

**PANCHAKSHARI'S PROFESSIONAL ACADEMY PVT. LTD.**

Service &amp; Operating Costing (Model Test Paper &amp; Answer) Marks: 75 Time: 135 Minutes

1.

PPA passenger transport company provides you the following information:

No. of buses	5
Cost of each bus	Rs. 3,00,000
Estimated life	5 years
Repairs & maintenance	Rs. 7,285 p.m. per bus
Driver's Salary	Rs. 800 p.m. per bus
Conductor's salary	Rs. 600 p.m. per bus
Garage rent	Rs. 600 p.m. per bus
Insurance	@ 2% p.a.
Taxes	Rs. 6,000 p.a.
Road licence	Rs. 600 p.a. per bus
Interest	@ 18% p.a.
Km per litre of fuel	20 km
Cost of fuel	Rs. 300 per 10 litres
Total capacity	50 passengers
Average capacity which is used	90%
Normal % of vehicles laid up for repairs	5%
No. of round trips per day	4
Distance of route	20 km
Working days in a month	25
Manager's salary	Rs. 1,000 p.m.
Accountant's salary	Rs. 500 p.m.
Peon's salary	Rs. 250 p.m.
Cleaner's salary	Rs. 100 p.m.
Mechanic's salary	Rs. 300 p.m.
Cost of tickets	Rs. 10 per 1000 passenger km
Office rent	Rs. 250 p.m.
Office routine expenses	Rs. 500 p.m.
Cost of each type	Rs. 3,000
Types to be replaced per bus	1 p.m.

**Notes:** (i) Commission @ 10% of the taking is to be paid to conductor

(ii) Profit @ 20% on taking is desired by the owner

**Required** – Calculate:

(a) Cost per month; (b) Cost per day; (c) Cost per trip; (d) Cost per km; (e) cost per passenger km; (f) Bus fare to be charged from each passenger.

**(12)****SOLUTION 1**

A. Cost p.m. [Refer to Working Note No. (i)]	Rs 34,200
B. No. of working days in a month	25
C. No. of trips p.m. (25 x 4)	100
D. Km. covered p.m. (100 x 40 x 95%)	3,800
E. Passenger km. p.m. (3800 x 50 x 90%)	1,71,000
F. Cost per day (A/B)	Rs. 1,368
G. Cost per trip (A/C)	Rs. 342
H. Cost per km (A/D)	Rs. 9.00
I. Cost per Passenger km (A/E)	20 paise
J. Profit desired by owner (20% ON taking or 25% on cost)	5 paise
K. Bus fare to be charged (I + J)	25 paise

**Working Notes:****(i) Statement showing the Operating Cost per Bus per month**

A. <b>Fixed Expenses p.m.</b>	Rs.
(i) Driver's salary	800
(ii) Conductor's salary	600
(iii) Interest $\frac{3,00,000 \times 18}{12 \times 100}$	4,500
(iv) Insurance $\frac{2\% \text{ of } 3,00,000}{12}$	500

(v) Taxes $\frac{6,000}{12 \times 5}$	100
(vi) Road Licence $\frac{600}{12}$	50
(vii) Garage Rent $\frac{6,000}{12 \times 5}$	100
(viii) Cleaner's Salary $\frac{100}{5}$	20
(ix) Mechanic's Salary $\frac{300}{5}$	60
(x) Office Administration Cost	500
<b>Total Fixed Expenses</b>	<b>7,230</b>
<b>B. Semi-Variable Expenses p.m.</b>	
(i) Depreciation $\frac{3,00,000}{5 \times 12}$	5,000
(ii) Repairs & Maintenance	7,285
<b>Total Semi-Variable Expenses</b>	<b>12,285</b>
<b>C. Variable Expenses p.m.</b>	
(i) Cost of Fuel	5,700
(ii) Cost of Types	3,000
(iii) Cost of Tickets (1,71,000 x 10/1000)	1,710
<b>Total Variable Expenses</b>	<b>10,410</b>
<b>D. Total Operating Cost (Without Commission) (A + B + C)</b>	<b>29,925</b>
<b>E. Commission of Conductor @ 10% on takings (10% of Rs. 42,750)</b>	<b>4,275</b>
<b>F. Total Cost p.m. (D + E)</b>	<b>34,200</b>
<b>G. Owner's profit @ 20% on takings (20% of Rs. 42,750)</b>	<b>8,550</b>
<b>H. Total Taking (F + G)</b>	<b>42,750</b>

