

3. EMPLOYEE COST AND DIRECT EXPENSES

ASSIGNMENT SOLUTIONS

PROBLEM NO:1

1. Statement showing calculation of remuneration

Particulars	Rs.
(a) Basic payment (7,000x12)	84,000
(b) Dearness allowances (1,000x12)	<u>12,000</u>
(c) Salary + D.A.	96,000
(d) Bonus (96,000x10%)	9,600
(e) Other allowances (1,500x12)	<u>18,000</u>
	1,23,600
(f) Employee contribution	<u>4,800</u>
Total	<u>1,28,400 (A)</u>
Hours (2,000 – 200) = 1800 h (B)	
Earning per hour A/B = 1,28,400 / 1,800 = 71.33	

PROBLEM NO:2

1. Statement showing effective hourly cost

Particulars	Rs.
Salary (200x12)	2,400
Dearness Allowances (Rs.100 → 400) (1,000x12) (Rs.100 → 100)	<u>6,000</u>
Salary + D.A.	8,400
Employer contribution to prided fund (8,400x5%)	420
Employer Contribution to E.S.I (8,400 x10%)	840
Bonus (8,400x10%)	840
Other allowances (given)	<u>10,000</u>
Total Earnings	<u>20,500 (A)</u>
Productive hours (Total hours – Un productive) (2,500 – 100) = 2,400 (B)	
Effective hourly cost A/B = 20,500 / 2,400 = 8.5416	

2. Statement showing sale value of the job:-

Particulars	Rs.
Direct material (DM = DL)	154
Direct wages (18hx8.5416)	154
Direct expenses	Nil
Prime cost	308
(+) Overheads @ 150% (308)	<u>462</u>

Total Cost	770
(+) Profit ($\frac{1}{5}$ on sale (or) $\frac{1}{4}$ on cost)	<u>193</u>
Sales	<u>963</u> $\left(770 \times \frac{5}{4}\right)$

Note:- Earning = Gross wages + Employer Contribution

(or)

= Net wages + Employees Contribution + Employer contribution

Net wages = Gross Wages – Employer Contribution

PROBLEM NO: 3

Calculation of Earnings of A & B for a month

Particulars	A (Rs.)	B (Rs.)
Basic wages	100	160
Dearness Allowance	(100x50%) 50	(160x 50%) 80
Contribution to provident fund	(150x10%) 15	(240x10%) 24
Contribution to Employee state insurance	(150x4.75%) 7.125	(240x4.75%) 11.4
Total	172.125	275.4

Calculation of overtime wages:

A = (Rs.150/200hrs) x 10hrs x 200% = Rs.15/-

Apportionment of worker A & worker B to different jobs like X, Y, Z.

Particulars	Job-X (Rs.)	Job-Y (Rs.)	Job-Z (Rs.)
Worker A	68.85	51.6375	51.6375
Worker B	137.7	55.08	82.62
Overtime	-	15	-
Total	206.55	121.7175	134.2575

PROBLEM NO: 4

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 units/10 units = 60 hours

∴ Time saved = Time allowed - Time taken

= 60 hrs. - 50 hrs. = 10 hrs.

∴ Bonus = 40 % of the time saved

= 40% x Time saved x rate per hour

= 40% x 10 hrs. x 0.5 per hour

= Rs.2

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

= (50 hrs. x 0.5) + 40% (10 hrs. x 0.5)

= 25 + 2 = Rs.27

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

= Rs.27/50hrs. = Rs. 0.54 per hour

PROBLEM NO: 5

- i) Effective hourly rate of earnings under Rowan Incentive Plan:

Earnings under Rowan Incentive plan =

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

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

$$= \text{Rs.600} + \text{Rs.100} = \text{Rs.700}$$

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

- ii) Let time taken = X

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

Or, Effective hourly rate under Rowan Incentive plan

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

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

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

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

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

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

PROBLEM NO: 6

- i) Computation of wages of each worker under guaranteed hourly rate basis.

