12 CHAPTER

Service Costing

Service or Operating Costing	• It is that form of operation costing which applies where standardized services are rendered either by an undertaking or by a service cost centre within an undertaking. • It is also known as Service Costing. • It is generally applied in road transport, railways, airlines, canteen etc.
Features of Operating Costing	• Services are standardized. • Investment in fixed assets is high and in working capital is low. • Major portion of the total cost is fixed cost. Hence, the cost per unit of service rendered is affected by the economies and scale of operations.
Applications of Service Costing	• **Internal –** It may be used for in-house services like canteen, transport, boiler house for providing steam to production dept. etc. • **External –** It is offered to outside customer like transport service by transporter, insurance, IT Companies etc.
Service Costing Vs Product Costing	• **Tangibility** – Unlike products, service are intangible and cannot be stored, hence, there is no inventory for the service. • **Cost units** – Use of composite cost units for cost measurement and to express the volume of outputs. • **Material vs Employee cost** – Unlike product manufacturing, employee cost constitute a major cost element than material cost. • **Traceability of costs** – Indirect costs have a significant portion in total cost of a service and it may not be economically feasible to trace all costs to the services.
Classification of Operating Cost	• **Operating and running costs –** These are the costs which are incurred for operating and running the vehicle. For e.g. cost of diesel, petrol etc. • **Standing Costs –** These are the costs which are incurred irrespective of operation. For e.g. rent of garage, driver salary etc. • **Maintenance Cost –** These are the costs which are incurred to keep the vehicle in good or running condition e.g. repair cost, overhauling etc.
Service Cost Unit	• In case of service industry, there can be two types of cost unit i.e. single cost unit or multiple/composite cost unit. • The selection of cost unit is a very important issue because it should reflect the realistic cost along with the effects of different factors like full time, part time, off-season etc. • Generally, composite cost units are used in case of service costing which complies with all criterions. • It can be classified in two ways i.e. Absolute (weighted average) and Commercial (simple average)

Composite Cost Unit	• It consists of two different units. • E.g. passenger-km, ton-km etc.
Absolute (weighted average) tonne-kms	• These are calculated on the basis of actual haulage from one destination to another when the same truck or station-wagon carries freight from different destinations in one trip. • It is determined by multiplying various distances by respective load quantity carried.
Commercial (simple average) tone-kms	• It is the sum total of tonnes-kms which is determined by multiplying total distance by average load quantity carried. • Numerically, Commercial tonne-km = Average load × Distance covered
Equivalent cost unit	• It is used when two or more different grade of service uses common resources. • Each grade of service is assigned a weight and converted into equivalent units.
BOT Approach	• It stands for Build-Operate-Transfer approach • It is an option for the Government to outsource public projects to the private sector. • In this case, the private sector designs, finances, constructs and operate the facility and eventually after specified concession period, the ownership is transferred to the Government.

Cost Units used in Service industry are:

Service Industry	Unit of Cost (examples)
Transport services	Passenger-km (in public transportation) Quintal-km or ton-km (in goods carriage)
Electricity supply service	Kilowatt-hour (kWh)
Hospital	Patient per day, room per day or per bed, per operation etc.
Canteen	Per item, per meal etc.
Cinema	Per ticket
Hotels	Guest Days or Room Days
Bank or Financial Institutions	Per transaction, per services (e.g. per letter of credit, per application, per project etc.)
Educational Institutes	Per course, per student, pre module etc.
IT & ITES	Cost per project, per module etc.
Insurance	Per policy, per claim, per TPA etc.

Key Performance Indicator (KPI)

These are the quantitative and qualitative factors which are used to assess the performance. Various KPIs for some service industry are as follows:

Industry	KPI	Meaning
Transportation	Number of shipments	This logistics metric monitors the number of orders that are shipped out of the warehouse.
	Truck Turnaround Rate (Truck Turning)	The time from when a delivery truck enters the warehouse to collect or deliver products to when it exits the facility.
	Lead Time (Order Cycle Time)	The amount of time in between order placement by customer and receipt of order.
	On-time and In-full (OTIF)	The number of orders delivered according to the schedule and quantity specified.
Hotel Industry	Cost per Occupied Room (CPOR)	The average cost per occupied room
	Occupancy Rate	The ratio of rented or used rooms to the total amount of available rooms
	Revenue per available room (RevPAR)	The average revenue per available room days.
Hospitals/Health care Industry	Bed Occupancy Rate	The proportion of hospital beds in use at any one time
	Self-To-Patient Ratio	The number of staff resources present to attend to the patients in a hospital over a certain period of time
	Average Treatment Charge	The average amount that a facility charges a patient for a treatment
IT & ITES Sector	Gross burn Rate	The rate at which the company sues up its available cash to cover operating expenses.
	Customer Acquisition Cost (CAC)	The amount it takes to attract new customers.
	Customer Lifetime Value (CLV)	The typical net profit a company generates over the entire life cycle of a single customer.
	Monthly Recurring Revenue (MRR)	The amount earned each month through subscription renewals, mew sales, upsells, and fluctuations on a monthly basis.
	Churn Rate	The percentage of customers that cancel their recurring subscriptions over a given time period.
	Cost per Feature	How much a specific feature costs your business, based on usage and cloud costs.
Telecom	Average return per user (ARPU)	How much money a company is making for each person using its service.

Industry	KPI	Meaning
	Subscriber acquisition cost (SAC)	Cost involved with gaining new subscribers.
	Network Operating Cost	Expenditure incurred on continual upkeep to telecom's network
	Gross Revenue Retention (GRR)	How well a company is retaining its customers based on factors such as sales price increases, organic customer growth and more.
Education Sector	Instructional Costs	The cost of part-time and full-time faculty members.
	Administrative cost per student	How much an institution is spending on administrative services on a per student basis.
	Student-to-Facility Ratio	Costs accrued by students on a semester or annual basis.
Insurance Sector	Average Cost Per Claim	The average cost of each claim mad
	Components of Claim costs (CCC)	Costs which are associated with a claim like legal fees, time to settle, administration costs, and report delays.
	Cost per Quote	The costs that the company incurs in order to get a quote in front of a potential client
	Administrative costs per policy	The cost of the policy administration to number of policies outstanding.
	Average policy size	The total amount of premium collected by the number of policies issued for a given time period.

PRACTICE QUESTIONS

Example–1: A bus travels for 25 days in a month and covers 200 kms per day. If capacity of bus is 50 passengers which is 80% occupied. Find passenger kms.

Example–2: A company has 5 buses which travel for 100 km per day. These buses don't work on 4 Sundays during the month of March. On 15th March, buses were off the road due to strike. The bus is 50 seater and usually runs 10% vacant. Find passenger kms.

Example–3: A bus works for 27 days and makes 4 trips of 30 kms each per day. The bus is 50 seater and usually runs 20% vacant. Find passenger kms.

Example–4: A bus works for 25 days and makes 4 round trips of 25 kms each per day. The bus is 50 seater and usually runs 10% vacant. Find passenger kms.

Example–5: A 10 ton truck travels between city A and B. It makes 4 round trips a day of 20 kms each. The truck is fully loaded on outward journey and returns empty. In the month of April, there are 4 Sundays on which truck doesn't work. On 20th April, truck was off the road due to strike. Find ton-km for month of April.

Example–6: A company has 20, 10 ton lorries and 30, 8 ton lorries. The lorries travel between cities A and B which are 25 kms apart. Each lorrey makes 4 trips everyday. On the outward journey, the lorries are fully loaded and on the return journey the lorries carry 80% capacity load. Assume 25 days a month. On an average 5 lorries are off the road for repair and maintenance at all times. Calculate normally effective ton-km for one year.

1. A transport service company is running five buses between two towns which are 50 kilometers apart. Seating capacity of each bus is 50 passenger. The following particulars were obtained from their books for April: **[SM]**

	₹
Wages of drivers, conductors and cleaners	24,000
Salaries of office staff	10,000
Diesel oil and other oil	35,000
Repairs and maintenance	8,000
Taxation, insurance etc.	16,000
Depreciation	26,000
Interest and other expenses	20,000
	1,39,000

Actually, passengers carried were 75% of seating capacity. All buses run on all days of the month. Each bus made one round trip per day. Find out the cost per passenger km.

Ans. ₹0.2471.

2. ABC Transport company has given a route 40 kilometers long to run bus. **[SM]**

(a) The bus costs the company a sum of ₹20,00,000
(b) It has been insured at 3% p.a. and
(c) The annual tax will amount to ₹20,000
(d) Garage rent is ₹20,000 per month
(e) Annual repairs will be ₹2,04,000
(f) The bus is likely to last for 5 years.
(g) The driver's salary will be ₹30,000 per month and the conductor's salary will be ₹25,000 per month in addition to 10% of takings as commission (to be shared by the driver and conductor equally).
(h) Cost of stationery will be ₹1,000 per month
(i) Manager-cum-accountant salary is ₹17,000 per month.
(j) The bus will make 3 up and down trips carrying on an average 40 passengers on each trip.
(k) The bus will run on an average 25 days in a month.
Assuming 15% profit on takings, calculate the bus fare to be charged from each passenger.
(l) Petrol cost will be ₹ 500 for every 100 kms travel.

Ans. ₹1.