(ii) Calculation of Total km covered per bus

= Distance of one round trip x No. of round trips per day x No. of days in a month x % of bus available  
 = (20 x 2) x 4 x 25 x 95/100 = 3,800 km

(iii) Calculation of total passenger kms covered

= Total km covered x Total capacity x % of Average Capacity  
 = 3,800 x 50 x 90/100 = 1,71,000 passenger km

(iv) Calculation of Cost of Fuel

(i) Fuel Consumption (in litres) =  $\frac{\text{Total kms covered}}{\text{Km run per litre}} = \frac{3800}{20} = 190 \text{ Ltr.}$

(ii) Cost of Fuel = Fuel Consumed (in litres) x Rate of Fuel per litre = 190 x Rs. 30 = Rs. 5,700

(v) Calculation of Share of Office & Admn. Cost

	Rs.
A. Office Rent	250
B. Office other routine expenses	500
C. Manager's salary	1,000
D. Accountant's salary	500
E. Peon's salary	250
F. Total for 5 buses ( A + B + C + D + E)	2,500
G. For 1 bus (Rs. 2,500/5)	Rs. 500

(vi) Calculation of Total Takings

Let the total takings be X

A. Total Operating cost (without Commission)	29,925
B. Add: Conductor's Commission	10% of X
C. Total Cost (including Commission)	29,925 + 10% of X
D. Add: Profit @ 20% on takings	20% of X
E. Total taking (C + D)	29,925 + 30% of X
X = 29,925 + 30% of X	
X - .30 X = 29,925	
.70 X = 29,925	
X = 29,925/.70 = Rs. 42,750	

**2.**

Global Transport Ltd. charges Rs. 90 per tone for its 6 tonnes truck lorry load from city 'A' to city 'B'. The charges for the return journal are Rs. 84 per tone. No concession or reduction in these rates is made for any delivery of goods at intermediate station 'C'. In January, 20X6 the truck made 12 outward journeys for city 'B' will full load out of which 2 tonnes were unloaded twice in the ways at city 'C'. The truck carried a load of 8 tonnes in its return journal for 5 times but once caught by police and Rs. 1,200 was paid as fine. For the remaining trips the truck carried full load out of which all the goods on load were unloaded once at city 'C'. The distance from city 'A' to city 'C' and city 'B' are 140 kms and 300 kms respectively. Annual fixed costs and maintenance charges are Rs. 60,000 and Rs. 12,000 respectively. Running charges spent during January 20X6 are Rs. 2,944.

**Required:** Calculate the cost per absolute tone-kilometer and the profit for January, 20X6.

**(12)**

**SOLUTION 2**

**Operating Cost and Profit Statement**

**M/s Global Transport Ltd.**

	Rs.
A. Fixed costs (Rs. 60,000/12)	5,000
B. Maintenance charges (Rs. 12,000/12)	1,000
C. Running charges	2,944
D. Total Operating Cost (A + B + C)	8,944
E. Cost per absolute tone km (Rs 8,944/44,720 absolute tone kms)	0.20
F. Net revenue received (Refer to Working Note iv)	12,168
G. Less: Total operating cost	8,944
H. Profit [F – G]	3,224

Working Notes:

(i) Tone – km on outward journeys:

From city A to city B: 10 journeys x 300 kms x 6 tonnes	= 18,000 tonnes-kms
From city A to city C: 2 journeys x 140 kms x 6 tonnes	= 1,680 tonnes-kms
From city C to city B: 2 journeys x 160 kms x 4 tonnes	= 1,280 tonnes-kms
<b>Total</b>	<b>20,960 tonnes-kms</b>

(ii) Tone – km on between journeys:

From city B to city A:	
5 journeys x 300 kms x 8 tonnes	= 12,000 tonnes-kms
6 journeys x 300 kms x 6 tonnes	= 10,800 tonnes-kms
From city B to city C: 1 journey x 160 kms x 6 tonnes	= 960 tonnes-kms
<b>Total</b>	<b>23,760 tonnes-kms</b>

(iii) Total absolute tonnes-kms of outward and return journeys:

= 20,960 tonnes-kms + 23,760 tonnes-km = 44,720 tonnes-kms

(iv) Net revenue received during January 20X6.