Worker	All Worked	Hourly Wages Rate	Wages
I	250	10	2,500
II	150	30	4,500
III	300	40	12,000

- ii) Computation of wages of each worker under price work earning basis.

Pro	Rate		Worker I	Worker II	Worker III
A	20	450	9,100	—	100
B	30	700	21,000	—	1,000
C	40	300	12,000	500	—
			<u>42,100</u>	<u>20,000</u>	<u>32,000</u>

Since each worker earnings are more than 50% of basic pay. Therefore worker I. II. III will be paid the wages as computed i.e. 42,100, 20,000, 32,000

Working Notes:-

1. Product	standard time p.u`.	piece rate each min	rate
A	10	2	20
B	15	2	30
C	20	2	40

2. To the allowed to each worker:-

Worker	A	B	C	Total Hours
I	455x10=4,550	700x30=21,000	300x20=6,00	= $\frac{31,550}{60} = 526$
II	-	-	500x15=7,500	= $\frac{7,500}{60} = 125$
III	100x10=1,000	1,000x30=30,000	-	= $\frac{31,000}{60} = 517$

iii) Computation of wages of each worker under premium bonus basis. (Where each worker receives bonus based on down scheme)

Worker	Time allowed	Time taken	Save	Wages	Earnings	Bonus
I	526	250	276	10	2,500	1,311
II	125	150	-	30	4,500	Nil
III	517	300	217	40	<u>12,000</u>	5,036
				<u>19,000</u>		

Total Earnings = Earning + Bonus

$$I = 2,500 + 1,311 = 3,811$$

$$II = 4,500 + Nil = 4,500$$

$$III = 12,000 + 5,036 = 17,036$$

Bonus:- $\frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Wage Rate}$

$$\text{Worker - I} = \frac{250}{526} \times 276 \times 10 = 1,311$$

$$\text{Worker - II} = Nil$$

$$\text{Worker - III} = \frac{300}{517} \times 217 \times 40 = 5,036$$

PROBLEM NO:7

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

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

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

$$\text{Or, Time saved} = \frac{1500}{150} = 10 \text{ hours}$$

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

Effective Hourly Rate under Halsey System:

Time saved = 10 hours

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

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

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

Working Note:

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

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

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

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

PROBLEM NO: 8

Increase in hourly rate of wages under Rowan Plan is Rs.10 i.e.(Rs. 60 - Rs. 50)

This is Equal to $\frac{\text{Time saved}}{\text{Time allowed}} \times \text{Rate per hour}$ (Please refer Working Note)

$$\text{Or, } \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Rs.50} = \text{Rs.10}$$

$$\text{Or, } \frac{\text{Time saved}}{90\text{hours}} \times \text{Rs.50} = \text{Rs.10}$$

Therefore, Time Saved = 18 hours and Time Taken is 72 hours i.e. (90 hours - 18 hours)

Effective Hourly Rate under Halsey System:

Time saved = 18 hours

Bonus @ 40% = 18 hours × 40% × Rs. 50 = Rs. 360

Total Wages = (Rs.50 × 72 hours + Rs.360) = Rs. 3,960

Effective Hourly Rate = Rs. 3,960 ÷ 72 hours = Rs. 55

Working Note:

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

$$\text{Or, Rs.60} = \frac{\text{Time Taken} \times \text{Rate per hour}}{\text{Time Taken}} + \frac{\frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Rate per hour}}{\text{Time Taken}}$$

$$\text{Or, Rs.60} = \frac{\text{Time Taken} \times \text{Rate per hour}}{\text{Time Taken}} = \frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Rate per hour} \times \frac{1}{\text{Time Taken}}$$

$$\text{Or, Rs.60} - 50 = \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Rs.50}$$

