3. EMPLOYEE COST

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

Particulars	Amount (Rs.)
Wages paid to worker during the year{(Rs.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 per hour

PROBLEM NO: 2

Particulars	Amount (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 $\left(\frac{(785-100)\times 0.80}{100}\times\frac{1}{25}\right)$	21.92
	101.92
c) Leave salary - 10% of (a) and (b) $\left(\frac{101.92\times 10}{100}\right)$	10.19
	112.11
d) Employers contribution to provident fund 10% of (a) ,(b) and (c) $\left(\frac{112.11\times 10}{100}\right)$	11.21
e) Employers contribution to state insurance 2.5% of (a), (b) and (c) $\left(\frac{112.11\times 2.5}{100}\right)$	2.80
f) Amenities to labour @ Rs.30 per head per month of 25 working days $\left(\frac{Rs.30}{25\ days}\right)$	1.20
TOTAL	**127.32**

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

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

Earnings under Rowan Incentive plan =

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

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

= Rs.600 + Rs.100 = Rs.700

Effective hourly rate = Rs.700/5 hours = Rs.140 /hour

ii) Let time taken = X

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

Or, Effective hourly rate under Rowan Incentive plan =

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

$$0\text{r, Rs.}140 = \frac{(X \times \text{Rs.}120) + 50\% \text{ Rs.}120 \times (6 - X)}{X}$$

Or, 140X = 120X + 360 - 60X

Or, 80X = 360

Or, X = 360/80 = 4.5 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: 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 units/10 units = 60 hours

$\therefore$ Time saved = Time allowed - Time taken

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

$\therefore$ 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: 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

Bonus payable = 100 units + 60 units

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

= Rs.24/-

c) Total wages = Rs.50 (Given) + Rs.24 (Bonus) = Rs.74/-

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

= 800 units x Rs. 0.078125 = 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 x R.P.H) + (½) (T.S x R.P.H)

= (8 hrs x Rs 6.25) + (½) (2 x 6.25) = Rs.56.25

g) Total Earnings under Rowan premium system = (H.W x R.P.H) + (T.S/T.A) (H.W x R.P.H)

$$= (8\ hrs \times Rs.6.25) + \frac{2\,hours}{10\,hours}\ (8\ hours \times Rs.\ 6.25)$$

= Rs.60/-

Note: Piece rate per piece

$$= \frac{Wage\ for\ a\ definite\ period}{Standard\ output\ for\ the\ same\ definite\ period}$$

$$= \frac{Rs.50(8hrs)}{640units(8hrs)}$$

= Rs.0.078125

PROBLEM NO: 7

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

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

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

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

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:

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

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

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

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

PROBLEM NO: 8

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

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

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

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

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

Effective Hourly Rate under Halsey System:

Time saved = 10 hours

Bonus @ 50% = 10 hours × 50% × Rs.150 = Rs.750

Total Wages = (Rs.150 × 40 hours + Rs.750) = Rs.6,750

Effective Hourly Rate = Rs.6,750 ÷ 40 hours = Rs.168.75

Working Note:

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

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

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

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

PROBLEM NO: 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 x R.P.H) + (½) (T.S x R.P.H)

= (6 hrs x Rs.60) + (½) (2 hrs x Rs. 60)

= 360 + 60 = Rs.420/-

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

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

= 360 + 90 = 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

$= \text{Time taken x Rate per hour} + \left(\frac{T.S}{S.T} \times TT \times RPH\right)$

$= 15 \text{ x } 5 + \frac{5}{20} \text{ x } 15 \text{ x } 5$

= 75 + 18.75 = Rs.93.75

Earnings as per Halsey plan = Wages + Bonus

$= \text{Time taken} \times \text{Rate per hour} + \left(\frac{1}{2} \times TS \times RPH\right)$

$= 15 \text{x} 5 + \frac{1}{2} \text{x } 5 \text{x } 5$

= 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

Calculation of bonus and total earnings under Emerson Efficiency System

Particulars	Worker A	Worker B	Worker C
Standard output in units	40	40	40
Actual output in units	25	40	45
Efficiency level (%) $\left(\frac{\text{Actual output}}{\text{Standard output}} \text{x} 100\right)$	62.5%	100%	112.50%
Time wages per day (Rs.)	500	500	500
Rate of bonus	No bonus	20% of time rate	32.50% (20% + 12.5%)

Bonus earnings (Rs.)	Nil	100 (20% of Rs. 500)	162.5 (32.5% of Rs. 500)
Total earnings (Rs.)	**500**	**600**	**662.5**

PROBLEM NO: 12

Actual output = 37 units

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

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 x Rs.3.32	= Rs.122.84

PROBLEM NO: 13

Efficiency (%) = (264 units/240 units) x 100 = 110%

As per Emerson efficiency plan, in case of above 100% efficiency, bonus of 20% of basic wages plus 1% for each 1% increase in efficiency is admissible.