(From city A to city B) 12 trucks x 6 tonnes x Rs. 90	6,480
(From city B to city A) 5 trucks x 8 tonnes x Rs. 84	3,360
(From city B to city A) 6 trucks x 6 tonnes x Rs. 84	3,024
(From city B to city C) 1 trucks x 6 tonnes x Rs. 84	504
<b>Total revenue:</b>	<b>13,368</b>
Less: Fine paid	1,200
<b>Net revenue received</b>	<b>12,168</b>

**3.**

From the following information calculate the cost of generating electricity per unit:

- (a) Coal used 600 tonnes @ Rs. 20 per tones.
- (b) Fright and handling charges: 10% of value of the cost used.
- (c) Oil: 10 tonnes @ Rs. 250 per tones.
- (d) Water: 25,000 litres @ Rs. 0.50 per 100 litres.
- (e) Depreciation of steam boiler Rs. 250
- (f) Salaries and wages of the boiler: 5 men @ Rs. 200 each; 20 coolies @ Rs. 40 each.
- (g) Recovery on account of sale of ashes: 100 tonnes @ rs 1 per tones.
- (h) Salaries and wages of generating stations: 25 men @ Rs. 200 each; 10 colliies @ Rs. 40 each

- (i) Repairs and maintenance of generating equipment Rs. 260.
- (j) Depreciation on generating equipment @ 10% p.a. cost of generating equipment Rs. 25,000
- (k) Share of administration charges: Rs. 2,865
- (l) Total Number of units generated: 1,46,000.
- (m) Normal loss in the process: 2,000 units generated

(13)

**SOLUTION 3**

**Operating Cost Statement**

<b>Materials:</b>		
Coal used 600 tonnes @ Rs. 20 per tones		Rs. 12,000
Oil 10 tonnes @ Rs. 250 per tones		2,500
Water 25,000 litres @ Rs. 0.50 per 100 litres		125
<b>Wages:</b>		Rs.
Boiler Hours : 5 men @ Rs. 200 each	1,000	
20 coolies @ Rs. 40 each	800	1,800
Generating station : 25 men @ Rs. 200 each	5,000	
10 coolies @ Rs. 40 each	400	5,400
Fright and handling charges : 10% of value of coal used		1,200
<b>Prime Cost</b>		23,025
Depreciation on steam boiler		250
Repairs and maintenance of generating equipment		260
Depreciation of generating equipment		2,500
		26,035
Less: Recovery on account of sale of ashes: 100 tonnes @ Rs. 1 per tones		100
<b>Works Cost</b>		25,935
Share of administration charges		2,865
<b>A. Total Operating Cost</b>		28,800
<b>B. Units generated</b>	1,46,000	
Less : Normal loss	2,000	1,44,000
<b>C. Cost of electricity generated per unit (28,800/1,44,000)</b>		20 paise

**4.**

From the following information relating to a hotel, calculate the room rent to be charged to give a profit of 25% on cost excluding interest

- a) Salaries of staff: Rs. 1,02,200 p.a.
- b) Wages of the room attendant: Rs. 4 per day  
There is a room attendant for each room. He is paid wages only when the room is occupied.
- c) Lighting, Heating and Power
  - (a) The normal lighting expenses for each room for the whole month is Rs. 100 when occupied.
  - (b) Power is used only in winter and the charges are Rs. 40 p.m. for a room, when occupied.
- d) Repairs to buildings: Rs. 10,000 p.a.
- e) Licence etc: Rs. 4,800 p.a.
- f) Sundries: Rs. 6,600 p.a.
- g) Interior decoration and furnishing: Rs 10,000 p.a.
- h) Depreciation @ 5% is to be charged on buildings costing Rs. 4,00,000 and 10% on equipments.
- i) Interest to be charged @ 20% on investment in buildings and equipments amounting to Rs 5,00,000.
- j) There are 100 rooms in the hotel 80% of the rooms are generally occupied in summer and 30% in winter.  
The period of summer and winter may be considered to be of 6 month in each case: A month may be assumed of 30 days.