PROBLEM NO: 9

Given Data

Rate per hour (R.P.H) = Rs.60

Time allowed (T.A) = 8 Hours

Time Taken (H.W) = 6 Hours

Time Saved (T.S) = 2 Hours

Earnings of a worker under Halsey system = (H.W × R.P.H) + (½) (T.S × R.P.H)

$$= (6 \text{ hrs} \times \text{Rs.60}) + (\frac{1}{2}) (2 \text{ hrs} \times \text{Rs. 60})$$

$$= 360 + 60 = \text{Rs.420/-}$$

Earnings of a worker under Rowan scheme = (H.W × R.P.H) + (T.S/T.A) (H.W × R.P.H)

$$= (6 \text{ hrs} \times \text{Rs. } 60) + \left(\frac{2 \text{ hours}}{8 \text{ hours}}\right)(6 \text{ hours} \times \text{Rs. } 60)$$

$$= 360 + 90 = \text{Rs. } 450/-$$

Note:

H.W = Hours worked

R.P.H = Rate per Hour

T.S = Time Saved

PROBLEM NO: 10

Standard time (ST) = 20 hours
 Actual time (AT) = 15 hours
 Time saved (TS) = Standard time - Actual time
 = 20 - 15 = 5 hours

Rate per hour = Rs.5
 Earnings as per Rowan plan = Wages + Bonus
 = Time taken x Rate per hour + $\left(\frac{T.S}{S.T} \times TT \times RPH\right)$
 = $15 \times 5 + \frac{5}{20} \times 15 \times 5$
 = 75 + 18.75 = Rs. 93.75

Earnings as per Halsey plan = Wages + Bonus
 = Time taken x Rate per hour + $\left(\frac{1}{2} \times TS \times RPH\right)$
 = $15 \times 5 + \frac{1}{2} \times 5 \times 5$
 = 75 + 12.5 = Rs.87.5

Statement showing Factory cost

Particulars	Rowan plan	Halsey plan
Direct Material	Rs.50	Rs.50
Direct Wages	Rs.93.75	Rs.87.5
Direct Expenses	Nil	Nil
Prime cost	Rs.143.75	Rs.137.5
Add: Factory overheads @100% on direct wages	Rs.93.75	Rs.87.5
Factory cost	237.5	225

PROBLEM NO: 11

Statement showing profit / loss per week.

Particulars	Time Wages	Halsay	Rowan
Actual production	19,200	19,200	19,200
Sales (units x S.P)	2,88,000 (19,200x15)	2,88,000 (19,200x15)	2,88,000 (19,200x15)
Direct Material cost	(1,72,800)	(1,72,800)	(1,72,800)
Wages (W.N.1)	(24,602)	(16,321)	(17,472)
Variable cost (actual hours x 80%)	2194 (2743*80%)	1536 (1920*-80%)	1536 (1920*-80%)
Fixed cost	(10,000)	(10,000)	(10,000)
Profit / Loss	78,404	87,343	86,192

Increase in profit		8,939	7,788
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Working Notes:-

Time wages:-

$$\text{Normal Wages rate p.h.} = \frac{210}{30\text{h}} = \text{Rs.}7$$

$$\begin{aligned} \text{Overtime wage rate p.h.} &= \text{Normal wage rate} + \text{overtime premium} \\ &= 7 + (7 \times 50\%) = 7 + 3.5 = 10.5 \end{aligned}$$

Actual Time	2,743 h (1h → 70) (? ← 19,200)
(-) Normal Time	(1,200)h (30*40)
overtime	1,543h

$$\begin{aligned} \text{Total wages} &= \text{Actual Time} + \text{Rate} + \text{Bonus} \\ &= 24(1,200 \times 7) + (1,543 \times 10.5) \\ &= 8,400 + 16,202 = 24,602 \end{aligned}$$

standard time for actual production	2,743h
Actual Time	(1,920h) (19200/10)
overtime	823h

Halsay :-

$$\begin{aligned} \text{Total wages} &= \text{wages} + \text{bonus} \\ &= (1,920 \times 7) + 823 \times \frac{1}{2} \times 7 \\ &= 13,440 + 2880.5 \\ &= 16,321 \end{aligned}$$

Rowan:-

$$\begin{aligned} \text{Total wages} &= \text{wages} + \text{Bonus} \\ &= (1,920 \times 7) + \frac{823}{2743} \times 1,920 \times 7 \\ &= 13,440 + 4,032 \\ &= 17,472 \end{aligned}$$

PROBLEM NO: 12

Time Allowed = 150 hours

Time Taken = 120 hours

Time Saved = 30 hours

i) Rowan Premium Plan

Particulars	Amt.
Normal wages (Rs.10 x 120 hours)	1,200

D.A. for 15 days i.e. $\left[\frac{120 \text{ hours}}{8 \text{ hours}} (\text{Rs.} 30 \times 15 \text{ days}) \right]$	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

(Rs.)