3. Mr. X owns a bus which runs according to the following schedule: **[SM]**

(i) Delhi to Chandigarh and back, the same day

Distance covered	250 km one way
Number of days run each month	8
Seating capacity occupied	90%

(ii) Delhi to Agra and back, the same day

Distance covered	210 km one way
Number of days run each month	10
Seating capacity occupied	85%

(iii) Delhi to Jaipur and back, the same day

Distance covered	270 km one way
Number of days run each month	6
Seating capacity occupied	100%

(iv) Following are the other details:

Cost of the bus	₹12,00,000
Salary of the driver	₹24,000 p.m.
Salary of the conductor	₹21,000 p.m.
Salary of the part-time Accountant	₹5,000 p.m.
Insurance of the bus	₹4,800 p.a.
Diesel consumption 4 km per litre at	₹56 per litre
Road tax	₹15,915 p.a.
Lubricant oil	₹10 per 100 km
Permit fee	₹315 p.m.
Repairs and maintenance	₹1,000 p.m.
Depreciation of the bus	@20% p.a.
Seating capacity of the bus	50 persons

Passenger tax is 20% of the total takings. Calculate the bus fare to be charged from each passenger to earn a profit of 30% on total takings. The fares are to be indicated per passenger for the journeys:

(i) Delhi to Chandigarh; (ii) Delhi to Agra; (iii) Delhi to Jaipur.

Ans. (i) ₹225; (ii) ₹189; (iii) ₹243.

4. SK is a Public School having 25 buses each plying in different directions for the transport of its school students. In view of large number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload of the students has been so arranged that in the morning, the first trip picks up senior students and the second trip plying an hour later picks up junior students. Similarly, in the afternoon, the first trip takes the junior students and an hour later the second trip takes the senior students home.

The distance traveled by each bus, one way is 16 km. The school works 24 days in a month and remains closed for vacation in May and June. The bus fee, however is payable by the students for all the 12 months in a year. The details of expenses for the year are as under:

Driver's salary – payable for all the 12 months	₹5,000 per month per driver
Cleaner's salary – payable for all the 12 months (one cleaner has been employed for every five buses)	₹3,000 per month per cleaner
License fees, taxed etc.	₹2,300 per bus per annum
Insurance premium	₹15,600 per bus per annum
Repairs and Maintenance	₹16,400 per bus per annum
Purchase price of the bus	₹16,50,000 each
Life of the bus	16 years
Scrap Value of each bus at the end of the life	₹1,50,000
Diesel Cost	₹18.50 per litre

Each bus gives an average of 10 km per litre of diesel. The seating capacity of each bus is 60 students. The seating capacity is fully occupied during whole year.

The school follows differential bus fees based on distance traveled as under:

Students picked up and dropped within the range of distance from the school	Bus Fare	Percentage of students availing the facility
4 km	25% of full	15%
8 km	50% of full	30%
16 km	Full	55%

Ignore interest. Since the bus fees has to be based on average cost, you are required to:

(a) Prepare a statement showing the expenses of operating a single bus and the fleet of 25 busses for a year.

(b) Work out average cost per student per month in respect of:

(i) Students coming from a distance of upto 4 km from the school

(ii) Students coming from a distance of upto 8 kms from the school

(iii) Students coming from a distance of upto 16 kms from the school

Ans. (a)1720, 9562, 19136 (b) 624072, 877527, 1284437 (c) 1577, 877, 1754

5. A company is considering three alternative proposals for conveyance facilities for its sales personnel who have to do considerable travelling, approximately 20,000 kms every year. The proposal are as follows: **[SM]**

(i) Purchase and maintain its own fleet of cars. The average cost of a car is ₹1,00,000

(ii) Allow the executive use his own car and reimburse expenses at the rate of ₹1.60 paise per kilometer and also bear insurance costs.

(iii) Hire cars from an agency at ₹20,000 per year per car. The company will have to bear costs of petrol, taxes and tyres.

The following further details are available:

Petrol ₹0.60 per km

Repairs and maintenance ₹0.20 per km

Tyre ₹0.12 per km

Insurance ₹1,200 per car per annum;

Taxes ₹800 per car per annum
Life of the car: 5 years with annual mileage of 20,000 kms
Resale value: ₹20,000 at the end of the fifth year
Work out the relative costs of three proposals and rank them.

Ans. ₹1.82; ₹1.66; ₹1.76.

6. Mr. SK now spends ₹0.90 per km on taxi for his clients' work. He is considering two other alternatives, the purchase of a new car or an old car. The estimated cost figures are:

Items	New Car	Old Car
Purchase price	35,000	20,000
Sale price, after 5 years	19,000	12,000
Repairing and servicing, per annum	1,000	1,200
Taxes and Insurance per annum	1,700	700
Petrol consumption per litre	10 km	7 km
Petrol price per litre	3.50	3.50

He estimates that he goes 10,000 km annually. Which of the three alternatives will be cheaper? If his practice expands and he has to go 19,000 km per annum, what should be his decision? At how many kms per annum will the cost of the two cars break even and why? Assume petrol only as variable cost. Ignore interest and income tax.

Ans. Old car for10,000 km; New car for 19,000 km; 16,000 km.

7. A factory which uses a large amount of coal is situated between two collieries 'S' and 'K' the former being 5 kilometers and the latter 10 kilometers distant from the factory. A fleet of lorries of 5 tonnes carrying capacity is used for the collection of coal from the pitheads. The lorries give an average speed of 20 kilometers per hour when running and regularly take 10 minutes in the factory premises to unload. At colliery 'S' loading time averages 30 minutes per load and at colliery 'K' 20 minutes per load.

Driver's wages, license, insurance, depreciation, garage and similar charges are notices to cost ₹6 per hour operated. Fuel, oil, tyres, repairs and similar charges are noticed to cost 60 paise per kilometer run. Draw up a statement showing the cost per tonne-kilometer of carrying coal form each colliery. If the coal is of equal quality and price at pithead, from which colliery should the purchases be made?

Ans. ₹0.52; ₹0.42.

8. SK Transport Ltd. charges ₹90 per ton for its 6 tons truck lorry load from city 'A' to city 'B'. The charges for the return journey are ₹84 per ton. No concession or reduction in these rates is made for any delivery of goods at intermediate station 'C'. In January, the truck made 12 outward journeys for city 'B' with full load out of which 2 ton were unloaded twice in the way at city 'C'. The truck carried a load of 8 tons in its return journey for 5 times but once caught by police and ₹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'. **[SM]**

The distance from city 'A' to city 'C' and city 'B' are 140 kms and 300 kms respectively. Annual fixed cost and maintenance charges are ₹60,000 and ₹12,000 respectively. Running charges spent during January, are ₹2,944. You are required to find out the cost per absolute ton-km and the profit for January. Also calculate cost per commercial ton-km.

Ans. ₹0.20; ₹3,224.

9. A transport company has a fleet of four trucks of 10 tonnes, capacity each plying in different directions for transport of customers' goods. The trucks run loaded with goods and return empty. The distance traveled, number trips made and the load carried per day by each truck are as under:

[RTP Nov 2019]

Truck No.	One way distance (Km)	No. of trips per day	Load carried per trip per day (tonnes)
1	48	4	6
2	120	1	9
3	90	2	8
4	60	4	8

The analysis of maintenance cost and the total distance traveled during the last two years is as under:

Year	Total distance traveled	Maintenance cost ₹
1	1,60,200	1,38,150
2	1,56,700	1,35,525

The following are the details of expenses for the last year under review:

Diesel	:	₹60 per litre. Each liter gives 4 km per litre of diesel on average
Driver Salary	:	₹22,000 per month
License and taxes	:	₹15,000 per annum per truck
Insurance	:	₹80,000 per annum for all 4 trucks
Purchase price per truck	:	₹30,00,000, Life 10 years, Scrap value at the end of life is ₹1,00,000
Oil and sundries	:	₹525 per 100 km run
General overhead	:	₹1,10,840 per annum

The vehicles operate 24 days per month on an average

Required:

(a) Prepare an Annual Cost Statement covering the fleet of four trucks

(b) Calculate the cost per Km run

(c) Determine the freight rate per tonne km to yield a profit of 30% on freight

Ans. (a) ₹1,13,39,112; (b) ₹26.89; (c) ₹10.057.

10. In order to develop tourism, ABCL airline has been given permit to operate three flights in a week between X and Y cities (both side). The Airline operates a single aircraft of 160 seating capacity. The normal occupancy is estimated at 60% throughout the year of 52 weeks. The one-way fare is ₹7,200. The costs of operation of flights are:

Variable Cost:	
Fuel Cost (variable)	₹96,000 per flight
Food served on board on non-chargeable basis	₹125 per passenger
Commission	5% of the fare applicable for all bookings
Fixed Cost:	
Aircraft Lease	₹3,50,000 per flight
Landing charges	₹72,000 per flight

Required:

(i) Calculate net operating income per flight

(ii) The airlines expect that its occupancy will increase to 108 passengers per flight if the fare is reduced to ₹6,720. Advise whether this proposal should be implemented or not.

Ans. (i) ₹1,26,640; (ii) Accept the proposal.

11. From the following data pertaining to the year prepare a cost sheet showing the cost of electricity generated per kwh by SK Thermal Power Station.

Total units generated	10,00,000 kwh
	₹
Operating labour	50,000
Repairs & maintenance	50,000
Lubricants, spares and stores	40,000
Plant supervision	30,000
Administration overheads	20,000

Coal consumed per kwh for the year is 2.5 kg @ ₹0.02 per kg. Depreciation charges @ 5% on capital cost of ₹2,00,000.

