M.B.A. S.Y. (Part - II) (CBCS Pattern) Sem-III

PCB3C01 - Applied Operations Research

P. Pages : 2 **GUG/W/22/10690**

Time : Three Hours * 0 9 2 1 * Max. Marks : 70

Notes : 1. Attempt **any five** questions.
2. All questions carry equal marks.

1. Solve the following game by method of subgame. **14**

		Player B	
		B_1	B_2
Player A	A_1	2	4
	A_2	2	3
	A_3	3	2
	A_4	-1	6

Obtain the optimal strategy and value of game.

2. The following data for the activities of a project are available. Draw a network & determine critical path calculate the three float for each activity. **14**

Activity :	A	B	C	D	E	F	G
Dependency :	-	-	-	A,B	A,B	C,D,E	C,D,E
Time :	4	7	6	5	7	6	5

3. The following is a table showing details of a project. **14**

Task	Dependency	Normal Time (week)	Normal cost (₹000)	Crush Time Week	Crush cost (₹000)
A	-	10	20	7	30
B	-	8	15	6	20
C	B	5	8	4	14
D	B	6	11	4	15
E	B	8	9	5	15
F	E	5	5	4	8
G	A, D, C	12	3	8	4

Indirect cost is ₹400 per day. Find the optimum duration and the associated minimum project cost.

4. The original cost of the machine Rs. 5000. operating costs varies as follows: **14**

Year :	1	2	3	4	5	6	7
Operating cost :	400	500	700	1000	1300	1700	2100

at 9% is discount rate of money, what should be the optimum replacement intervals.

5. The following mortality rates have been observed for certain types of fuse. **14**

Week :	1	2	3	4	5
% failure :	10	25	50	80	100

There are 1000 fuses in use and it cost Rs. 5 to replace an individual fuse which has burnt out. If all fuse are replaced simultaneously it would cost Rs 2 per fuse. At what interval of time the manager should replaced all the fuse and also prove that his optimal policy is superior to state forward policy of replace each fuse only when it fail.

6. 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 machine A	Time machine B
1	4	4	8
2	6	12	6
3	5	14	16
4	2	20	22
5	4	8	10
6	3	18	2

7. Two persons X and Y work on a two stations assembly line. The distributions of activity times at their stations are. **14**

Time (sec) :	10	20	30	40	50	60	70	80
Frequency X :	4	7	10	15	35	18	8	3
frequency Y :	2	3	6	8	12	9	7	3

a) Simulate operation of the line for eight items.
b) Assuming Y must wait until X completes the first item before starting work, will he have to wait to process any of the other seven items? What is average waiting time of item for Y.
c) Determine inventory of item between the two stations.
d) What is the average production rate?

Random Number:

For X :	83,	70,	06,	12,	59,	46,	54,	04
For Y :	51,	99,	84,	81,	15,	36,	12,	54

8. What is the need of Simulation? How can you use Monte Carlo simulation for Industrial problem? **14**

9. Discuss briefly the concept of dynamic programming. **14**

10. Write a short note on **any two.** **14**

a) The areas of application of network technique.
b) Methodology of solving replacement problem.
c) The role of theory of game for scientific decision making
d) Capital Budgeting through simulation.

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