Normal wages (Rs.10 x 120 hours) 1,200

D.A. for 15 days i.e. $\left[\frac{120 \text{ hours}}{8 \text{ hours}} (\text{Rs.} 30 \times 15 \text{ days}) \right]$ 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 Efficiency Plan

Particulars	Amt.
Normal wages (120 hours × Rs.10)	1,200
D.A. (15 days × Rs.30)	450
Bonus * = 45% × Rs.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%

From 101% to 125% = 25%= 45%**PROBLEM NO: 13**

i) Earnings as per Differential piece rate :

Wages = Actual Output x Differential piece rate per unit

Wages = 120 pieces x (120% of Rs. 4) = 120 x Rs. 4.8 = Rs. 576/-

ii) Halsey premium scheme :

Standard Time for Actual Production $\left(\frac{45 \text{ hours}}{100 \text{ units}} \times 120 \text{ units} \right) = 54 \text{ hours}$

Actual time worked = 45 hrs.

Time Saved = Standard time for Actual Production - Actual Time Worked = 54 - 45 = 9 hrs.

Wages = 45 x 8 + 50% x 9 hrs. x 8 = Rs. 396

PROBLEM NO: 14

Working notes:

1. Computation of time saved (in hours) per month:

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

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

$$\begin{aligned}
 \text{Time saved (Refer to working note 1)} & = 2,487 \text{ hours} \\
 \text{Wage rate per hour} & = \text{Rs. } 30 \\
 \text{Bonus under Halsey Scheme (With 50% bonus)} & = \frac{1}{2} \times 2,487 \text{ hours} \times \text{Rs. } 30 = \text{Rs. } 37,305 \\
 \text{Bonus under Rowan Scheme} & = \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour} \\
 & = \frac{2,487 \text{ hours}}{12,087 \text{ hours}} \times 9,600 \text{ hours} \times \text{Rs. } 30 \\
 & = \text{Rs. } 59,258.38
 \end{aligned}$$

a) Computation of effective rate of earnings under the Halsey and Rowan scheme:

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

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

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

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

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

$$\text{Effective rate of earnings per hour (under Rowan Plan)} = \frac{\text{Rs. } 3,47,258.38}{9600 \text{ hours}} = \text{Rs. } 36.17$$

b) Savings to the ZED Ltd., in terms of direct labour cost per piece: (Rs.)Direct labour cost (per unit) under time wages system (1.975 hours per unit \times Rs.30) 59.25Direct labour cost (per unit) under Halsey Plan $\left(\frac{\text{Rs. } 3,25,305}{6,120 \text{ units}} \right)$ 53.15Direct labour cost (per unit) under Rowan Plan $\left(\frac{\text{Rs. } 3,47,258.38}{6,120 \text{ units}} \right)$ 56.74**Saving of direct labour cost under:**

Halsey Plan (RS. 59.25 - RS.53.15) RS.6.10

Rowan Plan (RS. 59.25 - RS.56.74) RS.2.51

c) 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 Rs. 2,88,000 but the other scheme i.e. Rowan scheme fulfils the promise of 20% increase over the present earnings of Rs. 2,88,000 by paying 20.58% in the form of bonus. Hence Rowan Plan may be adopted.