Ans. ₹0.25.

12. SK Hospital runs a Critical Care Unit (CCU) in a hired building. CCU consists of 35 beds and 5 more beds can be added, if required. **[SM]**

Rent per month	-	₹75,000
Supervisors (2 persons)	-	₹25,000 per month – each
Nurse (4 persons)	-	₹20,000 per month – each
Ward Boys (4 persons)	-	₹5,000 per month – each

Doctors paid ₹2,50,000 per month – paid on the basis of number of patients attended and the time spent by them.

Other expenses for the year are as follows:

Repair (Fixed)	-	₹ 81,000
Food to patients (variable)	-	₹8,80,000
Other services to patients (variable)	-	₹3,00,000
Laundry charges (variable)	-	₹6,00,000
Medicines (variable)	-	₹7,50,000
Other fixed expenses	-	₹10,80,000
Administration expenses allocated	-	₹10,00,000

It was estimated that for 150 days in a year 35 beds are occupied and for 80 days only 25 beds are occupied. The hospital hired 750 beds at a charge of ₹100 per bed per day, to accommodate the flow of patients. However, this does not exceed more than 5 extra beds over and above the normal capacity of 35 beds on any day.

You are required to:

(a) Calculate profit per patient day, if the hospital recovers on an average ₹2,000 per day from each patient.

(b) Find out breakeven point for the hospital.

Ans. (a) ₹691.75; (b) 3,741 patient days.

13. Following are the data pertaining to SK Pvt. Ltd. for the year: **[SM]**

Particulars	Amount (₹)
Salary to Software Engineers (5 persons)	15,00,000
Salary to Project Leader (2 persons)	9,00,000
Salary to Project Manager	6,00,000
Repairs & Maintenance	3,00,000
Administration Overheads	12,00,000

The company executes a Project PK, the details of the same are as follows:

Project duration – 6 months

One Project Leader and three Software Engineers were involved for the entire duration of the project, whereas Project Manager spends 2 months' efforts, during the execution of the Project.

Travel expenses incurred for the project – ₹1,87,500

Two laptops were purchased at a cost of ₹50,000 each, for use in the project and the life of the same is estimated to be 2 years.

Prepare project cost sheet.

Ans. ₹13,75,000.

14. SK Toll Plaza Ltd built a 60 km long highway and now operates a toll plaza to collect tolls from passing vehicles using the same. The Company has invested ₹600 crores to build the road and has estimated that a total of 60 crore vehicles will be using the highway during the 10 years toll collection tenure. Toll Operating and Maintenance cost for the month of April are as follows:

[SM, Similar Nov 2020]

(i) Salary to:

Collection Personnel (3 shifts and 4 persons per shift) – ₹150 per day per person
Supervisor (2 shifts and 1 person per shift) – ₹250 per day per person
Security Personnel (3 shifts and 2 persons per shift) – ₹150 per day per person
Toll Booth Manager (2 shifts and 1 person per shift) – ₹400 per day per person

(ii) Electricity – ₹80,000

(iii) Telephone – ₹40,000

(iv) Maintenance Cost – ₹30 lacs

(v) The company needs 25% profit over total cost to cover interest and other costs.

Required:

(a) Calculate cost per kilometer.

(b) Calculate the toll rate per vehicle (assume there is only one type of vehicle)

Ans. (a) ₹8,87,333.33; (b) ₹13.31.

15. The loan department of a bank performs several functions in addition to home loan application processing task. It is estimated that 25% of the overhead costs of loan department are applicable to the processing of home-loan application. The following information is given concerning the processing of a loan application: **[SM]**

Direct Professional labour:

Particulars	Amount (₹)
Loan Processor monthly salary:	80,000
(4 employees @ ₹20,000 each)	
Loan department overhead costs (monthly)	
Chief loan officer's salary	5,000
Telephone expenses	750
Depreciation building	2,800
Legal advice	2,400
Advertising	400
Miscellaneous	650
Total overhead costs	12,000

You are required to compute the cost of processing home loan application on the assumption that two hundred home loan applications are processed each month.

Ans. ₹415.

16. SK Lifecare Ltd. operates in life insurance business. Last year it has launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'. The company has incurred the following expenditures during the last year for the policy: **[SM, RTP Nov 2018]**

Policy development cost	₹11,25,000
Cost of marketing of the policy	₹45,20,000
Sales support expenses	₹11,45,000

Policy issuance cost	₹10,05,900
Policy servicing cost	₹35,20,700
Claims management cost	₹ 1,25,600
IT Cost	₹74,32,000
Postage and logistics	₹10,25,000
Facilities cost	₹15,24,000
Employees cost	₹5,60,000
Office administration cost	₹16,20,400

Number of policy sold – 528

Total insured value of policies-₹1,320 crore

Required:

(a) Calculate total cost for Professionals Protection Plus policy segregating the costs into four main activities namely (i) Marketing and sales support, (ii) Operations, (iii) IT and (iv) Support functions.

(b) Calculate cost per policy

(c) Calculate cost per rupee of insured value.

Ans. (a) ₹2,36,03,600; (b) ₹44,703.79; (c) ₹0.0018.

17. A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹10,000 per month along with 5% of total taking. It has three types of suits for its customer, viz. single room, double rooms and triple rooms. Following information is given: **[SM, RTP May 2019]**

Type of suite	Number	Occupancy percentage
Single room	100	100%
Double room	50	80%
Triple room	30	60%

The rent of double rooms suite is to be fixed at 2.5 times of the single room suite and that of triple rooms suite as twice of the double rooms suite. The other expenses for the year are as follows:

	₹
Staff salaries	14,25,000
Room attendants's wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,000
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.

Ans. ₹33.73; ₹84.33; ₹168.65.

18. A company wants to outsource the operation of its canteen to a contractor. The company will provide space for cooking, free electricity and furniture in the canteen. The contractor will have to provide lunch to 300 workers of which 180 are vegetarian (Veg) and the rest are non-vegetarian (Non-Veg). In the case of non-veg meals, there will be a non-veg item in addition to the veg items. A contractor who is interested in the contract has analyzed the costs likely to be incurred. His analysis is given below: **[May 2018]**

Cereals	₹8 per plate
Veg items	₹5 per plate
Non-veg items	₹15 per plate
Spices	₹1 per plate
Cooking oil	₹4 per plate
One cook	Salary ₹13,000 per month
Three helpers	Salary ₹7,000 per month per head
Fuel	Two commercial cylinders per month, price ₹1,000 each.

On an average the canteen will remain open for 25 days in a month. The contractor wants to charge the non-veg meals at 1.50 times of the veg meals.

You are required to calculate:

(i) The price per meal (veg and non-veg separately) that contractor should quote if he wants a profit of 20% on his takings.

(ii) The price per meal (separately for veg and non-veg) that a worker will be required to pay if the company provides 60% subsidy for meals out of welfare fund.

Ans. (i) Veg = ₹30; Non-veg = ₹45; (ii) Veg = ₹12; Non-veg = ₹18.

19. AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes alongwith primary and secondary classes but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

[SM, RTP May 2020]

	Amount (₹)
Teachers' salary (15 teachers × ₹35,000 × 12 months)	63,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × ₹15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × ₹10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examinations expenditure	10,80,000
Office & Administration cost	15,20,000
Annual day expenses	4,50,000
Sports expenses	1,20,000

(i) Other Information:

	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for admission	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	-

(ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

(iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.

(iv) One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.

(v) All school students irrespective of section and age participate in annual functions and sports activities.

Requirement:

(a) CALCULATE cost per student per annum for all three streams.

(b) If the management decides to take uniform fee of ₹1,000 per month from all higher secondary students, CALCUALTE stream wise profitability.

(c) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all the three streams respectively.

Ans. (a) 1720, 9562, 19136 (b) – 624072, 877527, – 1284437 (c) 1577, 877, 1754

PRACTICE QUESTIONS

20. A transport company has been given a 40 kilometer long route to run 5 buses. The cost of each bus is ₹6,50,000. The buses will make 3 round trips per day carrying on an average 80 percent passengers of their seating capacity. The seating capacity of each bus is 40 passenger. The buses will run on an average 25 days in a month. The other information for the year are given below:

Garage rent	₹4,000	per month
Annual repairs and maintenance	₹22,500	each bus
Salaries of 5 drivers	₹3,000	each per month
Wages of 5 drivers	₹1,200	each per month
Manager's salary	₹7,500	per month
Road tax, permit fee etc.	₹5,000	for a quarter

Office expenses	₹2,000	per month
Cost of diesel per litre	₹33	
Kilometer run per litre for each bus	6 kilometers	
Annual depreciation	15% of cost	
Annual Insurance	3% of cost	

You are required to calculate the bus fare to be charged from each passenger per kilometer, if the company wants to earn profits of 33.33% on taking (total receipts form passenger).

Ans. ₹0.405.

21. Calculate a suggested fare per passenger-km from the following information for a Mini Bus: **[MTP Nov 2018]**

(a) Length of route: 30 km

(b) Purchase price ₹4,00,000

(c) Part of above cost met by loan, annual interest of which is ₹10,000 p.a.

(d) Other annual charges: Insurance ₹15,000, Garage rent ₹9,000, Road tax ₹3,000, Repair & maintenance ₹15,000, Administrative charges ₹5,000.

