Taken} \times \text{Rate per hour}) + \frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Rate per hour}}{\text{Time Taken}}$$

$$\text{Or, } ₹ 180 = \frac{\text{Time Taken} \times \text{Rate per hour}}{\text{Time Taken}} + \frac{\frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Rate per hour}}{\text{Time Taken}}$$

$$\text{Or, } ₹ 180 - \frac{\text{Time Taken} \times \text{Rate per hour}}{\text{Time Taken}} = \frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Rate per hour} \times \frac{1}{\text{Time Taken}}$$

$$\text{Or, } ₹ 180 - ₹ 150 = \frac{\text{Time Saved}}{\text{Time Allowed}} \times ₹ 150$$

**PROBLEM NO: 9**

**Calculation of total earnings :**

$$= \text{Time taken} \times \text{Time rate} + 50\% (\text{Time Allowed} - \text{Time Taken}) \times \text{Time rate}$$

$$= 6 \text{ hrs.} \times ₹60 + 1/2 \times (2 \text{ hrs.} \times ₹60) \text{ or } ₹360 + ₹60 = ₹420$$

Of his total earnings, ₹360 is on account of the time worked and ₹60 is on account of his share of the premium bonus.

**Calculation of total earnings :**

$$= \text{Time taken} \times \text{Rate per hour} + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time taken} \times \text{Rate per hour}$$

$$= 6 \text{ hours} \times ₹60 + \frac{2 \text{ hours}}{8 \text{ hours}} \times 6 \text{ hours} \times ₹60 = ₹360 + ₹90 = ₹450$$

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**PROBLEM NO: 10****Calculation of bonus and total earnings under Emerson Efficiency System**

	Particulars	Worker- A	Worker- B	Worker- C
A.	Standard output (units)	40	40	40
B.	Actual output (units)	25	40	45
C.	Efficiency (%)	62.5%	100%	112.5%
	$\left[ \frac{\text{Actual output}}{\text{Standard output}} \times 100 \right]$	$\left[ \frac{25 \text{ unit}}{40 \text{ unit}} \times 100 \right]$	$\left[ \frac{40 \text{ unit}}{40 \text{ unit}} \times 100 \right]$	$\left[ \frac{45 \text{ unit}}{40 \text{ unit}} \times 100 \right]$
D.	Time wages per day (₹)	500	500	500
E.	Rate of bonus	No bonus	20% of time rate	32.5% of time rate (20% + 12.5%)
F.	Bonus earnings (₹)	0	100 (20% of ₹ 500*)	162.50 (32.5% of ₹500*)
G.	Total Earnings (₹) (D + F)	500.00	600.00	662.50

**PROBLEM NO: 11**

Actual output = 37 units

$$\text{Standard output} = \frac{8 \text{ hrs.} \times 60 \text{ minutes}}{12 \text{ minutes per piece}} \\ = 40 \text{ units}$$

$$\text{Efficiency} = \frac{37 \text{ units}}{40 \text{ units}} \times 100 = 92.5\%$$

Under Taylor's differential piece rate system, a worker is paid lower piece rate of 83%, since his efficiency is less than 100%.

Standard production per hour = 60 minutes / 12 minutes = 5 units

Normal Rate per hour = Rs.20

Normal piece rate per unit = Rs.20/5 units = Rs.4

Lower piece rate per unit = Rs.4 × 83/100 = Rs.3.32

Total earnings = 37 units × 3.32 = 122.84

**PROBLEM NO: 12**

Standard output = 240 units (given)

Actual output = 264 units (given)

Wage rate per hour = Rs.10 per hour

**Under Emerson Plan:**

% of Efficiency = (264 units/240 units) × 100 = 110%

% of total bonus = 10%+20% = 30%

Total earnings = 100%+30% = 130%

Total earnings = 10 hrs × Rs. 10 × 130% = Rs.130

Total Bonus = 10 hrs × Rs. 10 × 30% = Rs.30

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**PROBLEM NO: 13****Earnings under Differential piece rate system**

