13. SERVICE COSTING

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

Absolute tonne km.: Weight in tonnes × Distance in km.

= From A to B + from B to C + from C to A

= (24 tonnes × 270 km.) + (14 tons × 150 km.) + (18 tonnes × 325 km.)

= 6,480 tonnes-km. + 2,100 tonnes-km. + 5,850 tonnes-km. = 14,430 tonnes-km.

Commercial Tonnes km.: = Average weight load × Total distance (km.) travelled

$$= \frac{24+14+18}{3} \text{ Tonnes} \times 745 \text{ km.} = 13{,}906.67 \text{ Tonnes km}$$

PROBLEM NO: 2

i) Calculation of Absolute Ton-km for the next month:

Journey	Distance in km (a)	Weight- Up (in MT) (b)	Ton-km (c) = (a) x (b)	Weight- Down (in MT) (d)	Ton-km (e) = (a) x (d)	Total (c) + (e)
Delhi to Kochi	2,700	14	37,800	6	16,200	54,000
Delhi to Guwahati	1,890	12	22,680	0	0	22,680
Delhi to Vijayawada	1,840	15	27,600	0	0	27,600
Delhi to Varanasi	815	10	8,150	0	0	8,150
Delhi to Asansol	1,280	12	15,360	4	5,120	20,480
Delhi to Chennai	2,185	10	21,850	8	17,480	39,330
Total	10,710	73	1,33,440	18	38,800	1,72,240

Total Ton-Km = 1,72,240 ton-km

ii) Calculation of cost per ton-km:

Particulars	Amount (Rs.)	Amount (Rs.)
A. Running cost:		
- Diesel Cost {Rs.13.75 × (10,710 × 2)}	2,94,525.00	
- Engine oil cost $\frac{\text{Rs. } 4{,}200}{13{,}000 \text{ km}}$ x 21,420 km	6,920.31	
- Cost of loading of goods {Rs.150 × (73+18)}	13,650.00	
- Depreciation $\frac{\text{Rs. } 20{,}00{,}000}{7{,}20{,}000 \text{ km}}$ x 21,420 km	59,500.00	3,74,595.31
B. Repairs & Maintenance Cost $\frac{\text{Rs. } 12{,}000}{10{,}000 \text{ km}}$ x 21,420 km		25,704
C. Standing Charges		
- Driver's salary (Rs.18,000 × 4 trucks)	72,000	
- Cleaner's salary (Rs.7,500 × 4 trucks)	30,000	
- Supervision and other general exp.	12,000	1,14,000
Total Cost (A + B + C)		5,14,299.31
Total ton-km		1,72,240
Cost per ton-km		2.99

PROBLEM NO: 3

Calculation of passenger kilometer:

= 6 buses x 25 days x 8 trips x 2 sides x 20 km. x 40 passengers x 80% = 15,36,000 passenger km.

PROBLEM NO: 4

Working notes:

W.N.1: Calculation of total kms. Traveled in a month

= 4 round trips x 2 sides x 20kms x 25 days = 4,000 kms per month

Statement showing monthly cost sheet:

Particulars	Amount (in Rs.)
Standing charges	
Insurance $\left[Rs.7,500 \times \frac{1}{12m}\right]$	625
Taxes $\left[Rs.1,800 \times \frac{1}{12m}\right]$	150
Garage rent	2,500
Depreciation $\left[\frac{Rs.4,50,000 - Rs.50,000}{10 Years} \times \frac{1}{12m}\right]$	3,333.33
Drivers Salary	3,000
Repairs and Maintenance charges	
Repairs cost $\left[Rs.12,000 \times \frac{1}{12m}\right]$	1,000
Running Charges	
Incidental Expenses	2,000
Petrol and Oil Cost $\left[\frac{Rs.4,000kms\,(W.N.1)}{100kms} \times Rs.220\right]$	8,800
(+) 10% on takings	2,854.444
Total Cost	24,262.774
(+) Profit (15% on takings) [28,544.44 x 15%]	4,281.666
Total Takings per month	28,544.44

Charge per round trip = $\frac{Rs.28,544.44}{100} = Rs.285.44$

Number of round trips in a month = 4 round trips per day x 25 days = 100

PROBLEM NO: 5

Operating Cost Sheet for the year 2013- 14

	Particulars	Total Cost (Rs.)
A.	Fixed Charges:	
	Garage rent (Rs.4,000 × 12 months)	48,000
	Salary of drivers (Rs.3,000 × 5 drivers ×12 months)	1,80,000
	Wages of Conductors (Rs.1,200 × 5 conductors × 12 months)	72,000
	Manager's salary (Rs. 7,500 × 12 months)	90,000
	Road Tax, Permit fee, etc. (Rs. 5,000 × 4 quarters)	20,000
	Office expenses (Rs. 2,000 × 12 months)	24,000
	Insurance (Rs. 6,50,000 × 5 buses × 3%)	97,500
	Total (A)	5,31,500
B.	Variable Charges:	
	Repairs and Maintenance (Rs. 22,500 × 5 buses)	1,12,500
	Depreciation (Rs. 6,50,000 × 5 buses × 15%)	4,87,500
	Diesel {(3,60,000 km. ÷ 6 km.) × Rs.33}	19,80,000
	Total (B)	25,80,000
	Total Cost (A+B)	31,11,500
	Add: 33 1/3 % Profit on takings or 50% on cost	15,55,750
	Total Takings (Total bus fare collection)	46,67,250
	Total Passenger-km. (Working Note 2)	1,15,20,000
	Bus fare to be charged from each passenger per km.	0.405

