

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

P. Pages : 2

Time : Three Hours



GUG/S/25/10690

Max. Marks : 70

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

1. It is the game between the two players where A is maximizing player and B is minimizing player. Player A wins B's coin if the two coins total are equal to odd number and losses his coin if total of two coins is even. It is game of 1, 2, 5, 10 and 50 Rs. coins. Determine the payoff matrix, the best strategies for each player and the value of game to A. **14**

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

Activity	A	B	C	D	E	F	G	H	I	J
Dependency	-	-	A	C	A, B	D	D, E	F, G	D, E	A, B
To	1	3	2	1	6	9	10	6	4	5
Tm	4	6	5	2	9	18	20	9	10	5
Tp	7	9	14	3	18	27	40	18	28	5

Draw a network & determine critical path calculate the expected duration of the task which will have 95% confidence of completion.

3. A firm has a machine whose purchase price is Rs. 20,000. It's maintenance cost and resale price at the end of each year are as under: **14**

Year	1	2	3	4	5	6
Maintenance Cost (Rs)	1500	1700	2000	2500	3500	5500
Resale Price (Rs)	17000	15300	14000	12000	8000	3000

The firm has obtained a contract to supply the goods produced by the machine for a period of five years from now. After this time period, the firm does not intend to use the machine. If the firm has a machine of this type that is one year old, what replacement policy should it adopt intends to replace the machine not more than once?

4. The management of a large hotel is considering the periodic replacement of lights bulbs fitted in its rooms. There are 500 rooms in the hotel and each room has 6 bulbs. The management is now following the policy of replacing the bulbs as they fail at a hotel cost of Rs. 3.00 per bulb. The management feels that this cost can be reduced to Rs. 1.00 by adopting the periodic replacement method. **14**

Month of use	1	2	3	4	5
% of bulb failing	10	25	50	80	100

Evaluate the alternative and make a recommendation to the management.

5. Six jobs 1, 2, 3, 4, 5 and 6 are to be processed on five machines A, B, C, D and E in the order BCDEA. Find the optimal sequence of jobs, minimum time to process these jobs and the idle time for each of the machines. 14
The processing times in hours are given below:

Machine /Job	A	B	C	D	E
1	8	6	1	2	5
2	13	7	2	4	1
3	8	18	5	5	4
4	11	15	2	6	3
5	13	8	6	5	6
6	9	11	4	6	7

6. A company trading in motor vehicle spare parts wishes to determine the level of stock it should carry for the item in its range. For one item A, the following information is obtained. 14

Demand (Unit/day)	3	4	5	6	7
Probability	0.10	0.20	0.30	0.30	0.10

Carrying cost = Rs. 0.20 / day

Ordering cost = Rs. 05/ order

Lead time for replenishment = 3 days

Stock in hand at beginning is 20 units

Inventory Rule: Order 15 units when present inventory plus any outstanding order falls below 15 units.

Calculate Total Inventory cost for 10 days.

Random Numbers: 0, 9, 1, 1, 5, 1, 8, 6, 3, 5

7. Discuss dynamic programming application to business and develop the recursive relation used in dynamic programming formulation. 14
8. What do you understand by term Direct Cost and Indirect Cost in PERT. How these are treated in the cost analysis. 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
 - Crashing of Project Network
 - Terminology of Game theory
 - Important assumptions made in sequencing problems
