

B.B.A. Semester - 6 (CBCS) Examination**May/June-2021 (NEW COURSE)****Statistics Group - Advanced Operations Research Techniques (Elective)****Time: 1:30 Hours****Marks: 42****Instructions:**

1. Figure to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

- Q.1(A) five jobs go first on machine A, then machine B and lastly on machine C. The order of the completion of jobs has no significance. The following table gives machine time for the five jobs on three machine. (07)

Jobs	Processing time (in Hours)		
	Machine A	Machine B	Machine C
1	16	10	8
2	20	12	18
3	12	4	16
4	14	6	12
5	22	8	10

Find the sequence of the jobs that minimize elapsed time to complete the jobs .Find also the idle time of the Machines A,B,C

- Q.1(B) A TV company has six plants located in different parts of a city. Every year, it is necessary for each plant to be completely overhauled. The overhauling is carried out in two stages A and B, and each stage requires a crew of workman with completely different skills. The work on stage B can start only when stage A has been completed. The plant has to be closed for entire period of its overhauling. the present schedule of the overhaul of the six plants as follows: (07)

Time required by crew(days)						
Plant	P1	P2	P3	P4	P5	P6
Crew A	10	10	8	10	9	12
Crew B	8	6	14	9	7	10

- (A) Determine the optimal sequence.
- (B) If the down time of any six plants costs rs.4,000 per day for a plant, idle time for Crew A costs Rs.1250 per day, and idle time for Crew B costsRs.2,150 per day, which of the two schedule ,the present one and optimal will be more economical? What are their respective costs?
- Q.2(A) Why does the problem of replacement arise? what is group replacement ? when it is economical? Justify your answer. (07)
- Q.2(B) An Equipment which cost Rs. 180,000 has to be replaced with new equipment. The following data have been estimated: (07)

Year	1	2	3	4	5	6	7
Resale value	90,000	45000	22500	22500	6000	6000	6000
Annual maintance cost	30000	36000	42000	54000	69000	84000	102000

Find minimum average cost for replacement

Q.3(A) Solve the game

(07)

Player A	B1	B2
A1	-6	7
A2	4	-5
A3	-1	-2
A4	-2	5
A5	7	-6

Q.3(B) Solve the game

(07)

	Player A		
Player A	B1	B2	B3
A1	0	2	2
A2	3	-1	3
A3	4	4	-2

Q.4(A) Briefly explain area of network techniques

(07)

Q.4(B) For the following activities determine

(07)

- Critical Path using PERT
- Calculate variance and S.D. for each activity
- Calculate the probability of completing the project in 26 days

Activity	1-2	1-3	2-4	3-4	3-5	2-6	4-6	5-6
To	6	3	2	4	1	5	7	1
Tm	9	4	5	6	1.5	6	8	2
Tp	12	11	14	8	5	7	15	3

Q.5(A) A vessel can carry a total of 500 kgs of a product. Three types of product are available for shipment. Their weights and return are tabulated as below. determine the loading which will maximize the total return.

(07)

Item	Weight(in kg)	Return
1	100	300
2	300	800
3	200	650

Q.5(B) A firm has divided its marketing area into three zones. The amount of sales depends upon the numbers of salesman in each zone. The firm has been collecting the data regarding sales and salesman in each area over a number of past years.

(07)

No. of salesman		0	1	2	3	4	5	6	7	8	9
Profitability	Zone1	30	45	60	70	79	90	98	105	100	90
('000'Rs.)	Zone2	35	45	52	64	72	82	93	98	100	100
	Zone3	42	54	60	70	82	95	102	110	110	110

Determine optimum allocation of salesman in order to maximize profit.