Workers	Amar	Akbar	Ali
Standard output per day (units) (8 hours x 60 minutes)/ 20 minutes	24	24	24
Actual output per day (units)	23	24	30
Efficiency (%)	95.83%	100%	125%
$\left[ \frac{\text{Actual output}}{\text{Standard output}} \times 100 \right]$	$\left[ \frac{23 \text{ unit}}{24 \text{ unit}} \times 100 \right]$	$\left[ \frac{24 \text{ unit}}{24 \text{ unit}} \times 100 \right]$	$\left[ \frac{30 \text{ unit}}{24 \text{ unit}} \times 100 \right]$
* Earning rate per unit	83% of the piece rate	125% of the piece rate	125% of the piece rate
Earning rate per unit (₹) (Refer to working note)	2.49 (83% of ₹3)	3.75 (125% of ₹3)	3.75 (125% of ₹3)
Earnings (₹)	57.27 (23 units × ₹ 2.49)	90.00 (24 units × ₹ 3.75)	112.50 (30 units × ₹ 3.75)

**Merrick Differential Piece Rate System**

Workers	Amar	Akbar	Ali
* Earning rate per unit (Refer to previous illustration)	10% above the normal rate	10% above the normal rate	20% above the normal rate or 30% above the normal
Earning rate per unit (₹)	3.30	3.30	3.60 or 3.90
Earnings (₹)	75.90 (23 units × ₹ 3.30)	79.20 (24 units × ₹ 3.30)	108 or 117 (30 units × ₹ 3.60) or (30 units × ₹ 3.90)

**PROBLEM NO: 14**

Time Allowed = 150 hours

Time Taken = 120 hours

Time Saved = 30 hours

(i) Rowan Premium Plan	(₹)
Normal wages (₹ 10 × 120 hours)	1,200
D.A. for 15 days i.e. $\frac{120 \text{ hours}}{8 \text{ hours}}$ (₹30 × 15 days)	450
Bonus : = $\frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Hourly rate}$	
= $\frac{30 \text{ hours}}{150 \text{ hours}} \times 120 \text{ hours} \times ₹10$	240
Total Wages	1,890
(ii) Emersion's Efficiency Plan	
Normal wages (120 hours × ₹ 10)	1,200
D.A. (15 days × ₹ 30)	450
Bonus * = 45% × ₹1,200	540
Total Wages	2,190
* Efficiency = $\frac{\text{Time Allowed}}{\text{Time Taken}} \times 100 = \frac{150}{120} \times 100 = 125\%$	
Rate of Bonus up to 100%	= 20%
From 101% to 125%	= 25%
	45%

**PROBLEM NO: 15**

Given Rate per hour = Rs. 0.4 per unit,  
 Piece rate = Rs. 0.3 per unit,  
 Standard production per hour = 2 units  
 Time taken = 40 hours  
 Standard production for 40 hours = 80 units (40 X 2)  
 Actual production for 40 hours (X) = 50 units  
 (Y) = 80 units

Particulars	Taylor Differential Piece Rate		Merrick Differential Piece Rate		Gantt's Task	
	X	Y	X	Y	X	Y
1. Earnings (W.N – 1)	12.45 (0.3×83%×50)	30 (0.3×125%×80)	15 (0.3×50)	26.4 (0.3×110%×80)	16 (40×0.4)	19.2 [16+(16×20%)]
2. Cost per piece	0.25 ( $\frac{12.45}{50}$ )	0.375 ( $\frac{30}{80}$ )	0.3 ( $\frac{15}{50}$ )	0.33 ( $\frac{26.4}{80}$ )	0.32 ( $\frac{16}{50}$ )	0.24 ( $\frac{19.2}{80}$ )

$$\% \text{ of Efficiency} = \frac{\text{Actual production}}{\text{Standard production}} \times 100$$

$$X = \frac{50}{80} \times 100 = 62.5\%; Y = \frac{80}{80} \times 100 = 100\%$$

**PROBLEM NO: 16****Working notes:****1. Computation of time saved (in hours) per month:**

$$\begin{aligned}
 & (\text{Standard production time for 6,120 units}) - (\text{Actual time taken by the workers}) \\
 &= (6,120 \text{ units} \times 1.975 \text{ hours}) - (24 \text{ days} \times 8 \text{ hours per day} \times 50 \text{ skilled workers}) \\
 &= (12,087 \text{ hours} - 9,600 \text{ hours}) \\
 &= 2,487 \text{ hours}
 \end{aligned}$$

