

B.B.A. Semester - 6 (CBCS) Examination**March/April-2024 (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.

- Que-1 (A) Explain total elapsed time and idle time. (07)
 (B) Explain 2 machines n – jobs method in terms of sequencing problem. (07)

OR

- Que-1 We have six jobs each of which must go through the three machines M1, M2, M3 in order M1M2M3. Processing time in hours are as given below; (14)

Job	Processing time (in hours)		
	M1	M2	M3
1	8	3	8
2	3	4	7
3	7	5	6
4	2	2	9
5	5	1	10
6	1	6	9

Find total elapse time for machine.

- Que-2 (A) Describe some important situations of replacement. (07)
 (B) Why does problem of replacement arise? (07)

OR

- Que-2 (A) A machine shop has a press which is to be replaced as it wears out. A new press is to be installed now and on an optimal replacement plan is to be for next 7 years after which the press is no longer required. Following data are available: (07)

Year	1	2	3	4	5	6	7
Cost of machine(rs.)	5,000	5,250	5,500	6,000	6,500	7,250	8,000
Salvage value(rs.)	2,500	1,250	750	500	400	250	0
Operating cost(rs.)	1,500	2,000	2,500	3,000	3,750	4,500	5,750

Find optimal replacement policy.

- (B) A manufacturer has a machine costs Rs.2500 but running cost of rs.1,200 per year for six years increase by rs.200 per year then after. If money is worth 10% per year find optimal replacement year. (07)
- Que-3 (A) Explain difference between PERT and CPM (07)
 (B) Explain total float, free float and independent float. (07)

OR

- Que-3 Find for given information. (14)

- Draw an arrow diagram
- Tabulate EST, EFT, LST and LFT for all the stages.
- Find the critical path and assembly duration
- Tabulate total float, free float and independent float.

Activity	1-2	1-3	2-3	2-4	3-4	3-5	4-6	5-6	5-9	6-7	7-8
Duration	4	17	4	5	0	8	2	0	3	8	0
Activity	7-9	8-10	9-10								
Duration	0	10	5								

Que-4 (A) Explain graphic method in terms of game. (07)

(B) Explain Dominance Rule for solution of game. (07)

OR

Que-4 (A) A person has 3 coins ,5 paisa,10 paisa and 20 paisa if two persons toss coin simultenesly if sum of coins is even no. A wins B's coin and if sum of coins is odd no. B wins A ' coin find optimal strategy for both players and value of game. (07)

(B) Solve the game. (07)

	B		
A	8	4	-2
	-2	-1	3

Que-5 (A) What is Dynamic programming problem. (07)

(B) Explain merits and limitations of dynamic programming problem. (07)

OR

Que-5 The product manager of ABC Corporation Finds that the budgeted amount for advertising during the next quarter permits 8 insertions in the three newspapers The Sandesh, The Gujarat Samachar and The Divya Bhaskar. The company solicits enquiries from prospective customers through the advertisements and the number of enquiries received used as a measure of the efficacy of the advertisement. The average estimated number of enquiries per insertion for various numbers of insertions n three newspapers is given below. (14)

Estimated Number of Enquiries			
No of Insertions	The Sandesh	The Gujarat Samachar	The Divya Bhaskar
0	150	160	200
1	165	170	240
2	190	210	270
3	230	245	320
4	260	260	340
5	290	300	350
6	330	310	355
7	350	315	360
8	360	315	360

What should be the allocation of insertions in each of the newspapers in order to maximize the total number of enquiries?