So, new bonus percentage = 20 + (110 - 100) = 30

Amount of Bonus = $\frac{30}{100}$ (Hours worked x Rate per hour)

= $\frac{30}{100}$ x 10 hours x Rs.10 = Rs.30

Total wages = (10 hours x Rs.10) + Rs.30 = Rs.130

PROBLEM NO: 14

Earnings under Taylors 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 (%) $\left[\frac{\text{Actual output}}{\text{Standard output}} \times 100\right]$	95.83% $\left[\frac{23\text{ units}}{24\text{ units}} \times 100\right]$	100 $\left[\frac{24\text{ units}}{24\text{ units}} \times 100\right]$	125% $\left[\frac{30\text{ units}}{24\text{ units}} \times 100\right]$
* Earning rate per unit	83% of the piece rate	125% of the piece rate	125% of the piece rate
Earning rate per unit (Rs.)	2.49	3.75	3.75
(Refer to working note)	(83% of Rs.3)	(125% of Rs.3)	(125% of Rs.3)
Earnings (Rs.)	57.27 (23 units × Rs.2.49)	90.00 (24 units × Rs.3.75)	112.50 (30 units × Rs.3.75)

* Under Taylor's Differential price rate system, two widely differing price rates are prescribed for each job. The lower rate is 83% of the normal piece rate and is applicable if efficiency of the worker is below 100%.

The higher piece rate is 125% of the normal piece rate and is applicable if work completed is at efficiency level of 100% and above.

Working Note:

Normal rate per hour = Rs.9.00

$$\text{Normal rate per unit} = \frac{\text{Rs.9.00}}{\text{Standard production per hour}} = \frac{\text{Rs.9.00}}{\text{3 units}} = \text{Rs.3}$$

Earnings under Merrick differential piece rate system:

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

PROBLEM NO: 15

Time Allowed = 150 hours

Time Taken = 120 hours

Time Saved = 30 hours

i)	Rowan Premium Plan	**(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	Rs.
	Normal wages (120 hours × Rs.10)	1,200
	D.A. (15 days x 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: 16

Calculation of effective wages rate and weekly earnings of the workers A, B and C

Workers	A	B	C
Standard Output	96 units (8 hrs. × 2 units × 6 days)	96 units (8 hrs. × 2 units × 6 days)	96 units (8 hrs. × 2 units × 6 days)
Actual Output	132 units	108 units	96 units

Efficiency (%)	$\frac{132 \text{ units}}{96 \text{ units}}$ x 100 = 137.5	$\frac{108 \text{ units}}{96 \text{ units}}$ x 100 = 112.5	$\frac{96 \text{ units}}{96 \text{ units}}$ x 100 = 100
Daily wages Rate	Rs. 360	Rs. 360	Rs. 360
Incentive system	Emerson's Efficiency System	Merrick differential piece rate system	Taylor's differential piece work system
Rate of Bonus	57.5% of time rate (20% + 37.5%)	20% of ordinary piece rate	25% of ordinary piece
Effective Wage Rate	Rs. 70.875 per hour $\left(\frac{Rs.360}{8 \text{ hours}} \times 157.5\%\right)$	Rs. 27 per piece $\left(\frac{Rs.360}{16 \text{ units}} \times 120\%\right)$	Rs. 28.125 per piece $\left(\frac{Rs.360}{16 \text{ units}} \times 125\%\right)$
Total weekly earnings	Rs. 3,402 (8 hours × 6 days × Rs.70.875)	Rs. 2,916 (108 units × Rs. 27)	Rs. 2,700 (96 units × Rs. 28.125)

PROBLEM NO: 17

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 $\left(\frac{45 \text{ hours}}{100 \text{ units}} \text{ x } 120 \text{ units}\right)$ = 54 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: 18

Given Rate per hour = Rs. 0.4,

Piece rate = Rs. 0.3,

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	$0.25\left(\frac{12.45}{50}\right)$	$0.375\left(\frac{30}{80}\right)$	$0.3\left(\frac{15}{50}\right)$	$0.33\left(\frac{26.4}{80}\right)$	$0.32\left(\frac{16}{50}\right)$	$0.24\left(\frac{19.2}{80}\right)$

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

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

PROBLEM NO: 19

Working notes:

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

(Standard production time for 6,120 units) - (Actual time taken by the workers)

= (6,120 units × 1.975 hours) - (24 days × 8 hours per day × 50 skilled workers)

= (12,087 hours - 9,600 hours)

