

M.B.A. - II (CBCS Pattern) Semester-III
PCB3C01 - Applied Operations Research

P. Pages : 2

Time : Three Hours



GUG/W/24/10690

Max. Marks : 70

- Notes :
1. Attempt **any five** questions.
 2. All questions carry equal marks.
 3. Use NSD Table.

1. Two breakfast food manufacturers ABC and XYZ are competing for an increased market share. The payoff matrix, represented in the following table, shows the increase in market share for ABC and decrease in market share for XYZ 14

		XYZ			
		X1	X2	X3	X4
A1		2	-2	4	1
A2		6	1	12	3
A3		3	2	0	6
A4		2	-3	7	1

Simplify the problem by the rules of dominance and obtain optimal strategies for both the manufacturers and the value of the game.

2. A small project consisting of ten activities has the following characteristics. 14

Activity	A	B	C	E	F	G	H	I	J	K
Dependency	-	-	-	A	A,B	B,C	C	E,F	G,H	H
Duration (days)	2	8	10	6	3	3	7	5	2	8

Draw a network & determine critical path calculate the three float for each activity.

3. A machine 'X' costs Rs. 5000. Its operating cost is Rs. 1000 per year in the first four years and then increases by Rs. 200 in each successive year. Another machine 'Y' costs Rs. 8000 whose operating cost is Rs. 200 in the first year which increases by Rs. 400 in every succeeding year. If the time value of money is 10% which of the two machines should be preferred. 14

4. Following mortality rates have been observed for certain type of fuses: 14

Week	1	2	3	4	5
% failing by the end of week	10	25	50	80	100

There are 1,000 fuses in use and it cost Rs. 5 to replace an individual fuse. If all fuses were replaced simultaneously, it would cost Rs. 2 per fuse. At what intervals, the group replacement should be made? Which policy should be adopted & why?

5. Determine an optimal sequence to process the various types of fan blades each day from the following information so as to minimize the total Elapsed time & Idle time for each machine. 14

Type of fan blade	Number of days	Processing Time in hours	
		Machine A	Machine B
1	4	4	8
2	6	12	6
3	5	14	16
4	2	20	22
5	4	08	10
6	3	18	2

6. Consider an inventory control problem, in which demand during lead time as well as lead time distribution are given below. The reorder point is 6 units and reorder quantity is 12 units. If the ordering cost is Rs100/ order, inventory carrying cost is Rs 4/ unit/week and the shortage cost is Rs 60/unit/week, Find the total inventory cost for 15 weeks. Assume an initial inventory of 10 units 14

Demand	Probability	Lead Time (weeks)	Probability
0	0.10	2	0.20
1	0.45	3	0.65
2	0.30	4	0.15
3	0.15		

Random Nos. for demand: 49, 67, 06, 30, 95, 01, 10, 70, 80, 66, 69, 76, 86, 56, 84

For lead time: 84, 79, 15, 03

7. Discuss dynamic programming application to business and develop the recursive relation used in dynamic programming formulation. 14
8. Explain PERT technique help a business manager in decision making. 14
9. What is the need of simulation? How can you use Monte Carlo Simulation for industrial problems? Give examples. 14
10. Write a short note on: **any two**. 14
- Applications of computer in ORT
 - Rules of Network Construction
 - Staff Replacement
 - The role of theory of game for scientific decision making