Working Notes:

1. Total Kilometres to be run during the year 2013-14

   = 40 km.× 2 sides × 3 trips × 25 days × 12 months × 5 buses = 3,60,000 Kilometres

2. Total passenger Kilometres = 3,60,000 km. × 40 passengers × 80% = 1,15,20,000 Passenger- km.

PROBLEM NO: 6

Working Notes:

i) Calculation of Depreciation of Bus (Per month)

$$= \frac{\text{Cost of the bus - Scrap value at the end of the 15 years}}{\text{Expected life of the bus}}$$

$$= \frac{18,00,000 - 1,20,000}{15 \text{ years}} = \text{Rs. } 1,12,000 \text{ p.a.}$$

$$\text{Depreciation per month} = \frac{\text{Rs. } 1,12,000}{12 \text{ months}} = \text{Rs. } 9,333.33$$

ii) Calculation of total distance travelled and Passenger-km. per month

Total distance = 3 trips × 2 × 20 km. × 25 days = 3,000 km.

Total Passenger-km. = 3 trips × 2 × 20 km. × 25 days × 40 passengers = 1,20,000 Passenger-km.

iii) Cost of Engine oil, Lubricants and Diesel & oil (Per month)

$$\text{Engine oil \& lubricants} = \frac{\text{Total distance travelled}}{1,200 \text{ Kms}} \times \text{Rs. } 2,500 = \frac{3,000 \text{ Kms}}{1,200 \text{ Kms}} \times \text{Rs. } 2,500 = \text{Rs. } 6,250$$

$$\text{Diesel and Oil} = \frac{\text{Total distance travelled}}{10 \text{ Kms}} \times \text{Rs. } 52 = \frac{3,000 \text{ Kms}}{10 \text{ Kms}} \times \text{Rs. } 52 = \text{Rs. } 15,600$$

Statement showing the Operating Cost per Passenger-km.

		(Rs.)	(Rs.)
i)	**Standing Charges:**		
	Depreciation {WN: (i)}	9,333.33	
	Insurance Charge $\left(\frac{18,00,000 \times 3\%}{12}\right)$	4,500	
	Manager-cum-accountant's salary	8,000	
	Annual Tax (p.m.) $\left(\frac{\text{Rs. } 50,000}{12}\right)$	4,166.67	
	Garage Rent	2,500	28,500
ii)	**Maintenance Charges:**		
	Repair & Maintenance per month $\left(\frac{\text{Rs. } 1,50,000}{12}\right)$		12,500
iii)	**Running Cost:**		
	Driver's Salary	15,000	
	Conductor's Salary	12,000	
	Stationery	500	
	Engine oil & Lubricants {Working Note- (iii)}	6,250	
	Diesel and oil {Working Note- (iii)}	15,600	
	Total running cost before deducting commission to driver and conductor	49,350	49,350
	Total cost excluding commission to driver and conductor		90,350
	Driver's commission on collection*		6,023.34
	Conductor's commission on collection*		6,023.33
	Total Cost (i) + (ii) + (iii)		1,02,396.67
	Add: Profit**		18,070
	Total Collection		1,20,466.67

Working Note:

Total costs before commission on collection and net profit is Rs. 90,350.

Commission on collection to driver and conductor is 10% of collection and Profit is 15% of collection means 100% - (10% + 15%) i.e. 75% = Rs. 90,350

So, Total collection = $\frac{Rs.90,350}{75} \times 100 = 1,20,466.67$

*Total Commission on collection = 10% × Rs. 1,20,466.67 = Rs. 12,046.67

Driver's share = 50% × Rs. 12,046.67 = 6,023.34

Conductor's share = 50% × Rs. 12,046.67 = 6,023.33

** Profit on collection = Rs. 1,20,466.67 × 15% = Rs. 18,070

Fare per Passenger-km = $\frac{\text{Total Collection}}{\text{Total Passenger - km. \{Working Note (ii)\}}} = \frac{Rs.\ 1,20,466.67}{1,20,000}$ =Rs. 1.004 (approx.)

PROBLEM NO: 7

Working Note:

1. **Total Kilometers run per annum:**

   = Number of Buses × Distance × Number of days in the Month × Number of trips × 12 months

   = 1 Bus ×40 kms × 25 Days × 6 Single trips (3 Round Trips) × 12 months = 72,000 kms.

2. **Total Passenger Kilometers per annum:**

   Total Kilometers run per annum × Seating Capacity

   = 72,000 Kms × 40 Seats = 28,80,000 Passenger-Kms

3. **Petrol & oil Consumption per annum:**

   Total Kilometers run per annum × Petrol Consumption per km.