(13)

**SOLUTION 4**

**Operating Cost Statement showing Room Rent per Day**

(Room-Days: 19,800)

Particulars	Per annum
<b>A. Total Cost</b>	
Staff Salaries	1,02,200
Room Attendant's wages [Refer to Working Note (ii)]	79,200
Lighting, Heating and Power [Refer to Working Note (iii)]	73,200

Repair to buildings		10,000
Licence etc.		4,800
Sundries		6,600
Interior Decoration and Furnishing		10,000
Depreciation on :		
Building @ 5% on Rs. 4,00,000	Rs. 20,000	
Other Equipments @ 10% (5,00,000 – 4,00,000)	Rs. 10,000	30,000
Interest on Investments (20% on Rs, 5,00,000)		1,00,000
<b>Total Cost</b>		<b>4,16,000</b>
B. Profit @ 25% on cost excluding interest (i.e. 25% on Rs. 3,16,000)		79,000
C. Total Rent to be charged for all rooms (A + B)		4,95,000
D. Room-days		19,800
E. Room Rent per day (C/D)		25

**Working Notes:**

(i) Calculation of Room Days:		
Summer: 100 rooms x 80/100 x 6 months x 30 days	=	14,400
Winter: 100 rooms x 30/100 x 6 months x 30 days	=	5,400
Total		19,800
(ii) Calculation of Room Attendants' Wages:		
Summer: Rs. 4 x 100 rooms x 80% x 6 months x 30 days	=	Rs. 57,600
Winter: Rs. 4 x 100 rooms x 30% x 6 months x 30 days		21,600
Total		79,200
(iii) Calculation of Lighting, Heating and Power:		
Lighting:		
Summer: Rs. 100 x 100 rooms x 80% x 6 months	=	Rs. 48,000
Winter: Rs. 100 x 100 rooms x 30% x 6 months	=	18,000
Power:		
Winter: Rs. 40 x 100 rooms x 30% x 6 months		7,200
Total		73,200

**5.**

A company runs a holiday home. For this purpose, it has hired a building at a rent of Rs. 10,000 per month alongwith 5% of total takings. It has three types of suites for its customers, viz., single room, double room and triple rooms.

Following information is given:

Types of Suite	Number	Occupancy percentage
Single Room	100	100%
Double Rooms	50	80%
Triple Rooms	30	60%

The rent of double room's suits is to be fixed at 2.5 times of the single room suite and that of triple rooms suites as twice of the double rooms suite.

The other expenses for the year 2006 are as follows:

	Rs.
Staff Salaries	14,25,000
Room attendants' 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

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to calculate the rent to be charged for each type of suite.

**(12)**

**SOLUTION 5**

**Total equivalent single room suites**

Nature of suite	Occupancy	Equivalent Single Room suites
Single room suites	100 x 360 x 100% = 36,000	36,000 x 1 = 36,000
Double room suites	50 x 360 x 80% = 14,400	14,400 x 2.5 = 36,000

Triple room suites	30 x 360 x 60% = 6,480	6,480 x 5 = 32,400
		Total 1,04,400

(ii) **Statement of Total Cost**

	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
	25,21,000
Building rent [10,000 x 12 + 5% on total taking]	1,20,000
	+ 5% on takings
<b>Total Cost</b>	<b>26,41,000 +5% on total takings</b>