(e) Running Expenses: Driver & Conductor ₹5,000 p.m., Repairs/Replacement of tyre-tube ₹3,600 p.a., Diesel and oil cost per km ₹5

(f) Effective life of vehicle is estimated at 5 years at the end of which it will have a scrap value of ₹10,000.

(g) Mini bus has 20 seats and is planned to make Six no. two way trips for 25 days/p.m.

(h) Provide profit @ 20% of total revenue.

Ans. ₹0.42743.

22. M/s XY Travels has been given a 25 km long route to run an air-conditioned Mini Bus. The cost of bus is ₹20,00,000. It has been insured @3% premium per annum while annual road tax amounts to ₹36,000. Annual repairs will be ₹50,000 and the bus is likely to last for 5 years. The driver's salary will be ₹2,40,000 per annum, and the conductor's salary will be ₹1,80,000 per annum in addition to 10% of the takings as commission (to be shared by the driver and the conductor equally). Office and administration overheads will be ₹18,000 per annum. Diesel and oil will be ₹1,500 per 100 km. The bus will make 4 round trips carrying on an average 40 passengers on each trip. **[Nov 2018]**

Assuming 25% profit on takings and considering that the bus will run on an average 25 days in a month, you are required to:

(i) Prepare operating cost sheet (for the month)

(ii) Calculate fare to be charged per passenger km

Ans. (i) Total cost = ₹1,57,000; (ii) ₹1.20769.

23. A mini-bus, having a capacity of 32 passengers, operates between two places – 'A' and 'B'. The distance between the place 'A' and place 'B' is 30 km. The bus makes 10 round trips in a day for 25 days in a month. On an average, the occupancy ratio is 70% and is expected throughout the year. The details of other expenses are as under:

	Amount (₹)	
Insurance	15,600	per annum
Garage Rent	2,400	per quarter
Road tax	5,000	per annum
Repairs	4,800	per quarter
Salary of operating staff	7,200	per month
Tyres and Tubes	3,600	per quarter
Diesel (one litre is consumed for every 5 km)	13	per litre
Oil and Sundries	22	per 100 km
Depreciation	68,000	per annum

Passenger tax @ 22% on total taking is to be levied and bus operator requires a profit of 25% on total takings. Prepare operating cost statement on the annual basis and find out the cost per passenger kilometer and one way fare per passenger.

Ans. ₹13,69,433; ₹0.18; ₹10.20.

24. Royal Transport Service runs fleet of buses within the limits of Jaipur city. The following are the details which were incurred by the company during October, 2021: **[RTP Nov 2022]**

	(₹)
Cost of each bus	24,00,000
Garage rent	1,00,000
Insurance	25,000
Road tax	20,000
Manager's Salary	60,000
Assistant's Salary (Two)	32,000 each
Supervisor's Salary (Three)	24,000 each
Driver's Salary (Twenty-Five)	20,000 each
Cleaner's Salary (Twenty)	5,000 each
Office Staff's Salary	1,00,000
Consumables	1,20,000
Repairs & Maintenance	90,000
Other fixed expenses	72,000
Diesel (10 Kms per Litre)	80 per litre
Oil & Lubricants	1,45,000
Tyres and tubes	35,000
Depreciation	10% p.a. on cost

Other details are as below:

	Capacity
12 Buses	60 Passengers
13 Buses	50 Passengers

Each bus makes 4 round trips a day covering a distance of 10 Kilomteres in each trip (One way) on average. During the trips 80% of the seats are occupied. The annual records show that 5 buses are generally required to be kept away from roods each day for repairs. You are required to calculate cost per passenger-km. Cost sheet to be prepared on the basis of 25 buses.

Ans. ₹1.103.

25. SK Cabs Pvt. Ltd. is a New Delhi based cab renting company, provides cab facility on rent for cities Delhi, Agra and Jaipur to the tourists. To attract more tourists it has launched a new three days tour package for Delhi-Jaipur-Agra-Delhi. Following are the relevant information regarding the package:

Distance between Delhi to Jaipur (Km.)	274
Distance between Delhi to Agra (Km.)	242
Distance between Agra to Jaipur (Km.)	238
Price of diesel in Delhi	₹54 per litre
Price of diesel in Jaipur	₹56 per litre
Price of diesel in Agra	₹58 per litre
Mileage of cab per litre of diesel (Km.)	16
Chauffeur's salary	₹12,000 per month
Cost of the cab	₹12,00,000
Expected life of the cab	24,00,000 kms
Servicing cost	₹30,000 after every 50,000 kms run
Chauffeur's meal allowance	₹50 every 200 Kms of completed journey
Other set up and office cost	₹2,400 per month

SK Cabs has made tie-up with fuel service centres at Agra, Jaipur and Delhi to fill diesel to its cabs on production of fuel passbook to the fuel centre. Company has a policy to get fuel filled up sufficient to reach next destination only.

You are required to calculate the price inclusive of GST @ 18% to be quoted for the package if company wants to earn profit of 25% on its net takings i.e. excluding GST.

Ans. ₹7,952.26.

26. Navya LMV Pvt. Ltd., operates cab/car rental service in Delhi/NCR. It provides its service to the offices of Noida, Gurugram and Faridabad. At present it operates CNG fueled cars but it is also considering to upgrade these into Electric vehicles (EV). The details related with the owning of CNG & EV propelled cars are as tabulated below: **[RTP May 2022]**

Particulars	CNG Car	EV Car
Car purchase price (₹)	9,20,000	15,20,000
Govt. subsidy on purchase of car (₹)	-	1,50,000
Life of the car	15 years	10 years
Residual value (₹)	95,000	1,70,000
Mileage	20 km/kg	240 km per charge
Electricity consumption per full charged	-	30 Kwh
CNG cost per Kg (₹)	60	-
Power cost per Kwh (₹)	-	7.60
Annual Maintenance cost (₹)	8,000	5,200
Annual insurance cost (₹)	7,600	14,600
Tyre replacement cost in every 5 year (₹)	16,000	16,000
Battery replacement cost in every 8 years (₹)	12,000	5,40,000

Apart from the above, the following are the additional information:

Particulars	
Average distance covered by a car in a month	1,500 km
Driver's salary (₹)	20,000 p.m.
Garage rent per car (₹)	4,500 p.m.
Share of office and administration cost per car (₹)	1,500 p.m.

Required to calculate the operating cost of vehicle per month per car for both CNG & EV option.

Ans. CNG = ₹36,627.78; EV = ₹43,708.33.

27. SK Milk Co-Operative Society (SMCS) collects raw milk from the farmers of Ramgarh, Pratapgarh and Devgarh panchayats and processes these milks to make various dairy products. SMCS has its own vehicles (tankers) to collect and bring the milk to the processing plant. Vehicles are parked in the SMCS's garage situated within the plant compound. Following are the information related with the vehicles:

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles assigned	4	3	5
No. of trips a day	3	2	2
One way distance from the processing	24 k.m.	34 k.m.	16 k.m.
Toll tax paid p.m. (₹)	2,850	3,020	---

All the 5 vehicles assigned to Devgarh panchayat, were purchased five years back at a cost of ₹9,25,000 each. The 4 vehicles assigned to Ramgarh panchayat, were purchased two years back at a cost of ₹11,02,000 each and the remaining vehicles assigned to Pratapgarh were purchased last year at a cost of ₹13,12,000 each. With the purchase of each vehicle a two years free servicing warranty is provided. A vehicle gives 10 kmpl mileage in the first two year of purchase, 8 kmpl

in next two years and 6 kmpl afterwards. The vehicles are subject to depreciation of 10% p.a. on straight line basis irrespective of usage. A vehicle has the capacity to carry 25,000 litres of milk but on an average only 70% of the total capacity is utilized.

The following expenditure is related with the vehicles:

Salary to a Driver (a driver for each vehicle)	₹18,000 p.m.
Salary to a Cleaner (a cleaner for each vehicle)	₹11,000 p.m.
Allocated garage parking fee	₹1,350 per vehicle per month
Servicing cost	₹3,000 for every complete 5,000 k.m. run.
Price of diesel per litre	₹58.00

From the above information you are required to calculate

(a) Total operating cost per month for each vehicle. (Take 30 days for the month)

(b) Vehicle operating cost per litre of milk.

Ans. (a) ₹73,815.75; ₹65,954; ₹57,218.40; (b) ₹0.053.

28. A transport company has 20 vehicles, for which capacities are as follows: **[RTP Nov 2020]**

No. of vehicles	Capacity per vehicle
5	9 tonne
6	12 tonne
7	15 tonne
2	20 tonne

The company provides the goods transport service between stations 'S' to station 'K'. Distance between these stations is 200 kilometer. Each vehicle makes one round trip per day on an average. Vehicles are loaded with an average of 90% of capacity at the time of departure from station 'S' to station 'K' and at the time of return back loaded with 70% of capacity. 10% of vehicles are laid up for repairs every day. The following information are related to the month of October:

Salary of Transport Manager	₹30,000
Salary of 30 drivers	₹4,000 each driver
Wages of 25 helpers	₹2,000 each helper
Wages of 20 labourers	₹1,500 each labourer
Consumable stores	₹45,000
Insurance (Annual)	₹24,000
Road license (Annual)	₹60,000
Cost of diesel per litre	₹35
Kilometers run per litre each vehicle	5 km
Lubricating oil etc.	₹23,500
Cost of replacement of tyers, tubes, other parts etc.	₹1,25,000
Garage rent (Annual)	₹90,000
Transport Technical Service Charges	₹10,000
Electricity and Gas charges	₹5,000
Depreciation of vehicles	₹2,00,000

There is a workshop attached to transport department which repairs these vehicles and other vehicles also. 40 percent of transport manager's salary is debited to the workshop. The transport department is charged ₹28,000 for the service rendered by the workshop during October. During the month of October, operation was 25 days. You are required:

(a) Calculate per ton-km operating cost

(b) Find out the freight to be charged per ton-km, if the company earned a profit of 25% on freight.