   = 72,000 Kms × (Rs.500 / 100 Kms) = Rs. 3,60,000

4. **Loading:** If Taking is Rs.100, then Rs.10 will have to be given as Commission and Rs.15 remain as Profit. The Cost is therefore, be Rs.75. On Rs.75, the loading must be Rs.25 to make the Taking equal to Rs.100.

Statement of Cost per Passenger - Km

Particulars	Per Annum	Per Passenger - Kilometer
A. Standing Charges:		
Insurance @ 3% on Rs.10,00,000	30,000	
Taxation	20,000	
Manager-cum-accountant's salary	84,000	
Depreciation	2,00,000	
Stationary	12,000	
Total Standing Charges	3,46,000	0.12014
B. Running Charges:		
Diesel and other Oil	3,60,000	
Salary of Driver	36,000	
Salary of Conductor	24,000	
Total Running Charges	4,20,000	0.14583
C. Maintenance Charges:		
Garage Rent @ Rs.2,000 Per month	24,000	
Repairs	20,000	
Total Maintenance Charges	44,000	0.01528
Grand Total (A + B + C)	8,10,000	0.28125
Loading @ 25/75		0.09375
Fare per Passenger Kilometer		0.37500

PROBLEM NO: 8

Statement showing total cost and bus fare to be charged from each passenger per km (Per month)

Particulars	Amount (in Rs.)
Standing charges	
Insurance $\left[\text{Rs.}9,00,000 \times 3\% \times \frac{1}{12m}\right]$	2,250
Taxes $\left[\text{Rs.}10,000 \times \frac{1}{12m}\right]$	833.33
Garage rent	10,000
Manager-cum-accountant salary	3,500
Depreciation $\left[\frac{9,00,000 - 60,000}{5yrs} \times \frac{1}{12m}\right]$	14,000
Repairs and Maintenance charges	
Repairs $\left[\text{Rs.}10,000 \times \frac{1}{12m}\right]$	833.33
Running Charges	
Drivers salary	1,500
Conductors	1,000
Diesel and oil $\left[\frac{3000\text{kms (W.N.1)}}{100} \times \text{Rs.}450 \text{ per hundred kms}\right]$	13,500
Drivers Commission $\left[63,888.88 \times 10\% \times \frac{1}{2}\right]$	3,194.444
Conductors Commission $\left[63,888.88 \times 10\% \times \frac{1}{2}\right]$	3,194.444
Stationery cost	500
Total Cost [85%]	54,305.548
(+) 15% Profit [63,888.88x15%]	9,583.332
Taking value [100%]	63,888.88

$\therefore$ Bus fare to be charged from each passenger per km

$$= \frac{\text{Total Takings value}}{\text{Total passenger km}} = \frac{\text{Rs. } 63,888.88}{1,20,000 \text{ passenger km [W.N.2]}} = \text{Rs. } 0.5324 \text{ per passenger km.}$$

W.N.1: Calculation of Total kms traveled per month

= 3 round trips x 2 times x 20 km x 40 passengers x 25 days = 3,000 kilometers

W.N.2: Calculation of Total passenger kms per month

= No. of kms travelled x average passengers per trip

= 3,000 kms x 40 passengers = 1,20,000 passenger kilometers

PROBLEM NO: 9

Operating Cost Statement

	Particulars	Total Cost Per annum (Rs.)
A.	Fixed Charges:	
	Insurance	15,600
	Garage rent (Rs. 2,400 × 4 quarters)	9,600
	Road Tax	5,000
	Salary of operating staff (Rs. 7,200 × 12 months)	86,400
	Depreciation	68,000
	Total (A)	1,84,600
B.	Variable Charges:	
	Repairs (Rs. 4,800 × 4 quarters)	19,200
	Tyres and Tubes (Rs. 3,600 × 4 quarters)	14,400

	Diesel {(1,80,000 km. ÷ 5 km.) × Rs.13}	4,68,000
	Oil and Sundries {(1,80,000 km. ÷ 100 km.) × Rs.22}	39,600
	Total (B)	5,41,200
	Total Operating Cost (A+B)	7,25,800
	Add: Passenger tax (Refer to WN-1)	3,01,275
	Add: Profit (Refer to WN-1)	3,42,359
	Total takings	13,69,434

Calculation of Cost per passenger kilometer and one way fare per passenger:

$$\text{Cost per Passenger-Km.} = \frac{\text{Total Operating Cost}}{\text{Total Passenger - Km.}} = \frac{\text{Rs. 7,25,800}}{\text{40,32,000 Passenger - Km.}} = \text{Rs. 0.18}$$

$$\text{One way fare per passenger} = \frac{\text{Total takings}}{\text{Total Passenger - Km.}} \times 30\text{km.} = \text{Rs. 10.20}$$

Working Notes:

1. Let total taking be X then Passenger tax and profit will be as follows:

   X = Rs. 7,25,800 + 0.22 X + 0.25X

   X - 0.47 X = Rs. 7,25,800

   $X = \frac{\text{Rs. 7,25,800}}{0.53} = \text{Rs. 13,69,434}$

   Passenger tax = Rs. 13,69,434 × 0.22 = Rs. 3,01,275

   Profit = Rs. 13,69,434 × 0.25 = Rs. 3,42,359

2. Total Kilometres to be run during the year

   = 30 km × 2 sides × 10 trips × 25 days × 12 months = 1,80,000 Kilometres

3. Total passenger Kilometres = 1,80,000 km. × 32 passengers × 70% = 40,32,000 Passenger- km.

PROBLEM NO. 10

Working Notes:

1. Depreciation per annum $= \frac{\text{Purchase price - Scrap value}}{\text{Estimated Life}} = \frac{\text{Rs. 4,00,000 - Rs. 10,000}}{\text{5 years}} = \text{Rs. 78,000}$

2. Total distance travelled by mini-bus in 25 days:

   = Length of the route (two -sides) × No. of trips per day × No. of days

   = 60 km × 6 trips × 25 days = 9,000 km

3. Total Passenger-Km:

   = Total distance travelled by mini-bus in 25 days × No. of seats

   = 9,000 km × 20 seats = 1,80,000 passenger-km

Statement suggesting fare per passenger-km

	Cost per annum Rs.	Cost per month Rs.
Fixed expenses:		
Insurance	15,000	
Garage rent	9,000	
Road tax	3,000	
Administrative charges	5,000	
Depreciation	78,000	
Interest on loan	10,000	
	1,20,000	10,000
Running expenses:		
Repair and maintenance	15,000	1,250
Replacement of tyre-tube	3,600	300
Diesel and oil cost (9,000 km × Rs. 5)	-	45,000
Driver and conductor's salary	-	5,000

Total cost (per month)		61,550.00
Add: Profit 20% of total revenue or 25% of total cost		15,387.50
Total revenue		76,937.50

Rate per passenger-km Rs. 76,937.50/1,80,000 passenger km = 0.42743 i.e., = 0.43 i.e., 43 paise

PROBLEM NO: 11

Working Note:

Total Passenger Kilometers =

Number of Buses × Distance × Seating Capacity × Used Capacity × Number of days in the Month × Number of trips

= 5 Buses × 40 kms. × 40 Seats × 75% × 30 Days × 2 Single trips (1 Round Trip)

= 3,60,000 Passenger-Kms.

Cost per Passenger-Km = Total costs / Total Passenger Kilometers

Statement of Cost per Passenger - Km

Particulars	Cost Per Month	Cost per Passenger - Km
A. Standing Charges:		
Wages of Drivers, Cleaners and Conductors	24,000	
Salary to Supervisor	10,000	
Taxation and Insurance	16,000	
Depreciation	26,000	
Interest	20,000	
Total Standing Charges	96,000	0.267
B. Running Charges		
Diesel and other Oil	40,000	0.111
C. Maintenance Charges		
Repairs and Maintenance	8,000	0.022
Total	1,44,000	0.400

Cost per Passenger-Km = Rs. 0.40

PROBLEM NO: 12

EPS Public School

Statement showing the expenses of operating a single bus and the fleet of 25 buses for a year

Particulars	Per bus per annum (Rs.)	Fleet of 25 buses per annum (Rs.)
Running costs: (A)		
Diesel (Refer to working note 1)	56,832	14,20,800
Repairs & maintenance costs: (B)	16,400	4,10,000
Fixed charges:		
Driver's salary(Rs. 5,000 × 12 months)	60,000	15,00,000
Cleaners salary(Rs.3,000 × 1/5th × 12 months)	7,200	1,80,000
License fee, taxes etc.	2,300	57,500
Insurance	15,600	3,90,000
Depreciation	93,750	23,43,750
Total fixed charges: (C)	1,78,850	44,71,250
Total expenses: (A + B + C)	2,52,082	63,02,050

Average cost per student per month in respect of students coming from a distance of:

a) 4 km. from the school {Rs. 2,52,082 / (354 students × 12 months)} (Refer to WN 2)	Rs. 59.34
b) 8 km. from the school (Rs. 59.34 ×2)	Rs. 118.68
c) 16 km. from the school (Rs. 59.34 × 4)	Rs. 237.36

Working Notes:

1. Calculation of diesel cost per bus:

No. of trips made by a bus each day	4
Distance travelled in one trip both ways (16 km. × 2 trips)	32 km.
Distance traveled per day by a bus (32 km. × 4 shifts)	128 km.

