S.Y.M.B.A.(with Credits)-Regular-Semester 2012 Sem. III

Paper-MBA231 : Applied Operation Research

P. Pages : 2 **GUG/W/16/3005**

Time : Three Hours * 3 8 7 1 * Max. Marks : 70

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

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

		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 optimal strategy & value of game.

2. The activities with duration and dependence of a small project are given below :

Activity	A	B	C	D	E	F	G	H
Dependence	---	---	A,B	A,B	C,D	C,D	E	F,G
Duration	7	5	3	8	7	5	6	9

i) Draw project network & determine critical path & expected project length.

ii) Calculate Total Float, Free Float & Independent Float for all activities.

3. The data on the operating cost per year and resale price of equipment A. Whose purchase price is ₹. 10,000 are given below.

Year	1	2	3	4	5	6	7
Operating Cost	1500	1900	2300	2900	3600	4500	5500
Resale Value	5000	2500	1250	600	400	400	400

i) What is the optimum period for replacement.

ii) When equipment A is 2 year old, equipment B, which is a new model for the same usage is available. The optimum period for replacement is 4 years. With an average cost of ₹. 3,600 should we change equipment A with equipment B? If so, when?

4. A steel bridge cost ₹. 380 lakhs to build and needs painting every ten years at the cost of ₹. 40 lakhs and is expected to last 40 years. Another bridge with different design has an expected life of 15 years and initial cost of ₹. 200 lakhs and it needs painting every two years at the cost of ₹. 20 lakhs each time. Which type of bridge is more economical? Interest is at 10% and infusion rate is 7%.

5. Six jobs are to be processed at three machine A, B & C in the order $B\overline{AC}$. The time taken by each job on three machine is given below. Processing time in min.

Job	1	2	3	4	5	6
A	30	40	20	10	50	35
B	50	80	90	70	60	75
C	40	80	70	60	20	45

Determine the optimum sequence for jobs and total Elapse time & Idle Time for each machine.

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.

Demand (unit / day)	3	4	5	6	7
Probability	0.1	0.2	0.3	0.3	0.1

Carrying cost = ₹. 0.20 / day
Ordering cost = ₹. 15 / 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. What do you understand by term Direct Cost and Indirect Cost in PERT.
How these are treated in the cost analysis.

8. What is simulation? Describe the simulation process. What are the advantages and limitation of simulation?

9. Discuss briefly, the general similarities between dynamic programming and Linear programming.

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

a) Role of Computer in Simulation.

b) Staff Replacement.

c) Practical uses of URT packages.

d) $[(M/M/1):(\infty/FCFS)]$ Model.

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