**2. Computation of bonus for time saved under Halsey and Rowan schemes:**

$$\begin{aligned}
 \text{Time saved} &= 2,487 \text{ hours} \\
 (\text{Refer to working note 1})
 \end{aligned}$$

$$\text{Wage rate per hour} = ₹ 30$$

$$\begin{aligned}
 \text{Bonus under Halsey Scheme} &= \frac{1}{2} \times 2,487 \text{ hours} \times ₹ 30 \\
 (\text{With 50\% bonus}) &= ₹ 37,305
 \end{aligned}$$

$$\begin{aligned}
 \text{Bonus under Rowan Scheme} &= \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour} \\
 &= \frac{2,487 \text{ hours}}{12,087 \text{ hours}} \times 9,600 \text{ hours} \times ₹ 30 \\
 &= ₹ 59,258.38
 \end{aligned}$$

**(i) Computation of effective rate of earnings under the Halsey and Rowan scheme:**

Total earnings (under Halsey scheme) (Refer to working note 2)

$$\begin{aligned}
 &= \text{Time wages} + \text{Bonus} \\
 &= (24 \text{ days} \times 8 \text{ hours} + 50 \text{ skilled workers} \times ₹ 30) + ₹ 37,305 \\
 &= ₹ 2,88,000 + ₹ 37,305 = ₹ 3,25,305
 \end{aligned}$$

Total earnings (under Rowan scheme) (Refer to working note 2)

$$\begin{aligned}
 &= \text{Time wages} + \text{Bonus} \\
 &= ₹ 2,88,000 + ₹ 59,258.38 \\
 &= ₹ 3,47,258.38
 \end{aligned}$$

$$\text{Effective rate of earnings per hour (under Halsey Plan)} = \frac{₹ 3,25,305}{9,600 \text{ hours}} = ₹ 33.89$$

$$\text{Effective rate of earnings per hour (under Rowan Plan)} = \frac{₹ 3,47,258.38}{9,600 \text{ hours}} = ₹ 36.17$$

(ii) Savings to the ZED Ltd., in terms of direct labour cost per piece:

	(₹)
Direct labour cost (per unit) under time wages system (1.975 hours per unit × ₹ 30)	59.25
Direct labour cost (per unit) under Halsey Plan $\left( \frac{₹ 3,25,305}{6,120 \text{ units}} \right)$	53.15
Direct labour cost (per unit) under Rowan Plan $\left( \frac{₹ 3,47,258.38}{6,120 \text{ units}} \right)$	56.74

Saving of direct labour cost under:

$$\text{Halsey Plan (₹ 59.25 – ₹ 53.15)} \quad ₹ 6.10$$

$$\text{Rowan Plan (₹ 59.25 – ₹ 56.74)} \quad ₹ 2.51$$

(iii) Advise to ZED Ltd.: (about the selection of the scheme to fulfill assurance)

Halsey scheme brings more savings to the management of ZED Ltd., over the present earnings of ₹ 2,88,000 but the other scheme i.e. Rowan scheme fulfils the promise of 20% increase over the present earnings of ₹ 2,88,000 by paying 20.58% in the form of bonus. Hence Rowan Plan may be adopted.