Distance traveled during a month (128 km. × 24 days)	3,072 km.
Distance traveled per year (3,072 km. × 10 months)	30,720 km.
No. of litres of diesel required per bus per year (30,720 km. ÷ 10 km.)	3,072 litres
Cost of diesel per bus per year (3,072 litres × Rs. 18.50)	Rs. 56,832

2. Calculation of number of students per bus:

Bus capacity of 2 trips (60 students × 2 trips)	120 students
¼th fare students (15% × 120 students)	18 students
½ fare 30% students (equivalent to ¼th fare students)	72 students
Full fare 55% students (equivalent to ¼th fare students)	264 students
Total ¼th fare students	354 students

PROBLEM NO: 13

Working Notes:

Total Distance (in km.) covered per month

Bus route	Km. per trip	Trips per day	Days per month	Km. per month
Delhi to Chandigarh	250	2	8	4,000
Delhi to Agra	210	2	10	4,200
Delhi to Jaipur	270	2	6	3,240
				11,440

Passenger- km. per month

Particulars	Total seats available per Month (at 100% capacity)	Capacity utilised		Km. per trip	Passenger - Km. per month
		(%)	Seats		
Delhi to Chandigarh & Back	800 (50 seats × 2 trips × 8 days)	90	720	250	1,80,000 (720 seats × 250 km.)
Delhi to Agra & Back	1,000 (50 seats × 2 trips × 10 days)	85	850	210	1,78,500 (850 seats × 210 km.)
Delhi to Jaipur & Back	600 (50 seats × 2 trips × 6 days)	100	600	270	1,62,000 (600 seats × 270 km.)
Total					**5,20,500**

Monthly Operating Cost Statement

	Amount (Rs.)	Amount (Rs.)
i) Running Costs		
- Diesel {(11,440 km ÷ 4 km) × Rs. 56}	1,60,160	
- Lubricant oil {(11,440 km / 100) × Rs. 10}	1,144	1,61,304
ii) Maintenance Costs		
- Repairs & Maintenance		1,000
iii) Standing charges		
- Salary to driver	24,000	
- Salary to conductor	21,000	
- Salary of part-time accountant	5,000	
- Insurance (Rs. 4,800 ÷12)	400	
- Road tax (Rs. 15,915 ÷12)	1,326.25	
- Permit fee	315	
- Depreciation {(Rs. 12,00,000 × 20%) ÷12}	20,000	**72,041.25**
Total costs per month before Passenger Tax (i)+(ii)+(iii)		2,34,345.25
Passenger Tax*		93,738.10
Total Cost		3,28,083.35
Add: Profit*		1,40,607.15
Total takings per month		4,68,690.50

*Let, total takings be X then

X = Total costs per month before passenger tax + 0.2 X (passenger tax) + 0.3 X (profit)

X = Rs. 2,34,345.25 + 0.2 X + 0.3 X

0.5 X = Rs. 2,34,345.25 or, X = Rs.4,68,690.50

Passenger Tax = 20% of Rs.4,68,690.50 = Rs. 93,738.10

Profit = 30% of Rs.4,68,690.50 = Rs. 1,40,607.15

Calculation of Rate per passenger km. and fares to be charged for different routes

$$\textbf{Rate per Passenger - Km.} = \frac{\text{Total takings per month}}{\text{Total Passenger} - \text{Km. per month}} = \frac{\text{Rs.4,68,690.50}}{\text{5,20,500 Passenger} - \text{Km.}} = \text{Rs.0.90}$$

Bus fare to be charged per passenger:

Delhi to Chandigarh = Rs. 0.90 × 250 km = Rs. 225.00

Delhi to Agra = Rs. 0.90 × 210 km = Rs. 189.00

Delhi to Jaipur = Rs. 0.90 × 270 km = Rs. 243.00

PROBLEM NO: 14

i) Calculation of Operating Cost per month for each vehicle

	Ramgarh	Pratapgarh	Devgarh	Total
A. Running Costs:				
- Cost of diesel (WN - 2)	1,25,280	70,992	92,800	2,89,072
- Servicing cost (WN - 3)	9,000	---	3,000	12,000
	1,34,280	70,992	95,800	3,01,072
B. Fixed Costs:				
- Salary to drivers	72,000 (4 drivers × Rs. 18,000)	54,000 (3 drivers × Rs. 18,000)	90,000 (5 drivers × Rs. 18,000)	2,16,000
- Salary to cleaners	44,000 (4 cleaners × Rs. 11,000)	33,000 (3 cleaners × Rs. 11,000)	55,000 (5 cleaners × Rs. 11,000)	1,32,000
- Allocated garage parking fee	5,400 (4 vehicles × Rs. 1,350)	4,050 (3 vehicles × Rs. 1,350)	6,750 (5 vehicles × Rs. 1,350)	16,200
- Depreciation (WN - 4)	36,733	32,800	38,542	1,08,075
- Toll tax passes	2,850	3,020	---	5,870
	1,60,983	1,26,870	1,90,292	4,78,145
Total [A + B]	2,95,263	1,97,862	2,86,092	7,79,217
Operating Cost per vehicle	73,815.75 (Rs. 2,95,263 ÷ 4 vehicles)	65,954 (Rs. 1,97,862 ÷ 3 vehicles)	57,218.40 (Rs. 2,86,092 ÷ 5 vehicles)	64,934.75 (Rs. 7,79,217 ÷ 12 vehicles)

ii) Vehicle operating cost per litre of milk:

$$\frac{\text{Total Operating Cost per month}}{\text{Total milk carried a month}} = \frac{\text{Rs. 7,79,217}}{\text{1,47,00,000 Litres (Working Note 5)}} = \text{Rs. 0.053}$$

Working Notes:

1. Distance covered by the vehicles in a month

Route	Total Distance (in KM.)
Ramgarh (4 vehicles × 3 trips × 2 × 24 km. × 30 days)	17,280
Pratapgarh (3 vehicles × 2 trips × 2 × 34 km. × 30 days)	12,240
Devgarh (5 vehicles × 2 trips × 2 × 16 km. × 30 days)	9,600

2. Cost of diesel consumption

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (km.)	17,280	12,240	9,600
Mileage per litre of diesel	8 kmpl	10 kmpl	6 kmpl
Diesel consumption (Litre)	2,160 (17,280 ÷ 8)	1,224 (12,240 ÷ 10)	1,600 (9,600 ÷ 6)
Cost of diesel consumption @ Rs. 58 per litre (Rs.)	1,25,280	70,992	92,800

3. Servicing Cost

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (km.)	17,280	12,240	9,600
Covered under free service warranty	No	Yes	No
No. of services required	3 (17,280 km. ÷ 5,000 km.)	2 (12,240 km. ÷ 5,000 km.)	1 (9,600 km. ÷ 5,000 km.)
Total Service Cost (Rs.)	9,000 (Rs. 3,000 × 3)	---	3,000 (Rs. 3,000 × 1)

4. Calculation of Depreciation

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles	4	3	5
Cost of a vehicle	11,02,000	13,12,000	9,25,000
Total Cost of vehicles	44,08,000	39,36,000	46,25,000
Depreciation per month	36,733 $\left(\frac{44,08,000 \times 10\%}{12 \text{ months}}\right)$	32,800 $\left(\frac{39,36,000 \times 10\%}{12 \text{ months}}\right)$	38,542 $\left(\frac{46,25,000 \times 10\%}{12 \text{ months}}\right)$

5. Total volume of Milk Carried

Route	Milk Qty. (Litre)
Ramgarh (25,000 ltr. × 0.7 × 4 vehicles × 3 trips × 30 days)	63,00,000
Pratapgarh (25,000 ltr. × 0.7 × 3 vehicles × 2 trips × 30 days)	31,50,000
Devgarh (25,000 ltr. × 0.7 × 5 vehicles × 2 trips × 30 days)	52,50,000
	1,47,00,000

PROBLEM NO: 15

i) Statement of operating income of DKG Airlines for Melbourne-Delhi flight (one way)

Particulars	Amount (Rs.)	Amount (Rs.)
Fare received (per flight): 250 passengers × Rs. 50,000		1,25,00,000
Variable costs (per flight):		
- Fuel cost	28,00,000	
- Food (250 × Rs. 2,600)	6,50,000	
- Commission to Travel Agents (15% of Rs.1,25,00,000)	18,75,000	(53,25,000)
Contribution per flight		71,75,000
Fixed cost (per flight):		
Annual lease cost	15,30,000	
Fixed ground service costs	1,70,000	
Salaries of flight crew	6,50,000	(23,50,000)
Operating income per flight		48,25,000

ii) Operating income of DKG Airlines per Melbourne-Delhi flight (one way) after reduction in fare

Fare received (per flight): 275 passengers × Rs. 48,000		1,32,00,000
Variable costs (per flight):		
Fuel cost	28,00,000	
Food (275 × Rs.2,600)	7,15,000	
Commission to Travel Agents (17.5% of Rs.1,32,00,000)	23,10,000	(58,25,000)
Contribution per flight		73,75,000

Excess contribution due to lowering of fare (Rs.73,75,000 - Rs.71,75,000) = Rs.2,00,000. DKG Airlines should lower its fare as it would increase its contribution by Rs.2,00,000.

PROBLEM NO: 16

Statement showing total cost of nonresident hotel

Particulars	Amount (Rs.)
Staff salaries (Given)	22,00,000
Repairs	4,20,000
Linen	4,50,000
Interior decoration	5,00,000
Sundries	3,15,500
Depreciation (1,40,00,000 x 5% + 10,00,000 x 10% + 20,00,000 x 10%)	10,00,000

Room-attendant's Wages (Working Note 2)	9,31,500
Lighting's cost (Working Note 3)	5,54,000
Power cost (Working Note 4)	2,77,000
Total Cost	66,48,000
Add: profit on cost @ 25% $\left(66,48,000 \times \frac{25}{100}\right)$	1,66,200
Amount to be collected	83,10,000

Rent to be charged:

Deluxe : $\frac{Rs.83,10,000}{41,550\ Rooms}$ = Rs.200

Super Deluxe : Rs.200 x 1.5 times = Rs.300

Executive Deluxe : Rs.200 x 2 times = Rs.400

Working Note 1: Calculation of No of Room days per annum

Particulars	Deluxe	Super Deluxe	Executive Deluxe
Summer	18,900 (100 x 90% 30 x7)	5,040	2,520
Winter	7,500 (100 x 50% x 30 x 5)	900	600
	26,400	5,940	3,120

Working Note 2: Calculation of Room Attendant's Wages per annum

Particulars	Amounts (Rs.)
Deluxe = [18,900 x Rs.20 + 7500 x Rs.30]	6,03,000
Super Deluxe = [5,040 x Rs.30 + 900 x Rs.45]	1,91,700
Executive Deluxe = [2,520 x Rs.40 + 600 x Rs.60]	1,36,800
	9,31,500

