

3. EMPLOYEE COST

PROBLEM NO:1

	(₹)
Wages paid to worker during the year ($₹ 10,000 + 2,000 \times 12$)	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: $285 \text{ days} \times 8 \text{ hours} = 2,280 \text{ hours}$

Wage rate per hour (for costing purpose): $₹ 1,89,240 / 2,280 \text{ hours} = ₹ 83$

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 @ ₹ 30 per head per month of 25 working days $\frac{₹ 30}{25 \text{ days}}$	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 =

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

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

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

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

Act
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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

$$\text{Time taken} = (9\text{hrs} + 9\text{hrs} + 9\text{hrs} + 9\text{hrs} + 9\text{hrs} + 5\text{hrs}) = 50 \text{ hrs}$$

$$\text{Time allowed} = \text{Total units produced/No. of units allotted per hour}$$

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

$$= 60 \text{ hours}$$

$$\therefore \text{Time saved} = \text{Time allowed} - \text{Time taken}$$

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

$$= 10 \text{ hrs}$$

$$\therefore \text{Bonus} = 40 \% \text{ of the time saved}$$

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

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

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

$$\text{Total Earnings (wages)} = (\text{H.W} \times \text{R.P.H}) + 40\% (\text{T.S} \times \text{R.P.H})$$

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

$$= 25 + 2$$

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

$$\text{Effective rate of earnings per hour} = \text{Total earnings}/\text{Hours worked}$$

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

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

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

\therefore Bonus payable on 160 units

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

$$= \text{Rs.15} + \frac{60 \text{ units}}{100 \text{ units}} \times 15 \\ = \text{Rs.24/-}$$

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$$\text{c) Total wages} = \text{Rs.50} \text{ (Given)} + \text{Rs.24} \text{ (Bonus)} \\ = \text{Rs.74/-}$$

$$\text{d) Total wages under piece rate basis} = (\text{No. of pieces produced} \times \text{Rate per piece}) \\ = 800 \text{ units} \times \text{Rs. 0.078125} \\ = \text{Rs. 62.5}$$

e) Calculation of time saved

1. Time allowed (standard) (800 units/ 80 units) = 10 hrs
2. Time taken = 8 hrs
3. Time saved = 2 hrs (1 - 2)

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

g) Total Earnings under Rowan premium system

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

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

Standard time (S) = 90 hours.

Rate per hour (R) = 50

Given effective rate of earnings = 60

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

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

We know that

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

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

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

$$18 = 90 - T$$

$$T = 90 - 18 = 72$$

Halsey 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:

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

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

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

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

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 :

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

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

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) <small>Act</small>
Earnings (₹)	57.27	90.00	112.50

(23 units × ₹ 2.49) (24 units × ₹ 3.75) (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	79.20	108 or 117
	(23 units × ₹ 3.30)	(24 units × ₹ 3.30)	(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

$$\text{Bonus : } = \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Hourly rate}$$

$$= \frac{30 \text{ hours}}{150 \text{ hours}} \times 120 \text{ hours} \times ₹10 \quad \underline{\underline{240}}$$

Total Wages	1,890
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(ii) Emerson'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

$$* \text{Efficiency} = \frac{\text{Time Allowed}}{\text{Time Taken}} \times 100 = \frac{150}{120} \times 100 = 125 \%$$

Rate of Bonus up to 100%	=	20%
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From 101% to 125%	=	25%
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		45%
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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:

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

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

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

(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

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

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

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

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

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

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

Substitute $y = 20$ in - 1

$$\begin{array}{rcl}
 x + 84y + 600 & = 7280 \\
 x + 84(20) + 600 & = 7280 \\
 x & = 7280 - 2280 \\
 x & = \text{Rs.}5000
 \end{array}$$

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
Normal days						
- 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
Holiday & Sunday						
- Tuesday	9.5	6.0	4.5	6.0	-	-
- Sunday	-	-	5.5	6.0	8.5	6.0
Total Hours	58.0	17.5	62.5	18.0	70.0	21.0

* 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
Total	3,531.25	400.00	3,931.25

(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

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

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

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

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

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

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

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

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

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

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

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

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

PROBLEM NO:20

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

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

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

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

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

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

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

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 = $(10,000 \text{ tonnes} \times 20 \text{ days}) / 25 \text{ days} = 8,000 \text{ tonnes}$

Actual output = 11,000 tonnes

Excess output = $(11,000 \text{ tonnes} - 8,000 \text{ tonnes}) = 3,000 \text{ tonnes}$

% of excess output = $3,000 \text{ tonnes} / 8,000 \text{ tonnes} = 37.5\%$

Group bonus = $3,000 \times 10 = \text{Rs.}30,000/-$

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

Particulars	Direct labour (Rs.)	Inspection staff (Rs.)	Maintenance staff (Rs.)	Supervisor (Rs.)
a. Group Bonus $30,000 \times (70\%: 10\%: 12\%: 8\%)$	21,000	3,000	3,600	2,400
b. Bonus to direct labour $(3,000 \text{ tonne} \times (17.5/37.5) \times \text{Rs.}5$	7,000	-	-	-
c. Penalty to IS staff $(11,000 \times 1\% - 200 \text{ tonnes}) \times \text{Rs.}20$	-	(1,800)	-	-
d. Penalty to maintenance $(40 \text{ hours} \times \text{Rs.}20)$	-	-	(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 = $(5,000/10,000) \times 100 = 50\%$ 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	$(3000 \times 50\%) 1500$	4,500	$(4500 / 40\text{hrs}) 112.5$
B	4800	$(4800 \times 50\%) 2400$	7,200	$(7200 / 60\text{hrs}) 120$
C	2200	$(2200 \times 50\%) 1100$	3,300	$(3300 / 44\text{hrs}) 75$

THE END

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To **MASTER MINDS**, Guntur