Ans. (a) ₹1.0228; (b) ₹1.36.

29. X Ltd. distributes' its goods to a regional dealer using single lorry. The dealer premises are 40 kms away by road. The capacity of the lorry is 10 tonnes. The lorry makes the journey twice a day fully loaded on the outward journey and empty on return journey. The following information is available:

Diesel Consumption	8 km per litre
Diesel Cost	₹60 per litre
Engine Oil	₹200 per week
Driver's Wages (fixed)	₹2,500 per week
Repairs	₹600 per week
Garage Rent	₹800 per week
Cost of Lorry (excluding cost of tyres)	₹9,50,000
Life of Lorry	1,60,000 kms
Insurance	₹18,200 per annum
Cost of Tyres	₹52,500
Life of Tyres	25,000 kms
Estimated sale value of the lorry at end of its life is	₹1,50,000
Vehicle License Cost	₹7,800 per annum
Other Overhead Cost	₹41,600 per annum

The lorry operates on a 5 day week.

Required:

(i) A statement to show the total cost of operating the vehicle for the four week period analyzed into Running cost and Fixed cost.

(ii) Calculate the vehicle operating cost per km and per tonne km. (Assume 52 weeks in a year)

Ans. (i) ₹68,320; (ii) ₹21.35; ₹4.27.

30. Chiku Transport Service is a Delhi based national goods transport service provider, owning four trucks for this purpose. The cost of running and maintaining these trucks are as follows:

[MTP May 2024]

Particulars	Amount
Diesel cost	₹19.20 per km
Engine oil	₹4,200 for every 13,000 km
Repair & Maintenance	₹36,000 for every 10,000 km

Driver's salary	₹24,000 per truck per month
Cleaner's salary	₹15,000 per truck per month
Supervision and other general expenses	₹14,000 per month
Cost of loading of goods	₹180 per Metric Ton (MT)

All four trucks were purchased for ₹30 lakhs with an estimated life of 7,20,000 km each. During the next month, it is expecting 6 bookings, the details are as follows:

S. No.	Journey	Distance in km	Weight-Up (in MT)	Weight-Down (in MT)
1	Delhi to Kochi	2,700	14	6
2	Delhi to Guwahati	1,890	12	0
3	Delhi to Vijayawada	1,840	15	0
4	Delhi to Varanasi	815	10	0
5	Delhi to Asansol	1,280	12	4
6	Delhi to Chennai	2,185	10	8
	Total	10,710	73	18

Required:

(i) Calculate the total absolute Ton-km for the vehicles

(ii) Calculate the cost per ton-km

31. From the following data pertaining to the year 2020-21, prepare a cost statement showing the cost of electricity generated per kwh by PK Thermal Power Station. **[SM]**

Total units generated	10,00,000 kwh
	(₹)
Operating labour	15,00,000
Repairs & maintenance	5,00,000
Lubricants, spares and stores	4,00,000
Plant supervision	3,00,000
Administration overheads	20,00,000

5 kwh of electricity generated per kg of coal consumed @ ₹4.25 per kg. Depreciation charges @5% on capital cost of ₹2,00,00,000.

Ans. ₹6.55.

32. Solar Power Ltd. has a power generation capacity of 1000 Megawatt per day. On an average it operates at 85% of its installed capacity. The cost structure of the plant is as under: **[SM]**

	Cost particulars	Amount (₹in lakhs)
1.	Employee cost per year	2500
2.	Solar panel maintenance cost per year	250

3.	Site maintenance cost per year	150
4.	Depreciation per year	5940

Calculate cost of generating 1kW of power.

[1 Megawatt – 1,000 kW]

Ans. ₹2.849.

33. A group of 'Health Care Services' has decided to establish a Critical Care Unit in a metro city with an investment of ₹85 lakhs in hospital equipments. The unit's capacity shall be of 50 beds and 10 more beds, if required, can be added. **[May 2018]**

Other information for a year are as under:

	₹
Building Rent	2,25,000 per month
Manager Salary (Number of Manager – 03)	50,000 per month to each one
Nurses Salary (Number of Nurses – 24)	18,000 per month to each Nurse
Ward Boy's Salary (Number of Ward Boys – 24)	9,000 per month per person
Doctor's payment (Paid on the basis of number of patients attended and time spent by them)	5,50,000 per month
Food and laundry services (variable)	39,53,000
Medicines to patients (variable)	22,75,000 per year
Administrative Overheads	28,00,000 per year
Depreciation on equipments	15% per annum on original cost

It was reported that for 200 days in a year 50 beds were occupied, for 105 days 30 beds were occupied and for 60 days 20 beds were occupied.

The hospital hired 250 beds at a charge of ₹950 per bed to accommodate the flow of patients. However, this never exceeded the normal capacity of 50 beds on any day. Find out:

(i) Profit per patient day, if hospital charges on an average ₹2,500 per day from each patient

(ii) Break-even point per patient day (Make calculation on annual basis)

Ans. (i) ₹485.17; (ii) 10,187.

34. SLS Infrastructure builts and operates a 110 km long highway on the basis of Built-Operate-Transfer (BOT) model for a period of 25 years. A traffic assessment has been carried out to estimate the traffic flow per day. The details are as below: **[SM, MTP Nov 2019]**

S. No.	Type of Vehicle	Daily Traffic Volume
1.	Two wheelers	44,500
2.	Car and SUVs	3,450

3.	Bus and LCV	1,800
4.	Heavy commercial vehicles	816

The following is the estimated cost of the project:

S. No.	Activities	Amount (₹in lakh)
1.	Site clearance	170.70
2.	Land development and filling work	9,080.35
3.	Sub base and base courses	10,260.70
4.	Bituminous work	35,070.80
5.	Bridge, Flyovers, underpass, Pedestrian subway, footbridge etc.	29,055.60
6.	Drainage and protection work	9,040.50
7.	Traffic sign, marking and road appurtenance	8,405.00
8.	Maintenance, repairing and rehabilitation	12,429.60
9.	Environmental management	982.00
	Total Project Cost	1,14,495.25

An average cost of ₹1,120 lakh has to be incurred on administration and toll plaza operation. On the basis of the vehicle specifications (i.e. weight, size time saving etc.) the following weights has been assigned to the passing vehicles:

S. No.	Type of vehicle	
1.	Two Wheelers	5%
2.	Car and SUVs	20%
3.	Bus and LCV	30%
4.	Heavy Commercial Vehicles	45%

Required:

(a) Calculate the total project cost per day of concession period

(b) Compute toll fee to be charged for per vehicle of each type, if the company wants to earn a profit of 15% on total cost

[Note: Concession period is a period for which an infrastructure is allowed to operate and recovers its investment]

Ans. (a) ₹12.67; (b) ₹19.06.

35. ABC Bank is having a branch which is engaged in processing of 'Vehicle Loan' and 'Education Loan' applications in addition to other services to customers. 30% of the overhead costs for the branch are estimated to be applicable to the processing of 'Vehicle Loan' applications and 'Education Loan' applications each. **[Nov 2022]**

Branch is having four employees at a monthly salary of ₹50,000 each, exclusively for processing of Vehicle Loan applications and two employees at a monthly salary of ₹70,000 each, exclusively for processing of Education Loan applications.

In addition to above, following expenses are incurred by the Branch:

Branch Manager who supervises all the activities of branch, is paid at ₹90,000 per month.

Legal charges, Printing & stationery and advertising expenses are incurred at ₹30,000, ₹12,000 and ₹18,000 respectively for a month.

Other expenses are ₹10,000 per month.

You are required to:

(a) Compute the cost of processing a Vehicle Loan application on the assumption that 496 Vehicle Loan applications are processed each month.

(b) Find out the number of Education Loan applications if the total processing cost per Education Loan Application is sale as in the Vehicle loan Application as computed in (i) above.

Ans. (a) ₹500; (b) 376 applications.

36. MRSL Healthcare Ltd. has incurred the following expenditure during the last year for its newly launched 'COVI-19' Insurance policy: **[July 2021]**

	₹
Office administration cost	48,00,000
Claim management cost	3,80,000
Employees' cost	16,20,000
Postage and logistics	32,40,000
Policy issuance cost	29,50,000
Facilities cost	46,75,000
Cost of marketing of the policy	1,38,90,000
Policy development cost	35,00,000
Policy servicing cost	96,45,000
Sales support expenses	32,00,000
IT cost	?

Number of Policy sold: 2,800

Total insured value of policies - ₹3,500 crores

Cost per rupee of insured value - ₹0.002

You are required to:

(i) Calculate the total cost for "COVID-19" Insurance policy segregating the costs into four main activities namely (a) Marketing and Sales support (b) operations (c) IT Cost and (d) Support functions.

(ii) Calculate cost per policy

Ans. (i) ₹7,00,00,000; (ii) ₹25,000.

37. A hotel is being run in a Hill station with 200 single rooms. The hotel offers concessional rates during six off-season months in a year. During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending 31st March, 2019: **[SM, Nov 2019]**

(i) Occupancy during the season is 80% while in the off-season it is 40%.

