

B.B.A. Semester - 6 (CBCS) Examination**March/April-2023 (NEW COURSE)****Statistics Group - Advanced Operations Research Techniques (Elective (New))****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q-1(A) Give difference between PERT and CPM. (07)

Q-1(B) Consider the following given data and based on that find out critical path for the given project. (07)

Activity	1-2	1-3	2-3	2-5	3-4	3-6	4-6	5-6	6-7
Time (days)	10	10	3	6	7	9	5	4	7

Also find EST, EFT, LST, LFT and Total float for each of the activities.

OR

Q-1 The activities involved in a PERT project are detailed in the adjoining table : (14)

Job	1-2	2-3	3-5	7-8	5-8	6-7	4-5	1-6	2-4
a	3	6	5	4	1	3	3	2	2
m	6	12	11	19	4	9	6	5	5
b	15	30	17	28	7	27	15	14	8

- Draw a network diagram.
- Find the critical path after estimating the earliest and latest event times for all nodes.
- Find the probability of completing the project before 31 days.
- What is the chance of project duration exceeding 46 days?

What will be the effect on the effect on the current critical path if the most likely time of activity 3-5 gets revised to 14 instead of 11 days given above?

Q-2(A) What is replacing problem? Describe some important situations of replacement. (07)

Q-2(B) A firm is considering the replacement of a machine. The purchase price of the machine is Rs. 16,600 while its scrap value is Rs. 1,600. The data on maintains cost in various years are as follows: (07)

Year	1	2	3	4	5	6	7	8	9
Mt(in Rs.)	300	700	1,000	1,500	2,100	2,800	3,600	4,800	6,200

What is the optimal replacement interval?

OR

Q-2 A manufacture is offered two machine A and B. A is priced at Rs.5,000 and running costs are estimated at Rs.800 for each of first five years, increasing by Rs. 200 per year in the 6th and subsequent years. Machine B which is the same capacity as A, costs Rs.2,500 but will have running costs of Rs.1,200 per year for six years increasing by Rs.200 per year thereafter. If money is worth 10% per year, which machine should be purchased? (14)

Q-3(A) What is Sequencing Problem? (07)

Q-3(B) Find the sequence that minimize the total elapsed time required to complete the following tasks: (07)

Tasks	A	B	C	D	E	F	G	H	I
Time on M1	2	5	4	9	6	8	7	5	4
Time on M2	6	8	7	4	3	9	3	8	11

OR

- Q-3 A book binder has one printing press, one binding machine and manuscript of different books. The time required to perform the printing and binding operations for each book is known. He wishes to determine the order to minimize the total time required to turn out all the books: (14)

Books	1	2	3	4	5	6
Printing time	30	120	50	20	90	110
Binding time	80	100	90	60	30	10

An additional operation is added to the above process, finishing. The time of the finishing operation is 20: 40: 60: 120: 30: 40 respectively what should be the order of the books now?

- Q-4(A) What is dynamic programming problem? (07)
 Q-4(B) What different terms are often talked about in context of dynamic programming? (07)
 Explain the meaning of such terms clearly.

OR

- Q-4 A manager of a certain company, based in city 12, is in city 1 to attend a series of business seminars. on his return he wants to reach city 12 adopting the least cost route between city 1 and city 12. The cost from moving between cities is given below. Find least cost. (14)

From				To city		(figures are in '00' Rs.)					
	2	3	4	5	6	7	8	9	10	11	12
1	5	3	6								
2				4	3	7	7				
3				5	5	3	4				
4				7	4	6	3				
5								7	6	9	
6								6	7	6	
7								8	9	6	
8								8	10	8	
9											9
10											12
11											8

- Q-5(A) What is game theory? (07)
 Q-5(B) Explain dominance rule. (07)

OR

- Q-5(A) Solve the game. (07)

		B			
		35	35	25	5
A	30	20	15	0	
	40	50	0	10	
	55	60	10	15	

- Q-5(B) Solve the game. (07)

		B	
		8	-2
A	-2	-1	3