PROBLEM NO: 15

Let 'y' be the wage rate per hour

Let 'x' be the cost of materials

Earnings

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

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

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

$$\begin{array}{r} x + 84y + 600 = 7280 \quad - \quad 1 \\ x + 90y + 800 = 7600 \quad - \quad 2 \\ \hline (-) \quad (-) \quad (-) \quad (-) \\ -6y \quad -200 = -320 \\ -6y = -320 + 200 \\ -6y = -120 \\ y = \text{Rs.}20 \end{array}$$

Substitute y = 20 in Equation - 1

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

Cost of Materials = Rs.5000

Wage rate per hour = Rs.20

PROBLEM NO: 16

Calculation of:

1. Time saved and wages:

Workmen	A	B
Standard time (hrs.)	40	40
Actual time taken (hrs.)	32	30
Time saved (hrs.)	8	10
Wages paid @ Rs. x per hr. (Rs.)	32x	30x

2. Bonus Plan:

Particulars	Halsey	Rowan
Time saved (hrs.)	8	10
Bonus (Rs.)	$4x \left(\frac{8 \text{ hrs.} \times \text{Rs.} x}{2} \right)$	$7.5x \left(\frac{10 \text{ hrs.}}{40 \text{ hrs.}} \times 30 \text{ hrs.} \times \text{Rs.} x \right)$

3. Total wages:

$$\text{Workman A: } 32x + 4x = \text{Rs.}36x$$

$$\text{Workman B: } 30x + 7.5x = \text{Rs.}37.5x$$

Statement of factory cost of the job

Workmen	A	B
Material cost (assumed)	y	y

Wages (shown above)	36x	37.5x
Works overhead	240	225
Factory cost (given)	2,600	2,600

The above relations can be written as follows:

$$36x + y + 240 = 2,600$$

$$37.5x + y + 225 = 2,600$$

Subtracting (i) from (ii) we get

$$1.5x - 15 = 0$$

$$\text{Or, } 1.5x = 15$$

$$\text{Or, } x = \text{Rs.10 per hour}$$

On substituting the value of x in (i) we get y = Rs.2,000

Hence the wage rate per hour is Rs.10 and the cost of raw material is Rs.2,000 on the job.

PROBLEM NO: 17

Statement showing earnings and earning p/h:

Particulars	X	Y	Z
Standard time(ST)	100h	100h	100h
Actual time(AT)	50h	60h	70h
Time saved (ST – AT)	50h	40h	30h
Rate p/h		2	2
% of time saved $\left(\frac{T.S}{ST} \times 100\right)$	$50\% \left(\frac{50}{100} \times 100\right)$	$40\% \left(\frac{40}{100} \times 100\right)$	$30\% \left(\frac{30}{100} \times 100\right)$
Wage Rate (T x R)	100 (50*2)	120 (60*2)	140 (70*2)
Bonus hours / rate	13 $\left(\begin{array}{l} 5\% \times 10h \\ 10\% \times 10h \\ 20\% \times 15\% \\ 10\% \times 20\% \end{array}\right) \times 2$	9 $\left(\begin{array}{l} 10\% \times 5\% \\ 10\% \times 10\% \\ 20\% \times 15\% \end{array}\right) \times 2$	6 $\left(\begin{array}{l} 10\% \times 5\% \\ 10\% \times 10\% \\ 10\% \times 15\% \end{array}\right) \times 2$
Total	113	129	146
Earnings p/h	$2.26 \left(\frac{113}{50}\right)$	$2.15 \left(\frac{129}{60}\right)$	$2.08 \left(\frac{146}{70}\right)$

PROBLEM NO: 18

i) Statement showing annual cost of each employee

Particulars	Rs.
Salary (37,500x12)	4,50,000
Bonus (4,50,000x10%)	45,000
Employer contribution to PF and AI (4,50,000x5%)	22,500
Employees welfare exp. $\left(\frac{76,600}{250} \right)$	306
Annual cost of each worker	5,17,806

$$\text{ii) Employee cost p/h} = \frac{\text{Employee Cost}}{\text{Effective Hours}} = \frac{5,17,806}{2,270} = 228.11$$

Effective hours	

Effective hours = 3,105

(-) Leave (25)