(ii) Total investment in the hotel is ₹300 lakhs of which 80% relates to Buildings and the balance to Furniture and other Equipment.

(iii) Room attendants are paid ₹15 per room per day on the basis of occupancy of rooms in a month.

(iv) Expenses:

Staff salary (excluding that of room attendants)	₹8,00,000
Repairs to Buildings	₹3,00,000
Laundry Charges	₹1,40,000
Interior Charges	₹2,50,000
Miscellaneous Expenses	₹2,00,200

(v) Annual Depreciation is to be provided on Buildings @ 5% and 15% on Furniture and other Equipments on straight line method.

(vi) Monthly lighting charges are ₹110, except in four months in winter when it is ₹30 per room and this cost is on the basis of full occupancy for a month.

You are required to workout the room rent chargeable per day both during the season and the off-season months using the foregoing information.

(Assume a month to be of 30 days and winter season to be considered as part of off-season).

Ans. ₹158.72; ₹79.36.

38. A hotel having 20 single rooms is having 80% occupancy in normal season (8 months) and 50% in off-season (4 months) in a year (take 30 days month). **[MTP May 2024]**

	Amount in ₹
Annual Fixed expenses	
Salary of the staff	15,00,000
Repair & Maintenance	12,60,000
Depreciation on building & furniture	12,40,000
Other fixed expenses like dusting, sweeping etc.	13,25,000
	53,25,000
Variable expenses (per guest per day)	
Linen, laundry & security support	80.00
Electricity & other facilties	120.00
Misc. expenses like attendant etc.	300.00
	500.00

Management wishes to make a margin of 25% of total cost.

Required

(a) Calculate the Tariff per room per day.

(b) Calculate the break-even occupancy in normal season (in percentage also) assuming there is 50% occupancy in off-season.

Ans. (a) ₹1,945.68; (b) 2483 room days

39. Find out the most appropriate unit cost from the following information of ZMD Transport Services Ltd. dealing in goods carriage:

Total cost = ₹5,25,000
Kms. Travelled = 8,75,000 Tonnes carries = 4,000
No. of Drivers = 25
No. of trucks = 20
Tonnes Km carried = 6,55,000

(a) ₹0.6 (b) ₹0.8 (c) ₹21,000 (d) ₹131.25

Ans. 0.8

SOLUTION OF PRACTICE QUESTIONS

20. Operating Cost Sheet for the year

Particulars	(Total Passenger Km = 115,20,000)	
	Total Cost (₹)	Cost per Pass. Km (₹)
A. Fixed Charges:		
Garage rent (4,000 × 12)	48,000	
Salary of drivers (3,000 × 5 × 12)	1,80,000	
Wages of Conductors (1200 × 5 × 12)	72,000	
Manager's salary (7,500 × 12)	90,000	
Road Tax, Permit fee, etc. (5,000 × 4)	20,000	
Office expenses (2,000 × 12)	24,000	
Insurance ($6,50,000 \times \frac{3}{100} \times 5$)	97,500	
Repairs and Maintenance (22,500 × 5)	1,12,500	
Depreciation ($6,50,000 \times \frac{15}{100} \times 5$)	4,87,500	
Total (A)	11,31,500	0.098
B. Variable Charges:		
Diesel: $\frac{3,60,000}{6} \times ₹33$	19,80,000	0.172
Total (B)	19,80,000	0.172
Total Cost (A + B)	31,11,500	0.270
Add: 33-1/3 percent Profit on takings or 50% on cost	15,55,750	0.135
Bus fare to be charged from each passenger per km [31,11,500 ÷ 66.666667%]	46,67,250	0.405

Working Notes:

(i) Total Kilometers to be run during the year = 40 × 2 × 3 × 25 × 12 × 5 = 3,60,000 Kilometers

Total passenger Kilometers $= 3,60,000 \times 40 \times \frac{80}{100} = 1,15,20,000$ Passenger km

21. Total distance travelled by mini bus = 60 km × 6 tips × 25 days = 9,000 km

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

Statement of calculation of fare per passenger-km

Particulars	Amount (₹)
Fixed Expenses:	
Insurance (15,000 ÷ 12)	1,250
Garage rent (9,000 ÷ 12)	750
Road tax (3,000 ÷ 12)	250
Administrative charges (5,000 ÷ 12)	417
Depreciation [(4,00,000 – 10,000) ÷ (5 × 12)]	6,500
Interest on loan (10,000 ÷ 12)	833
Total Fixed cost (A)	10,000
Running Expenses:	
Repair & Maintenance (15,000 ÷ 12)	1,250
Replacement of tyre-tube (3,600 ÷ 12)	300
Diesel and oil cost (9,000 × 5)	45,000
Driver and conductor salary	5,000
Total Running cost (B)	51,550
Total Cost (A + B)	61,550.00
Add: Profit 20% of total revenue or 25% of total cost	15,387.50
Total revenue	76,937.50
Passenger km	1,80,000
Rate per passenger-km	0.42743

22. **Calculation of Passenger Kms**

No.	×	Kms	×	Passenger	=	Passenger Kms
1	×	25 × 4 × 2 × 25	×	40	=	2,00,000

Kms travel = 1 × 25 × 4 × 2 × 25 = 5,000 kms

Statement of Operating Cost

Particulars	Amount (₹)
Fixed Cost:	
Depreciation $\left[\left(\frac{20,00,000-0}{5}\right)\times\frac{1}{12}\right]$	33,333.33
Insurance (20,00,000 × 3% × 1/12)	5,000.00

Particulars	Amount (₹)
Road tax (36,000 ÷ 12)	3,000.00
Total Fixed Cost (A)	41,333.33
Variable Cost:	
Driver Salary (2,40,000 ÷ 12)	20,000
Conductor Salary (1,80,000 ÷ 12)	15,000
Diesel and oil $\left(\frac{1500}{100}\times 5{,}000\right)$	75,000
Total Variable Cost (B)	1,10,000
Maintenance Cost:	
Annual Repairs (50,000 ÷ 12)	4,166.67
Office and administration overheads (18,000 ÷ 12)	1,500.00
Total Maintenance Cost (C)	5,666.67
Total Cost (A + B + C)	1,57,000
(+) Commission (2,41,538 × 10%)	24,154
(+) Profit (2,41,538 × 25%)	60,634
Total Takings (1,57,000 ÷ 65%)	2,41,538
Effective Passenger km	2,00,000
Takings per effective passenger km	**1.20769**

23.

Particulars		Amount
A. Fixed Charges:		
Insurance		15,600
Garage Rent: ₹2,400 × 4		9,600
Road Tax		5,000
Repairs: ₹4,800 × 4		19,200
Salary of Operating Staff: ₹7,200 × 12		86,400
Depreciation		68,000
Total (A)		2,03,800
B. Variable Charges:		
Cost of diesel: $\frac{1{,}80{,}000}{5}\times$ ₹ 13		4,68,000
Oil & Sundries: $\frac{1{,}80{,}000}{100}\times$ ₹ 22		39,600
Tyres & Tubes: ₹3,600 × 4		14,400
Total (B)		5,22,000
	A. **Total Cost (A + B)**	7,25,800
Add: Passenger tax		3,01,275
Add: Profit Margin $\left[\frac{7{,}25{,}800}{100\% - 22\% - 25\%}\right]$		3,42,358
	Total Takings	13,69,433

No. of passenger kms = 10 × 2 × 30 × 25 × 12 × 32 × 70% = 40,32,000

Cost per Passenger – Km = $\frac{7,25,800}{40,32,000}$ = ₹0.18

One way fare per passenger = $\frac{13,69,433}{40,32,000} \times 30$ = ₹10.20

24.

Calculation of Passenger Kms

No.	×	Kms	×	Passenger	=	Passenger Kms
12	×	10 × 4 × 2 × 31	×	60 × 80%	=	14,28,480
13	×	10 × 4 × 2 × 31	×	50 × 80%	=	12,89,600
				Total	=	27,18,080
				(–) Normal loss	=	5,43,616
				Effective passenger km	=	21,74,464

Kms travel = (10 × 4 × 2 × 31)(12 + 13) = 62,000 kms

Actual total km travel = 62,000 × 20/25 = 49,600 kms

Statement of Operating Cost

Particulars	Amount (₹)
Fixed Cost:	
Depreciation (24,00,000 × 10% × 1/12 × 25)	5,00,000
Garage Rent	1,00,000
Insurance	25,000
Road tax	20,000
Manager's Salary	60,000
Assistant's Salary (32,000 × 2)	64,000
Supervisor's Salary (24,000 × 3)	72,000
Driver's Salary (20,000 × 25)	5,00,000
Cleaner's Salary (5,000 × 20)	1,00,000
Office Staff's Salary	1,00,000
Consumables	1,20,000
Repairs and maintenance	90,000
Other fixed expenses	72,000
Total Fixed Cost (A)	18,23,000
Variable Cost:	
Diesel [(49,600 ¸ 10) × 80]	3,96,800
Oils and lubricants	1,45,000
Tyres and tubes	35,000
Total Variable Cost (B)	5,76,800
Total Cost (A + B)	23,99,800
Effective Passenger km	21,74,464
Cost per effective passenger km	**1.103**

