2007

COMMERCE

(Marketing Management and Operations Management)

PAPER—II

Full Marks : 100

Time : 4 hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

First Half

(Marketing Management)

[Marks : 50]

Answer Q. No. *1* and any other *two* questions.

1. Answer any *four* of the following : 5×4

(a) What do you understand by Marketing Management ?

(b) "A marketing plan is considered to be a living document that guides a company throughout the year." Explain briefly the contents of a marketing plan.

(c) Point out the differences between high involvement and low involvement consumer buying.

(d) Explain the meaning of market minimum and market demand.

(e) What are the characteristics of services ?

(f) Describe the meaning and importance of a brand.

(g) Discuss the different components of a communication-mix.

(h) Which one of the two is better : Mass marketing or Segment marketing ? Give reasons for your answer.

2. (a) Explain the need for understanding consumer behaviour.

(b) Describe the procedure by which a buyer makes purchasing decisions. 6+9

3. (a) What do you mean by product life cycle ?

(b) Discuss the characteristics of different phases of product life cycle.

(c) Discuss the importance of packaging in marketing. 5+5+5

4. (a) Describe the functions that are performed by members in a marketing channel.

(b) What do you understand by channel-design decisions ? 7+8

5. (a) Describe the hierarchy-of-effects model to explain the objectives of a communication strategy.

(b) Discuss the points to be considered in formulating an effective message. 8+7

Second Half

(Operations Management)

[Marks : 50]

Answer Q. No. *6* and other *two* questions.

6. Answer any *four* of the following : 5×4

(a) What common assumptions are necessary in solving a Travelling Salesman problem ?

(b) How would you resolve a tie situation while selecting the departing variable in LPP ?

(c) Differentiate between PERT and CPM in network analysis.

(d) Discuss in brief (i) lead time, (ii) re-order level, and (iii) safety stock.

(e) Discuss with example the situations in LPP when the introduction of artificial variables in necessary.

(f) What do you mean by 'average queue length' ? In this context, explain the concepts of 'empty queue' and 'non-empty queue'.

(g) Convert the following LPP into its dual form :

$$\begin{aligned} \text{Min } Z &= x_1 + x_2 + x_3 \\ \text{s.t. } & x_1 - 3x_2 + 4x_3 = 5 \\ & x_1 - 2x_2 \leq 3 \\ & 2x_2 - x_3 \geq 4 \end{aligned}$$

where $(x_1 \ \& \ x_2) \geq 0$, x_3 unrestricted.

(h) Describe the principle of relaxation in network analysis.

7. (a) A manufacturer has distribution centres of x, y and z. These centres have available 40, 20 and 40 units of his product. His retail outlets at A, B, C, D and E require 25, 10, 20, 30 and 15 units respectively. The transport costs (in rupees) per unit between each centre and each outlet are given in the following table. Determine the cheapest distribution schedule.

Retail outlets

Distribution Centres	A	B	C	D	E
X	50	30	45	50	40
Y	35	40	80	45	60
Z	50	60	85	35	30

(b) The recent hike in oil prices will have an effect increasing transport cost of Re. 1 per unit. Would yc like to revise the distribution schedule determin under (a) above in view of the price hike ? What w be the total transport cost after the price hike ?

12+2+

8. Below is given a related set of activity time estimates f a PERT network :

Activities	A	B	C	D	E	F	G	H	I	J
Precedence relationships	–	–	A	C	B	E	E	F	G	(D,H
Time Estimates (days) :										
Optimistic	2	1	4	4	5	1	2	3	3	2
Pessimistic	6	5	6	10	7	3	2	7	9	1
Most likely	4	3	5	7	6	2	2	5	6	4

You are required to find :

(a) Expected completion time of each activity ;

(b) The critical path and its duration ;

(c) Standard deviation of expected completion time activities on the critical path ;

(d) Standard deviation of expected completion time of project ;

(e) The probability that the project will be comple within 41 days.
Given : $P(Z \leq 0.48) = 0.1844$. 3+2+3+2

9. (a) An animal feed manufacturer has to produce 200 kgs of a feed mixture consisting of two ingredients x_1 and x_2. x_1 costs Rs. 6 per kg. and x_2 costs Rs. 16 per kg. Not more than 80 kgs. of x_1 can be used and at least 60 kgs of x_2 must be used. Using simplex technique find how much of each ingredient should be used in the mix if the company wants to minimise the cost.

(b) At a certain petrol pump, customers arrive in a Poisson process with an average time of 6 minutes between arrivals. The time-intervals between services at the petrol pump follow exponential distribution and as such the mean time taken to service a unit is 3 minutes. On the basis of this information you are required to answer the following questions :

(i) What would be expected average queue length ?

(ii) What would be the average number of customers in the queueing system ?

(iii) How long, on an average does a customer wait in the queue ?

(iv) How much time, on an average does a customer spend in the system ?

(v) By how much should the flow of customers be increased to justify the opening of a second service point if the management is willing to open the same provided the customer has to wait for 5 minutes for the service ? 8+7

10. (a) Below is given the final iteration table of the following problem :

$$\begin{aligned} \text{Maximize} \quad & Z = 3x + 2y \\ \text{Subject to} \quad & x + y \leq 16 \\ & x + 3y \leq 36 \\ & 2x + y \leq 26 \\ & 3x + y \leq 36 \\ \text{where} \quad & (x \text{ and}) \geq 0. \end{aligned}$$

x_i	c_i	x_o	3 x	2 y	0 S_1	0 S_2	0 S_3	0 S_4
y	2	6	0	1	$\frac{3}{2}$	0	0	$\frac{1}{2}$
S_2	0	8	0	0	4	1	0	1
S_3	0	0	0	0	$\frac{1}{2}$	0	1	$-\frac{1}{2}$
x	3	10	1	0	$-\frac{1}{2}$	0	0	$\frac{1}{2}$
Z_j		42	3	2	$\frac{3}{2}$	0	0	$\frac{1}{2}$
(Z_j-C_j)			0	0	$\frac{3}{2}$	0	0	$\frac{1}{2}$

(i) Find the effect of increasing the profit per unit of x from 3 to 6.

(ii) Study the effect of addition of further does of resources in the system to increase profitability.

(b) A manufacturer requires 2000 units of raw material per annum. The ordering cost is Rs. 10 per order and inventory carrying costs are 16% per year per unit of average inventory. The purchase price is quoted at Re. 1 per unit in quantities below 1000 units, but a quantity discount of 5% is available if the material is purchased in lots of 1000 units or above and there is a 7% discount if the whole annual requirement of 2000 units is purchased in a single lot.

Find the economic order quantity and the total inventory cost (including the cost of material). Which of the above three ways of purchase should be adopted? 8+7