Working Note 3: Calculation of lighting cost

Particulars	Amount (Rs.)
Deluxe = $\left(26,400 \times \frac{Rs.400}{30days}\right)$	3,52,000
Super deluxe = $\left(5,940 \times \frac{Rs.600}{30days}\right)$	1,18,800
Executive deluxe = $\left(3,120 \times \frac{Rs.800}{30days}\right)$	83,200
	5,54,000

Working Note 4: Calculation of power cost

Particulars	Amount (Rs.)
Deluxe = $\left(26,400 \times \frac{Rs.200}{30days}\right)$	1,76,000
Super deluxe = $\left(5,940 \times \frac{Rs.300}{30days}\right)$	59,400
Executive deluxe = $\left(3,120 \times \frac{Rs.400}{30days}\right)$	41,600
	2,77,000

Working Note 5:

Calculation of Equivalent Rooms days	No. Of Room Days
Deluxe Rooms (26,400 x 1 time)	26,400
Super deluxe Rooms (5,940 x 1.5 times)	8,910
Executive deluxe Rooms(3,120 x 2 times)	6,240
	41,550

PROBLEM NO: 17

WORKING NOTES:

i) Total equivalent single room suites

Nature of Suite	Occupancy (Room-days)	Equivalent single room suites
Single room suite	36,000 (100 Rooms x 360 days x 100%)	36,000 (36,000 x 1)
Double room suites	14,400 (50 Rooms x 360 days x 80%)	36,000 (14,400 x 2.5)
Triple room suites	6,480 (30 Rooms x 360 days x 60%)	32,400 (6,480 x 5)
		1,04,400

ii) Statement of total cost

Particulars	Amount (Rs.)
Staff Salaries	14,25,000
Room Attendant's wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000
Building rent [(Rs.10,000 x 12 months) + 5% on total takings]	1,20,000 + (5% On Total Takings)
Total Cost	26,41,000 + (5% On Total Takings)

Profit is 20% on Total takings

∴ Total Takings = Rs.26,41,000 + 25% (5% + 20%) of total takings

Let x be rent for single room suite.

The 1,04,400 x = 26,41,000 + 0.25 x 1,04,400 x

∴ x = 33.73

iii) Rent to be charged for single room suite = Rs. 33.73

Rent for double rooms suite = Rs.33.73 x 2.5 = Rs.84.325

Rent for triple room suites = Rs.33.73 x 5 = Rs.168.65

Alternative:

Let x be the total takings & Profit is 20% on total takings

Total takings = 26,41,000 + 5% on total takings + 20% on total takings

X = 26,41,000 + 5% on x + 20% on x

X = 26,41,000 + 25%x

X - 0.25x = 26,41,000

0.75x = 26,41,000

$$X = \frac{26,41,000}{0.75}$$

X = Rs.35,21,333.33

Total Takings = Rs.35,21,333.33

iv) Rent to be charged

Single Room suite $= \frac{35,21,333.333}{1,04,400}$ = Rs.33.73

Double Room Suite = 33.73 x 2.5 = Rs.84.325

Triple Room Suite = 33.73 x 2.5 x 2 = Rs.168.65

PROBLEM NO: 18

ICU days = 300 days

Permanent staff: 6 (1 supervisor, 2 nurses and 3 ward boys)

Salary of supervisor: Rs. 2,000 per month

Salary of Nurses: Rs. 2,000 per month (each)

Salary of Ward boys: Rs. 1,000 per month (each)

25 beds + 5 extra beds each extra bed at Rs. 10 per day

Full capacity (25 beds) : 120 patient days

Only 60% capacity (15 beds) : 120 patient days

Capacity with extra beds : 60 patient days (Total hiring charges for an year for beds: Rs. 2,000)

: 300 patient days

Outside doctor's fees: Rs. 3,00,000 per annum

Fixed expenses: Rs. 48,000 per annum

a) **Statement showing profit**

Particulars	Amount (Rs.)	Amount (Rs.)
Total Revenue (6,500 x 100)		6,50,000
Fixed charges:		
Rent (5,000 x 12)	60,000	
Supervisor's salary (2,000 x 12)	24,000	
Salary of Nurses (2,000 x 2 x 12)	48,000	
Salary of ward boys (1,000 x 3 x 12)	36,000	
Other Fixed Expenses	48,000	2,16,000
Operating expenses:		
Extra Beds rent per annum	2,000	
Payment to outside doctors	3,00,000	3,02,000
Profit		1,32,000

$$\text{Profit per patient day} = \frac{1,32,000}{6,500 \text{ (patient days per patient bed) (Refer WN)}} = \text{Rs. } 20.30$$

b) Given that, Total Revenue = Total Cost

No. of patient days = x

$$100x = 2,16,000 + \left(\frac{3,02,000}{6,500}\right)x$$

$$100x = 2,16,000 + (46.461)x$$

$$53.539x = 2,16,000$$

$$x = \left(\frac{2,16,000}{53.539}\right) = 4,034.48 \cong 4,035$$

Charges per patient per day = Rs. 100

Profit per patient day =?