25. Calculation of Price of the Delhi-Jaipur-Agra-Delhi tour package

Particulars	Amount (₹)	Amount (₹)
Diesel Cost (Working Note-2)		2,635.00
Servicing cost $\left(\frac{₹30,000}{50,000\text{ km.}} \times 754\text{ kms}\right)$		452.40
Chauffeur's meal cost (three 200 km. completed journey × ₹50)		150.00
Other Allocable costs:		
Depreciation $\left(\frac{₹12,00,000}{24,00,000\text{ km.}} \times 754\text{ kms}\right)$	377.00	
Other set-up and office cost $\left(\frac{₹2,400}{30\text{ days}} \times 3\text{ days}\right)$	240.00	
Chauffeur's salary $\left(\frac{₹12,000}{30\text{ days}} \times 3\text{ days}\right)$	1,200.00	1,817.00
Total cost		5,054.40
Add: Profit (25% of net takings of 1/3rd of total cost)		1,684.80
(5,054.40 ÷ 75%)		6,739.20
Add: GST @ 18%		1,213.06
Price of the package (inclusive of GST)		**7,952.26**

Working Notes

(1) Total distance of journey

From	To	Distance (in km)
Delhi	Jaipur	274
Jaipur	Agra	238
Agra	Delhi	243
Total distance		754

(2) Cost of diesel

From	To	Distance (in km)	Price of diesel per litre (₹)	Total diesel Cost (₹)
I	**II**	**III**	**IV**	**V=(III÷16 km)×IV**
Delhi	Jaipur	274	54	924.75
Jaipur	Agra	238	56	833.00
Agra	Delhi	242	58	877.25
		Total cost		**2,635.00**

26. Working Notes:

1. Calculation of Depreciation per month

	Particulars	CNG Car	EV Car
A.	Car Purchase price (₹)	9,20,000	15,20,000
B.	Less: Govt. Subsidy	-	(1,50,000)
C.	Less: Residual value (₹)	(95,000)	(1,70,000)
D.	Depreciation value of cat (₹) (A – B – C)	8,25,000	12,00,000
E.	Life of the car	15 years	10 years
F.	Depreciation per month (₹) [D ÷ (E × 12)]	4,583.33	10,000

2. Fuel/Electricity consumption per month

	Particulars	CNG Car	EV Car
A.	Average distance covered in a month	1,500	1,500
B.	Mileage (KM)	20	240
C.	Quantity of CNG/Full charge required (A × B)	75 kg	6.25
D.	Electricity consumption (C × 30 Kwh)	-	187.5
E.	Cost of CNG per kg (₹)	60	-
F.	Power cost per Kwh (₹)	-	7.60
G.	CNG Cost per month (₹) (C × E)	4,500	-
H.	Power cost per month (₹) (D × F)	-	1,425

3. Amortized cost of Tyre replacement

	Particulars	CNG Car	EV Car
A.	Life of vehicle	15 years	10 years
B.	Replacement interval	5 years	5 years
C.	No. of time replacement required	2 times	1 time
D.	Cost of tyres for each replacement (₹)	16,000	16,000
E.	Total replacement cost (₹) (C × D)	32,000	16,000
F.	Cost per month (₹) [E ÷ (A × 12)]	177.78	133.33

4. Amortized cost of Battery replacement

	Particulars	CNG Car	EV Car
A.	Life of vehicle	15 years	10 years
B.	Replacement interval	8 years	8 years
C.	No. of time replacement required	1 time	1 time
D.	Cost of battery for each replacement (₹)	12,000	5,40,000
E.	Total replacement cost (₹) (C × D)	12,000	5,40,000
F.	Cost per month (₹) [E ÷ (A × 12)]	66.67	4,500

Statement of Operating Cost

Particulars	CNG Car (₹)	EV Car (₹)
Fixed Cost:		
Depreciation (working note - 1)	4,583.33	10,000
Driver's Salary	20,000	20,000
Garage rent	4,500	4,500
Total Fixed Cost (A)	30,583.33	36,000
Variable Cost:		
Fuel cost / power cost (Working note – 2)	4,500	1,425
Total Variable Cost (B)	4,500	1,425
Maintenance Cost:		
Annual maintenance cost	666.67	433.33
Annual insurance cost	633.33	1,216.67
Amortized cost of tyres replacement (working note – 3)	177.78	133.33
Amortized cost of battery replacement (working note – 4)	66.67	4,500
Total Maintenance Cost (C)	1,544.45	62,83.33
Operating cost per month (A + B + C)	**36,627.78**	**43,708.33**

27.

(a) Calculation of Operating Cost per month for each vehicle

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

(b) Vehicle operating cost per litre of milk

$$= \frac{\text{Total Operating Cost per month}}{\text{Total milk carried month}} = \frac{2,95,263 + 197,862 + 2,86,092}{1,47,00,000} = ₹0.053$$

Working Notes:

1. Distance covered by the vehicles in a month

Route	Total Distance (in K.M.)
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 (K.M.)	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 @ ₹58 per litre (₹)	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 (₹)	9,000 (₹3,000 × 3)	---	3,000 (₹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

28. (a) Operating Cost Sheet for the month of October

Particulars	Amount
A. Fixed Charges:	
Manager's salary: ₹30,000 × $\frac{60}{100}$	18,000
Drivers' Salary: ₹4,000 × 30	1,20,000
Helpers' wages: ₹2,000 × 25	50,000
Labourer wages: ₹1,500 × 20	30,000
Insurance: $\frac{₹24,000}{12}$	2,000
Road licence: $\frac{₹60,000}{12}$	5,000
Garage rent: $\frac{₹90,000}{12}$	7,500
Transport Technical Service Charges	
Depreciation	10,000
Consumable Stores (assumed fixed)	2,00,000
Electricity and Gas charges	45,000
Share in workshop expenses	28,000
Total (A)	5,20,500
B. Variable Charges:	
Cost of diesel	12,60,000
Lubricant, Oil etc.	23,500
Replacement of Tyres, Tubes & other parts	1,25,000

Particulars	Amount
Total (B)	14,08,500
C. Total Cost (A + B)	19,29,000
D. Total Ton- Kms.	18,86,400
E. Cost per ton-km. (C/D)	1.0228

(b) Calculation of chargeable Freight

Cost per ton-km.	₹1.0228
Add: Profit @ 25% on freight or 33 1/3% on cost	₹0.3409
Chargeable freight per ton-km.	₹1.3637 or ₹1.36

Workings:

1. **Cost of Diesel:**
   Distance covered by each vehicle during October = 200 × 2 × 25 × 90/100 = 9,000 km.
   Consumption of diesel = $\frac{9,000 \times 20}{5}$ = 36,000 litres.
   Cost of diesel = 36,000 × ₹35 = ₹12,60,000.
2. **Calculation of total ton-km:**
   Total Ton-Km. = Total Capacity × Distance covered by each vehicle × Avg. Capacity Utilization ratio
   = [(5 × 9) + (6 × 12) + (7 × 15) + (2 × 20)] × 9,000 × $\frac{(90\% + 70\%)}{2}$
   = (45 + 72 + 105 + 40) × 9,000 × 80% = 262 × 9,000 × 80% = 18,86,400 ton-km.

29. Operating Cost Sheet

Fixed Costs:	**Per Four Weeks**
Garage rent (150 × 4)	600
Insurance ($\frac{6,500}{52 \text{ weeks}}$ × 4 weeks)	500
License cost ($\frac{1,300}{52 \text{ weeks}}$ × 4 weeks)	3,200
Other overhead ($\frac{41,600}{52 \text{ weeks}}$ × 4 weeks)	
Total	4,400
Variable Costs:	
Petrol cost*	5,200
Oil expenses	400
Driver's wages	1,600
Repairs	400

Tyre cost ($\frac{₹6,250 \times 3,200 * km.}{25,000 km.}$)	800
Depreciation ($\frac{₹4,50,000 - 50,000}{80,000}$) × 3,200* km.	16,000
Total	24,400
Total Cost (Fixed + Variable)	28,800

Cost per km. = ₹28,800 ÷ 3,200 km. = ₹9

Cost per tonne km. = $\frac{₹28,800}{*16,000 \text{ tonnes - km.}}$ = ₹1.80

***Working Note:** Petrol cost for four weeks is computed as follows:

Kms. travelled = 40 km. × 2 return trip × 2 trips × 20 days = 3,200 km.

Total consumption of petrol in four weeks = $\frac{3,200 km.}{8 km.}$ = 400 litres.

Cost of petrol 400 litres @ ₹13 = ₹5,200

Total tonne-km = 40 kms × 2 trips × 20 days × 10 tonnes = 16,000 tonne kms.]

30.