= 2,487 hours

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

Time saved (Refer to working note 1) = 2,487 hours

Wage rate per hour = Rs. 30

Bonus under Halsey Scheme (With 50% bonus) = ½ × 2,487 hours × Rs.30 = Rs.37,305

Bonus under Rowan Scheme $= \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour}$

$= \frac{2,487 \text{hours}}{12,087 \text{hours}} \times 9,600 \text{ hours} \times \text{Rs.30}$

= Rs.59,258.38

i) Computation of effective rate of earnings under the Halsey and Rowanscheme:

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

= Time wages + Bonus

= (24 days × 8 hours + 50 skilled workers ×Rs.30) + Rs.37,305

= Rs.2,88,000 +Rs.37,305 =Rs. 3,25,305

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

= Time wages + Bonus

= Rs.2,88,000 + Rs.59,258.38 =Rs.3,47,258.38

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

Effective rate of earnings per hour (under Rowan Plan) $= \frac{\text{Rs.3,47258.38}}{9600 \text{hours}} = \text{Rs.36.17}$

ii) 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 × Rs.30)	59.25
Direct labour cost (per unit) under Halsey Plan $\left(\frac{\text{Rs.3,25,305}}{6,120 \text{units}}\right)$	53.15
Direct 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

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 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: 20

Let 'y' be the wage rate per hour

Let 'x' be the cost of materials

Earnings

Under Halsey = (H.W x R.P.H) + (½) (T.S x R.P.H)

= (80hrs x y) + ½(20hrs × y) = 90y

Under Rowan = (H.W x R.P.H) + (T.S/T.A) (H.W x R.P.H)

= (60hrs x y) + (40/100) 60hrs x y = 84y

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 - 1

x + 90y + 800 = 7600 - 2

(-) (-) (-) (-)

- 6y - 200 = -320

- 6y = -320 + 200

-6y = -120

y = Rs.20

Substitute y = 20 in - 1

x + 84y + 600 = 7280

x + 84 (20) + 600 = 7280

x = 7280 - 2280

x = Rs.5000

Cost of Materials = Rs.5000]

Wage rate per hour = Rs.20

PROBLEM NO: 21

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.)	$4x\left(\frac{8\text{ hrs. x Rs. x}}{2}\right)$	$7.5x\left(\frac{10\text{ hrs.}}{40\text{ hrs.}}\text{ x 30 hrs. x Rs. x}\right)$

3. Total wages:

Workman A: 32x + 4x = Rs.36x

Workman B: 30x + 7.5x = 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

Or, 1.5 x = 15

Or, x = 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: 22

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	-	8.5	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 (Rs.)	Diet Allowance (Rs.)	Total (Rs.)
A	1,093.75 (Rs.62.50 × 17.5)	160.00 (Rs.80 × 2 days)	1,253.75
B	1,125.00 (Rs.62.50 × 18.0)	80.00 (Rs.80 × 1 day)	1,205.00
C	1,312.50 (Rs.62.50 × 21.0)	160.00 (Rs.80 × 2 days)	1,472.50
Total	3,531.25	400.00	3931.25

PROBLEM NO: 23

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:

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

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

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

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: 24

Labour Turnover Rate (Replacement method)

$$= \frac{\text{No. of worker s replaced}}{\text{Average No. of workers}} \text{ or, } \frac{8}{100} = \frac{36}{\text{Average No. of workers}}$$

Or, Average No. of workers = 450

Labour Turnover Rate (Separation method)

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

Or, No. of workers separated = 27

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

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

Or, 100 (27 + No. of Accessions) = 6,300

Or, No. of Accessions = 36

i) The No. of workers recruited and Joined = 36

ii) The No. of workers left and discharged = 27

PROBLEM NO: 25

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

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

PROBLEM NO: 26

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:

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: 27

Total wages on time basis:

Worker	(Rs.)
A(25 days × Rs. 800)	20,000
B (30 days × Rs.600)	18,000
C (40 days × Rs.500)	20,000
	58,000
Bonus (balancing figure)	14,500
Payment received for the task	72,500

The group bonus of Rs.14,500 is 25% (Rs.14,500/Rs.58,000 ×100) of total time wages, the bonus is to be distributed among the workers at the rate of 25% of their respective time wages.

Calculation of share of bonus and total earnings of each worker

Worker	Basic Wages (Rs.)	Share of bonus @25% (Rs.)	Total earnings (Rs.)
A	20,000	5,000 (25% of Rs.20,000)	25,000
B	18,000	4,500 (25% of Rs.18,000)	22,500
C	20,000	5,000 (25% of Rs.20,000)	25,000
Total	**58,000**	**14,500**	**72,500**

THE END