290 Expected no of days to work

Total hours (290x8) = 2,320h

(-) Normal idle time = (50)

Effective Hours 2,270h

iii) Cost of abnormal idle time =

= Abnormal Idle Time x Cost p/h

= 70h x 228.11

= 15,968

PROBLEM NO: 19

Labour turnover rate:

It comprises of computation of labour turnover by using following methods:

i) Separation Method:

$$= \left(\frac{\text{No. of workers left} + \text{No. of workers discharged}}{\text{Average number of workers}} \times 100 \right)$$

$$= \left(\frac{(80 + 320)}{(7,600 + 8,400) \div 2} \right) \times 100 = \frac{400}{8,000} \times 100 = 5\%$$

ii) Replacement Method:

$$= \left(\frac{\text{No. of workers replaced}}{\text{Average number of workers}} \times 100 \right) = \frac{300}{8,000} \times 100 = 3.75\%$$

iii) **New Recruitment:**

$$= \left(\frac{\text{No. of workers newly recruited}}{\text{Average number of workers}} \times 100 \right)$$

$$= \left(\frac{\text{No. Recruitments} - \text{No. of Replacements}}{\text{Average number of workers}} \times 100 \right)$$

$$= \left(\frac{1,500 - 300}{8,000} \times 100 \right) = \frac{1,200}{8,000} \times 100 = 15\%$$

iv) **Flux Method:**

$$= \left(\frac{\text{No. of separations} + \text{No. of accessions}}{\text{Average number of workers}} \times 100 \right)$$

$$= \frac{(400 + 1500)}{(7,600 + 8,400) \div 2} \times 100 = \frac{1,900}{8,000} \times 100 = 23.75\%$$

PROBLEM NO: 20

$$\text{Labour Turnover Rate (Replacement method)} = \frac{\text{No. of workers replaced}}{\text{Average no. of workers}} \times 100$$

$$\text{Or, } \frac{10}{100} = \frac{50}{\text{Average no. of workers}}$$

Thus, Average No. of workers = 500

$$\text{Labour Turnover Rate (Separation method)} = \frac{\text{No. of workers separated}}{\text{Average no. of workers}} \times 100$$

$$\frac{5}{100} = \frac{\text{Number of workers separated}}{500}$$

Thus, No. of workers separated = 25

Labour Turnover Rate (Flux Method)

$$= \frac{\text{No. of Separations} + \text{No. of Accession (Joinings)}}{\text{Average no. of workers}} \times 100$$

$$\text{Or, } \frac{20}{100} = \frac{25 + \text{No. of Accession (Joinings)}}{500} \times 100$$

$$100 (25 + \text{No. of Accessions}) = 10,000$$

$$25 + \text{No. of Accessions} = 100$$

$$\text{Thus, No. of Accessions} = 100 - 25 = 75$$

Accordingly,

(i) Workers recruited and Joined = 75

(ii) Workers left and discharged = 25

(iii) Average number of workers on roll = 500

PROBLEM NO: 21

Total hours worked = 4,45,000h

Un productive hours = (5,000)

Productive hours = 4,40,000h

Productive hours lost due to labor turnover = 50,000h

Sales lost due to labour turnover = 6,02,273

$$\left(\begin{array}{l} 4,40,000 \rightarrow 53,00,000 \\ 50,000 \rightarrow ? \end{array} \right)$$

Contribution lost = sales cost x p/v ratio
 = 6,02,273 x 30%
 = 1,80,682

Statement showing profit forgone due to labour turnover:-

Particulars	Rs.
Contributions Cost	1,80,682
Settlement Cost due to leaving	50,000
Recruitment Cost	35,000
Selection Cost	10,000
Training Cost	<u>5,000</u>
	<u>2,80,682</u>

PROBLEM NO: 22

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

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

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

Total loss of output = Due to delay recruitment + Due to inexperience = 10,000 + 2,000 = 12,000 units

Contribution per unit = 20% of Rs.180 = Rs. 36

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

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

Profit forgone due to labour turnover

Particulars	Amount (Rs.)
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

THE END