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

Journey	Distance in km	Weight-Up (in MT)	Ton-km	Weight-Down (in MT)	Ton-km	Total
	(a)	(b)	(c) = (a) × (b)	(d)	(e) = (a) × (d)	(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 (₹)	Amount (₹)
A.	Running cost:	4,11,264.00	
	- Diesel Cost {₹19.20 × (10,710 × 2)}		
	Engine oil cost $\left(\frac{₹4,200}{13,000\ km} \times 21,420\ km\right)$	6,920.31	
	Cost of loading of goods (₹ 180 × (73 + 18)}	16,380.00	
	Depreciation {(30,00,000/720,000 × 21,420 km) × 4}	3,57,000.00	7,91,564.31
B. Repairs & Maintenance Cost (36,000/10,000 × 21,420)			77,112.00
C. Standing Charges			
	- Drivers' salary (₹24,000 × 4 trucks)	96,000.00	
	Cleaners' salary (₹15,000 4 trucks)	60,000.00	
	- Supervision and other general exp.	14,000.00	1,70,000.00
Total Cost (A + B + C)			10,38,676.31
Total ton-km			1,72,240
Cost per ton-km			6.03

31. Statement of Operating Cost

Particulars	Amount (₹)
Fixed Cost:	
Plant supervision	3,00,000
Administration overheads	20,00,000
Depreciation (2,00,00,000 × 5%)	10,00,000
Total Fixed Cost (A)	33,00,000
Variable Cost:	
Operating labour	15,00,000
Lubricants, spares and stores	4,00,000
Repair & Maintenance	5,00,000
Coal [(20,00,000 ¸ 5) × 4.25)	8,50,000
Total Variable Cost (B)	32,50,000
Total Cost (A + B)	65,50,00,000
Kwh	10,00,000
Cost per kwh	6.55

32. Estimated power generated in a year = 1000 megawatt × 85% × 365 days = 3,10,250 Megawatt

Calculation of 1kW power generation cost

	Cost particulars	Amount (₹)
A	Employee cost per year	2500 lakhs
B	Solar panel maintenance cost per year	250 lakhs
C	Site maintenance cost per year	150 lakhs
D	Depreciation per year	5940 lakhs
E	Total Cost	8840 lakhs
F	Estimated power generated (in Megawatt)	3,10,250
G	Cost of generating 1 Megawatt [(E ¸ F) × 1,00,000]	2,849.31
H	Cost of 1kW (G ¸ 1,000)	2.849

33. Number of patient days = (200 × 50) + (105 × 30) + (60 × 20) + 250 = 14,600 patient days

Statement showing Profit

Particulars	Amount (₹)
Variable Cost:	
Food and Laundry Service	39,53,000
Medicines to Patients	22,75,000
Doctor's Payment	66,00,000
Hire charges of Bed (250 × ₹950)	2,37,500
Total Variable Cost (A)	1,30,65,500
Fixed Cost:	
Building Rent	27,00,000
Manager's Salary (₹5,000 × 3 × 12)	18,00,000
Nurse's Salary (₹18,000 × 12 × 24)	51,84,000
Ward boy's Salary (₹9,000 × 12 × 24)	25,92,000
Administrative Overheads	28,00,000
Depreciation on Equipment's	12,75,000
Total Fixed Cost (B)	1,63,51,000
Total Cost (A + B)	2,94,16,500
Revenue (14,600 × ₹2,500)	3,65,00,000
Profit (C)	70,83,000
Patient days (D)	14,600
Profit per patient day (C ÷ D)	485.17

Contribution per patient day = $\frac{3,65,00,000 - 1,30,65,500}{14,600}$ = ₹1,605.10

Break-even point = $\frac{1,63,51,000}{1,605.10}$ = 10,186.90 or say 10,187 patient day

34. Working Note:

S. No.	Type of vehicles	Daily traffic volume	Weight	Ratio	Equivalent Two wheeler
1	Two Wheelers	44,500	0.05	1	44,500
2	Car and SUVs	3,450	0.20	4	13,800
3	Bus and LCV	1,800	0.30	6	10,800
4	Heavy Commercial Vehicles	816	0.45	9	7,344
	Total				76,444

(a) Calculation of total project cost per day

Activities	Amount (₹in lakhs)
Site clearance	170.70
Land development and filling work	9,080.35
Sub base and base courses	10,260.70
Bituminous work	35,070.80
Bridge, Flyovers, underpass, Pedestrian subway, footbridge etc.	29,055.60
Drainage and protection work	9,040.50
Traffic sign, marking and road appurtenance	8,405.00
Maintenance, repairing and rehabilitation	12,429.60
Environmental management	982.00
Total Project Cost	1,14,495.25
Administration and toll plaza operation cost	1,120.00
Total Cost	1,15,615.25
Concession period in days (25 years × 365 days)	9,125
Cost per day of concession period (₹in lakhs)	12.67

(b) Computation of toll fee

Cost to be recovered = Cost per day + 15% profit on cost
= 12,67,000 + 1,90,050 = ₹14,57,050

Cost per equivalent two-wheeler vehicle = $\frac{14,57,050}{76,444}$ = ₹19.06

Vehicle type wise toll fee:

S. No.	Type of vehicles	Equivalent cost	Weight	Toll fee per vehicle
1	Two Wheelers	19.06	1	19.06
2	Car and SUVs	19.06	4	76.24
3	Bus and LCV	19.06	6	114.36
4	Heavy Commercial Vehicles	19.06	9	171.54

35.

Particulars	Vehicle Loan Applications (₹)	Education Loan Applications (₹)	Total (₹)
Employee Cost	50,000 × 4 = 2,00,000	70,000 × 2 = 1,40,000	3,40,000
Apportionment of branch manager's salary	27,000	27,000	54,000
Legal charges, printing & stationary and advertising	18,000	18,000	36,000
Other expenses	3,000	3,000	6,000
Total cost	**2,48,000**	**1,88,000**	**4,36,000**

(a) Cost of processing vehicle loan application = $\frac{\text{Total cost}}{\text{No. of applications}} = \frac{2,48,000}{496} = ₹500$

(b) Cost of processing education loan application = $\frac{\text{Total cost}}{\text{No. of applications}}$

$500 = \frac{1,88,000}{\text{No. of applications}}$

No. of applications = $\frac{1,88,000}{500} = 376$

36.

(i) Total Cost = Total insured value × Cost per rupee of insured value
Total Cost = ₹3,500 crore × 0.002
Total Cost = ₹7,00,00,000
Other Cost + IT Cost = 7,00,00,000
4,79,00,000 + IT Cost = 7,00,00,000
IT Cost = ₹2,21,00,000

Statement of Cost

Particulars	Amount
Marketing and Sales Support:	
Cost of marketing the policy	1,38,90,000
Policy development cost	35,00,000
Sales support expenses	32,00,000
Total (A)	**2,05,90,000**
Operations Cost:	
Claim management cost	3,80,000
Policy issuance cost	29,50,000
Policy servicing cost	96,45,000
Total (B)	**1,29,75,000**

Particulars	Amount
IT Cost:	
IT Cost	2,21,00,000
Total (C)	**2,21,00,000**
Support Function:	
Office administration cost	48,00,000
Employees' cost	16,20,000
Postage and logistics	32,40,000
Facilities cost	46,75,000
Total (D)	**1,43,35,000**
Total Cost (A + B + C + D)	**7,00,00,000**
Number of Policies	2,800
Cost per policy	**25,000**

37.

Computation of Effective room days

Season = (200 rooms × 80%) × (6 × 30) days	28,800
Off-season = (200 rooms × 40%) × (6 × 30) days	14,400
	43,200

Computation of Total Cost			₹
(1) Staff Salary			8,00,000
(2) Repairs to buildings			3,00,000
(3) Laundry charges			1,40,000
(4) Interior charges			2,50,000
(5) Miscellaneous Expenses			2,00,200
(6) Depreciation			
Building (5% × 300,00,000 × 80%)	12,00,000		
Furniture & equipment (15% × 300,00,000 × 20%)	9,00,000		21,00,000
(7) Attendant's Salary (43,200 × 15)			6,48,000
(8) Lighting Charges			
Season (28,800 days × ₹3.67) [₹110 p.m. means ₹110÷30 = ₹3.67 per day]			1,05,696
Off-Season			
Winter (14,400 × 4/6 × ₹1) [₹30 p.m. means ₹30÷30 = ₹1 per day] (4 months)			9,600
Balance (14,400 × 2/6 × ₹3.67) (2 months)			17,616
Total Cost			45,71,112

Computation of Total Revenue	₹
Total Cost	45,71,112
(+) Profit (20% of revenue) (45,71,112 × 20/80)	11,42,778
Total Revenue	57,13,890

Assume Rent per room per day during Season is ₹Y & during off season is ₹Y/2
Hence, total annual revenue = 28,800Y + 14,400(Y/2) = 26,000Y
Now, 36,000Y = ₹57,13,890
Y = 158.72
Hence, Rent per room per day
During Season = Y = ₹158.72
During off-season = [Y/2] = ₹[158.72 ÷ 2] = ₹79.36

38. Total room days = Occupancy in normal season + Occupancy in off-season
= (20 rooms × 80% × 8 months × 30 days) + (20 rooms × 50% × 4 month × 30 days)
= 5,040 room days
(a) Total cost = Variable cost + fixed cost = (500 × 5,040) + 53,25,000 = ₹78,45,000
Total trariff or revenue = 78,45,000 + 25% = ₹98,06,250

$$\text{Tariff rate per room day} = \frac{98,06,250}{5,040} = ₹1,945.68$$

(b) Contribution per room day = 1,945.68 – 500 =₹1,445.68

$$\text{Total Break-even point} = \frac{\text{Total fixed cost}}{\text{Contribution per room day}} = \frac{53,25,000}{1,445.68} = 3,683$$

Occupacy in normal season = Ttoal break-even – Occupancy in off-season
= 3,863 – (20 rooms × 50% × 4 months × 30 days

$$= \text{In percentage} = \frac{2,483}{4,800} \times 100 = 51.73\%$$

39. Total Cost = ₹5,25,00
Tonnes km carried = 6,55,000

$$\text{Unit cost} = \frac{5,25,000}{6,55,000} = ₹0.801$$

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