### PROBLEM NO: 17

Let 'y' be the wage rate per hour

Let 'x' be the cost of materials

Earnings

$$\begin{aligned}
 \text{Under Halsey} &= (\text{H.W} \times \text{R.P.H}) + \left(\frac{1}{2}\right) (\text{T.S} \times \text{R.P.H}) \\
 &= (80 \text{ hrs} \times y) + \frac{1}{2}(20 \text{ hrs} \times y) \\
 &= 90y
 \end{aligned}$$

$$\begin{aligned}
 \text{Under Rowan} &= (\text{H.W} \times \text{R.P.H}) + (\text{T.S}/\text{T.A}) (\text{H.W} \times \text{R.P.H}) \\
 &= (60 \text{ hrs} \times y) + (40/100) 60 \text{ hrs} \times y \\
 &= 84y
 \end{aligned}$$

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Statement showing factory cost of the worker Vishnu and Shiva

Particulars	Vishnu	Shiva
a. Cost of materials	x	x
b. Normal wages	84y	90y
c. factory overheads	600 (60 hours x Rs. 10)	800 (80 hours x Rs.10)
d. factory cost	x+84y+600	x+90y+800

From solved equation

$$X + 84y + 600 = 7280 \quad - \quad 1$$

$$X + 90y + 800 = 7600 \quad - \quad 2$$



$$\begin{aligned}
 (-) \quad (-) \quad (-) \quad (-) \\
 -6y - 200 &= -320 \\
 -6y &= -320 + 200 \\
 -6y &= -120 \\
 y &= \text{Rs.20}
 \end{aligned}$$

Substitute  $y = 20$  in - 1

$$x + 84y + 600 = 7280$$

$$x + 84(20) + 600 = 7280$$

$$x = 7280 - 2280$$

$$x = \text{Rs.5000}$$

Cost of Materials = Rs.5000]

Wage rate per hour = Rs.20

### PROBLEM NO: 18

#### 2. Working:

	Worker- A		Worker- B		Worker- C	
	Total hours	Overtime Hours	Total hours	Overtime Hours	Total hours	Overtime Hours
<b>Normal days</b>						
- Monday	10.5	1.0	11.5	2.0	13.5	4.0*
- Wednesday	14.5	5.0*	9.5	-	15.5	6.0*
- Thursday	8.5	-	13.5	4.0*	12.5	3.0
- Friday	15.0	5.5*	8.5	-	8.5	-
- Saturday	-	-	9.5	-	11.5	2.0
<b>Holiday &amp; Sunday</b>						
- Tuesday	9.5	6.0	4.5	6.0	-	-
- Sunday	-	-	5.5	6.0	8.5	6.0
<b>Total Hours</b>	<b>58.0</b>	<b>17.5</b>	<b>62.5</b>	<b>18.0</b>	<b>70.0</b>	<b>21.0</b>

\* Eligible for diet allowance

#### (i) Calculation of Overtime and diet Allowance payable to the workers:

Worker	Overtime Allowance (₹)	Diet Allowance (₹)	Total (₹)
A	1,093.75 (₹ 62.50 × 17.5)	160.00 (₹80 × 2 days)	1,253.75
B	1,125.00 (₹ 62.50 × 18.0)	80.00 (₹80 × 1 day)	1,205.00
C	1,312.50 (₹ 62.50 × 21.0)	160.00 (₹80 × 2 days)	1,472.50
<b>Total</b>	<b>3,531.25</b>	<b>400.00</b>	<b>3,931.25</b>

#### (ii) Accounting Treatment of overtime and diet allowance:

##### (a) Worker A & C were involved in a specific job assigned to them:

Overtime and diet allowance of ₹ 2,726.25 payable to worker A & C shall be charged to the specific job and are treated as cost for the job.

Further, Overtime and diet allowance of ₹1,205 payable to Worker-B, will be charged to:

Either, as Cost of production as a part of labour if it is due to labour shortage.

Or, as Cost of production as a part of factory overhead, if it is irregular and to meet production requirement, which arises due to some uncontrollable developments.

Or, either to Responsibility centre in fault or Costing Profit & Loss A/c., if it is irregular and to meet production requirement, which arises due to some controllable developments.

- (b) Overtime was due to under-estimation of sales demand provided by the sales department:

The total amount of overtime allowance and diet allowance of ₹ 3,931.25 shall be charged to Sales Department.

- (c) Overtime was due to make up a shortfall in production due to sudden demand:  
The total amount of overtime allowance and diet allowance of ₹ 3,931.25 shall be charged to Cost of production as factory overhead.

