

C 42882

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Name.....

Reg. No.....

SECOND SEMESTER M.Com. DEGREE EXAMINATION, MAY 2013

Paper 2.4—OPERATIONS RESEARCH

(2004 admission onwards)

Time : Three Hours

Maximum : 80 Marks

Part A

*Answer all questions.
Each question carries 2 marks.*

1. Explain the necessity of Operations Research in business.
2. What are the advantages of LPP method ?
3. What is called as Hurwitz principle ?
4. Differentiate PERT and CPM.
5. What is called "queue length" ?

(5 × 2 = 10 marks)

Part B

*Answer any four questions.
Each question carries 10 marks.*

6. Discuss the various phases of Operations Research and how it acts as a aid to executive decisions.
7. What is PERT ? What kinds of decision-making situations may be analyzed by using PERT ? How ?
8. Discuss Monte Carlo simulation. Illustrate how would you use it in situations of queuing and inventory control.
9. Past records indicate that of the five machines that a factory owns, breakdowns occur at random and the average time between the breakdowns is 2 days. Assuming that the repairing capacity of the workman is one machine a day and the repairing distributed exponentially, determine the following :—
 - (a) The expected length of a queue.
 - (b) The probability that the service facility will be idle.
 - (c) The expected number of machines waiting to be, and being repaired.

Turn over

10. The research department of SRK Ltd. has recommended to the marketing department to launch a shampoo of three different types. The marketing manager has to decide one of the types of shampoo to be launched under the following estimated pay-offs for various levels of sales :

Type of Shampoo		Estimated level of sale (units)		
		150000	100000	5000
Egg shampoo	...	30	10	10
Clinic shampoo	...	40	15	5
Deluxe shampoo	...	55	20	3

What will be the marketing manager's decision if (a) Maximin and (b) Maximax is applied ?

11. (a) Explain the concept of dominance in game theory.
 (b) For the following two person zero-sum game, find the optimal strategy for each player and the value of the game :

Player A	Player B			
	B1	B2	B3	B4
A1	0	-1	3	5
A2	-5	2	4	5
A3	-2	-3	-4	-2

(4 × 10 = 40 marks)

Part C

Answer any two questions.

Each question carries 15 marks.

12. MNC Electric Company produces two products P1 and P2 that are produced and sold on a weekly basis. The weekly production cannot exceed 25 for product P1 and 35 for product P2 because of limited available facilities. The company employs a total of 60 workers. Product P1 requires 2 man-weeks of labour where P2 requires only one. Profit margin on P1 is Rs. 60 and on P2 is Rs. 40. Formulate it as a LPP and solve for maximum profit.
13. The data for a project is :

Activity		Preceding Activity	Time (in weeks)		Cost in (Rs.)	
			Normal	Crash	Normal	Crash
A	...	None	3	2	18000	19000
B	...	None	8	6	600	1000
C	...	B	6	4	10000	12000
D	...	B	5	2	4000	10000
E	...	A	13	10	3000	9000
F	...	A	4	4	15000	15000
G	...	F	2	1	1200	1400
H	...	C, E, G	6	4	3500	4500
I	...	F	2	1	7000	8000

- (a) Draw a project network diagram and find the critical path.
- (b) If a deadline of 17 weeks is imposed for completion of the project, what activities will be crashed, what would be the additional costs, and what would be the critical activities of the network after crashing?

14. A small retailer has studied the weekly receipts and payments over the past 200 weeks and has developed the following set of information :

Weekly Receipts (Rs.)	Probability	Weekly payments (Rs.)	Probability
3,000	0.20	4,000	0.30
5,000	0.30	6,000	0.40
7,000	0.40	8,000	0.20
12,000	0.10	10,000	0.10

Using the following set of random numbers, simulate the weekly pattern of receipts and payments for the 12 weeks of the next quarter, assuming further that the beginning bank balance is Rs. 8,000. What is the balance at the end of the 12 weekly periods? What is the average weekly balance for the quarter?

Random Numbers

For Receipts : 03 91 38 55 17 46 32 43 69 72 24 22
 For Payments : 61 96 30 32 03 88 48 28 88 18 71 99

(2 × 15 = 30 marks)