Profit is 20% of total takings

Total takings = Rs. 26,41,000 + 25% of total takings

Let x be rent for single room suite

Then 1,04,400 x = 26,41,000 + 25% of (1,04,400 x)

or, 1,04,400 x = 26,41,000 + 26,100 x

or, 78,300 x = 26,41,000

or, x = 33.73

**6.**

A Multinational company runs a Public Medical Health Centre. For this purpose, it has hired a building at a rent of Rs. 10,000 per month with 5% of total taking. Health centre has three types of wards for its patients namely. General ward, Cottage ward and Deluxe ward. State the rent to be charged to each bed-day for different types of ward on the basis of the following information:

- The numbers of beds of each type are General ward 100, Cottage ward 50, Deluxe ward 30.
- The rent of Cottage ward bed is to be fixed at 2.5 times of the General ward bed and that of Deluxe ward bed as twice of the Cottage ward bed.
- The occupancy of each type of ward is as follows:  
General ward 100%, Cottage ward 80% and Deluxe ward 60%. But in general ward there were occasions when beds are full, extra beds were hired at a charges of Rs. 20 per bed. The total hire charges for the extra beds incurred for the whole year amount to Rs. 12,000.
- The Health Centre engaged a heart specialist from outside and on an average fees paid to him was Rs. 15,000 per trip. He makes three trips in the whole year.
- The other expenses for the year were as under:

	Rs.
Salary for Supervisors, Nurses, Ward boys	4,25,000
Repairs and maintenance	90,000
Salary of doctors	13,50,000
Food supplied to patients	40,000
Laundry charges for their bed linens	80,500
Medicines supplied	74,000
Cost of oxygen, X-ray etc. other than directly borne for Treatment of patients	49,500
General administration charges	63,000
f) Provided Profit @ 20% on total taking.	
g) The Health Centre imposes 8% service tax on rent received.	
h) 360 days may be taken in year.	

**(13)**

**SOLUTION 6**

**(a) Statement of Total Cost**

Particulars	(Rs)
Salary of Supervisor, Nurses, Ward boys	4,25,000
Repairs and Maintenance	90,000
Salary of doctors	13,50,000
Food supplied to patients	40,000
Laundry charges for their bed linens	80,500

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Service &amp; Operating Costing (Model Test Paper &amp; Answer) Marks: 75 Time: 135 Minutes

Medicines supplied	74,000
Cost of oxygen, X ray etc, other than directly borne	
For treatment of patients	49,500
General administration charges	63,000
Building rent (10 x 12,000)	Rs. 1,20,000
Additional building rent on takings	5% on Total Takings
Hire charges extra beds	Rs. 12,000
Fees to heart specialists (3 x 15,000)	Rs. 45,000
Total Cost	Rs 23,49,000 + 5% on Total Takings
Profit	20% on Total Takings
Total Takings	Rs 23,49,000 + 25% of Total Takings
Total Takings (assuming X to be the rent per day)	1,05,000 x X

**Rent to be charged**

$$1,05,000 \times X = 23,49,000 + 25\% (1,05,000 \times X) = 78750X = 23,49,000 \text{ or } X = 29.83 \text{ (Rounded Off)}$$

**No of beds with Equivalent Rent**

Nature of wards	Occupancy	Weight of rent	Ward Days
General ward	100 x 360 x 100%	36,000 x 1	36,000
Additional general ward	12000/20 = 600	600 x 1	600
Cottage ward	50 x 360 x 80%	14,400 x 2.5	36,000
Deluxe ward	30 x 360 x 60%	6,480 x 5	32,400
Total			1,05,000

**Rent to be charged**

Particulars	Basic	Service Tax	Total
General ward	29.83	2.39	32.22
Cottage ward	74.58	5.97	80.55
Deluxe ward	149.15	11.93	161.08

**Note:** You may assume Total Taking to include Service Tax also.

$$\text{Rent} = 23,49,000 + 25\% \times (1,05,000 \times 1.08) + 0.08 \times (1,05,000X) = 1,05,000X \times 1.08 = 23,49,000 + 28,350X + 8,400X = 1,13,400X$$

Therefore X = Rs 30.65

**Rent to be Charged**

Particulars	Basic	Service Tax	Total
General ward	30.65	2.45	33.10
Cottage ward	76.63	6.13	82.76
Deluxe ward	153.25	12.26	165.51