At Break-even point, Total Cost = Total Revenue

Working Notes: Patient beds

Full (100%) Capacity (25 beds) = 120 days x 25 beds = 3,000

60% Capacity (15 beds) = 120 days x 15 beds = 1,800

= 60 days x 25 beds = 1,500

Extra Beds $\left(\frac{2,000}{\text{Rs. } 10}\right)$ = 200

Patient beds = 6,500

PROBLEM NO: 19

Number of Patient Days = (200 x 50) + (105 x 30) + (60 x 20) = 14,350 + 250 = 14,600 patient days

Statement Showing Profit

Elements of Cost and Revenue	Total (Rs.)
A. Revenue (14,600 x Rs. 2,500)	3,65,00,000
B. Variable Costs	
Food and Laundry Service	39,53,000
Medicines to Patients	22,75,000
Doctor's Payment	66,00,000
Hire Charges of Bed (250 x Rs. 950)	2,37,500
Total Variable Cost	1,30,65,500
C. Fixed Costs	
Building Rent	27,00,000
Manager's Salary (Rs. 50,000 x 3 x 12)	18,00,000
Nurse's Salary (Rs. 18,000 x 12 x 24)	51,84,000
Ward boy's Salary (Rs. 9,000 x 12 x 24)	25,92,000
Administrative Overheads	28,00,000
Depreciation on Equipment's	12,75,000
	1,63,51,000
D. Total Cost (B + C)	2,94,16,500
E. Profit (A - D)	70,83,500

Profit per patient day = Rs. 70,83,500/14,600 = Rs. 485.17

i) Contribution (per patient day) = (Rs. 3,65,00,000 - Rs. 1,30,65,500)/ 14,600 = Rs. 1,605.10

ii) BEP = 1,63,51,000/1,605.10 = 10,186.90 or say 10,187 patient days

Notes:

1. Higher Charges for extra beds are a semi variable cost; still, for the sake of convenience it has been considered a variable cost.
2. Assumed, the hospital hired 250 beds at a charge of Rs. 950 per bed to accommodate the flow of patients. However, this never exceeded the 10 beds above the normal capacity of 50 beds on any day.
3. The fees were paid based on the number of patients attended to and the time spent by them, which on an average worked out to Rs. 5,50,000 p.m.

PROBLEM NO: 20

Statement showing monthly steam production cost:

Particulars	Amount (Rs.)
Cost of coal (Rs.16 per quintal x 1,400 Quintals)	22,400
Water $\left(1{,}50{,}000\,\text{liters} \times \frac{\text{Rs.}1}{1{,}000\,\text{liters}}\right)$	150
Freight and handling of coal (Rs. 22,400 x 10%)	2,240
Net sales of ash (Rs.1,540 - Rs.200)	(1,340)
Repairs and maintenance $\left(\text{Rs.}2{,}000 \times \frac{1}{2}\right)$	1,000
Stores $\left(\text{Rs.}\,1{,}500 \times \frac{2}{3}\right)$	1,000
Supervision and administrative costs $\left(\text{Rs.}\,2{,}500 \times \frac{3}{5}\right)$	1,500
Wages and salaries (Rs.150 x 50 men)	7,500
Depreciation $\left(\frac{\text{Rs.}\,62{,}000 - \text{Rs.}\,2000}{10\,\text{yrs}} \times \frac{1}{12\,\text{months}}\right)$	500
Total Cost	34,950

Cost per Therm / Unit = $\frac{\text{Rs.}\,34{,}950}{40{,}000\,\text{therms(given)}} = \text{Rs}\,0.874$

Statement showing total cost of electricity generation:

Particulars	Amount (Rs.)
steam cost $\left(Rs.34{,}950 \times \frac{4}{5}\right)$	27,960
Repairs and maintenance (Rs. 2,000 x 0.5)	1000
Stores $\left(Rs.1{,}500 \times \frac{1}{3}\right)$	500
Supervision and administration cost (2,500 x 2/5)	1000
Dep. On G.P $\left(\frac{Rs.1{,}00{,}000 - Rs.4{,}000}{10 years} \times \frac{1}{12}\right)$	800
Wages and salaries (10 men x Rs.300)	3000
	34,260

$\therefore$ Cost of generating electricity = $\frac{Rs.34{,}260}{3{,}00{,}000 units}$ = Rs. 0.1142 per unit

WORKING NOTE:

Total Electricity generated = 3,10,000 units

Less: Normal Loss in Units = 10,000 units 3,00,000 units

PROBLEM NO: 21

Statement showing whether to accept the car instead of train

Particulars	Amount (Rs.)
Benefits:	
Savings in ticket cost	188
Reimbursement by Rahul	120
Less: Expenditure	
Petrol & Oil	128
Tyres & Miscellaneous	52
Net benefit	128

Decision: Accept the Rahul's offer.

Note: Depreciation being a fixed cost shall be ignored. By acceptance of proposal there will be no increase in depreciation. Therefore, ignore it.

THE END