### **PROBLEM NO: 19**

$$\text{Labour Turnover Rate (Replacement method)} = \frac{\text{No. of workers replaced}}{\text{Average No. of workers}}$$

$$\text{Or, } \frac{8}{100} = \frac{36}{\text{Average No. of workers}}$$

$$\text{Or, Average No. of workers} = 450$$

$$\text{Labour Turnover Rate (Separation method)} = \frac{\text{No. of workers separated}}{\text{Average No. of workers}}$$

$$\text{Or, } \frac{6}{100} = \frac{\text{No. of workers separated}}{450}$$

$$\text{Or, No. of workers separated} = 27$$

$$\text{Labour Turnover Rate (Flux Method)} = \frac{\text{No. of Separations} + \text{No. of accession (Joinings)}}{\text{Average No. of workers}}$$

$$\text{or, } \frac{14}{100} = \frac{27 + \text{No. of accessions (Joinings)}}{450}$$

$$\text{or, } 100 (27 + \text{No. of Accessions}) = 6,300$$

Active

$$\text{or, No. of Accessions} = 36$$

$$(i) \text{ The No. of workers recruited and Joined} = 36$$

$$(ii) \text{ The No. of workers left and discharged} = 27$$

### **PROBLEM NO: 20**

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

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

$$\text{Loss of output} = 5,000 - 3,000 = 2,000 \text{ units}$$

$$\begin{aligned} \text{Total loss of output} &= \text{Due to delay recruitment} + \text{Due to inexperience} \\ &= 10,000 + 2,000 = 12,000 \text{ units} \end{aligned}$$

$$\text{Contribution per unit} = 20\% \text{ of } ₹180 = ₹ 36$$

$$\text{Total contribution lost} = ₹36 \times 12,000 \text{ units} = ₹ 4,32,000$$

$$\text{Cost of repairing defective units} = 3,000 \text{ units} \times 0.2 \times ₹ 25 = ₹ 15,000$$

#### **Profit forgone 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 2014-15	9,00,000

**PROBLEM NO: 21**

Standard output = (10,000 tonnes x 20 days) / 25 days = 8,000 tonnes

Actual output = 11,000 tonnes

Excess output = (11,000 tonnes - 8,000 tonnes) = 3,000 tonnes

% of excess output = 3,000 tonnes/8,000 tonnes = 37.5%

Group bonus = 3,000 x 10 = Rs.30,000/-

**Statement showing bonus payable to each group (In Rs.)**

Particulars	Direct labour (Rs.)	Inspection staff (Rs.)	Maintenance staff (Rs.)	Supervisor (Rs.)
a. Group Bonus 30,000 × (70%: 10%: 12%: 8%)	21,000	3,000	3,600	2,400
b. Bonus to direct labour (3,000 tonne x (17.5/37.5) x Rs.5	7,000	-	-	-
c. Penalty to IS staff (11,000 × 1% - 200 tonnes) × Rs. 20	-	(1,800)	-	-
d. Penalty to maintenance (40 hours x Rs.20)	-	-	(800)	-
Net bonus paid	28,000	1,200	2,800	2,400

**PROBLEM NO: 22**

**Calculation of wages on the basis of time**

A = 40 hours x Rs. 75 per hour = Rs.3,000/-

B = 60 hours x Rs. 80 per hour = Rs.4,800/-

C = 44 hours x Rs. 50 per hour = Rs.2,200/-

Rs.10,000/-

∴ Bonus amount = Actual payment – Time wages

= 15,000 - 10,000 = Rs.5,000/-

% of bonus = (5,000/10,000) x 100 = 50% on time wages

**Statement showing the earnings per hour for each worker**

Worker	Time basis wages (1) (Rs.)	Bonus (2) (Rs.)	Total (3)=(1)+(2) (Rs.)	Earnings per hour (Rs.)
A	3000	(3000 x 50%) 1500	4,500	(4500 / 40hrs) 112.5
B	4800	(4800 x 50%) 2400	7,200	(7200 / 60hrs) 120
C	2200	(2200 x 50%) 1100	3,300	(3300 / 44hrs) 75

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To **MASTER MINDS**, Guntur

**THE END**