

B.B.A. Semester - 6 (CBCS) Examination**March/April -2020****ADVANCED RESEARCH OPERATION TECHNIQUES (ELECTIVE)****Time: 2:30 Hours****Marks: 70****Instructions:**

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

- Q.1 A refrigeration company has six plants located in different part of city. Every year, it is necessary (14)
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. A plant has to be closed for entire period of its
overhauling. The present schooled of the overhaul of the six plant it as follows:

Time required by crew (days)						
Plant	P1	P2	P3	P4	P5	P6
Crew A	6	6	4	6	5	8
Crew B	4	2	10	5	3	6

(A) Determine optimal sequence.

(B) If down time of any of the six plants costs Rs.800 per day for a plant, idle time for crew A costs Rs.250 per day, and idle time for crew B costs Rs.430 per day, which of the two schuldes, the present one and the one determine in (a) will be more economical? What are there respective costs?

OR

- Q.1 (A) What is sequencing problem? Explain with illustration. (07)
(B) Six jobs J1,J2.....J6, are required to be processed on four machines M1, M2, M3, M4. In (07)
that order. Using the processing times given below, determine the optimal sequence of the
job performance.

Job	Machine			
	M1	M2	M3	M4
J1	12	6	6	8
J2	8	3	6	12
J3	13	4	6	9
J4	9	2	4	14
J5	10	6	7	12
J6	12	7	2	10

- Q.2 (A) A firm is using a machine whose purchase price is Rs.13,000. The installation charges (07)
amount to Rs.3,600 and the machine has a scrap value of only Rs. 1,600 because the firm
has monopoly of this type of work. The matintence cost in various years is given in the
following table.

Year	1	2	3	4	5	6	7	8	9
Cost (Rs.)	250	750	1000	1500	2100	2900	4000	4800	6000

The firm wants to determine after how many years the machine should be replaced on economic considerations, assuming that the machine replacement can be done only at the year ends.

- (B) What is replacement problem? Describe some important replacement situations and polices. (07)

OR

- Q.2 (A) A truck owner finds from his past experience that the maintenance costs are Rs.200 for the first year and then increase by Rs.2,000 every year. The cost of truck type A is Rs.9000. determine the best age at which to replace the truck. If the optimum replacement is followed, what will be the average yearly cost of owning and operating the truck? Truck type B costs Rs. 10,000. Annual operating costs are Rs. 400 for the first year and then increase by Rs.800 every year. The truck owner has now the truck type A which is one year old. Should it be replaced with B, and , if so, when? (07)

(B) For a machine, the following data are available: (07)

Year	0	1	2	3	4	5	6
Cost of spares (Rs.)	-	200	400	700	1,000	1,400	1,600
Salary of maintance staff (Rs.)	-	1,200	1,200	1,400	1,600	2,000	2,600
Losses due to breakdown (RS.)	-	600	800	700	1,000	1,200	1,600
Resale value (Rs.)	12,000	6,000	3,000	1,500	800	400	400

Determine the optimum period for replacement of the above machine.

- Q.3 (A) Draw a network corresponding to the following information. (14)
 (B) Find EST, EFT, LST, LFT TF, FF, IF for each activity.
 (C) Can this project be completed within 65 days?
 (D) What would be the effect on the project length of reducing the resources to be used for activity 8-10 by such an amount as would increase the time for this activity by 5 days?

Activity	1-2	1-3	1-4	1-5	2-4	2-7	3-5	3-6	4-10	5-11	6-7
Time (in dayas)	8	2	6	12	5	9	3	7	4	10	2
Activity	6-8	7-10	8-9	8-10	9-12	10-12	10-14	11-12	11-14	12-13	13-14
Time (in days)	10	12	3	6	8	18	9	7	4	11	4

OR

- Q.3 (A) What kind of decision making situation may be analyzed by using PERT and CPM techniques? (07)
 (B) Explain: (1) merge and burst events. (2) Dummy activity. (07)
- Q.4 (A) Easton electronics co produces 2,000 TV sets in a year for which it needs an equal number of tubes of a certain type. Each tube costs Rs.10 and the cost to hold a tube in stock for a year is 2.40 besides, the cost of placing an order is Rs. 150 which is not related to its size. (07)

Now, if an order for 2,000 tubes is placed, only one order per annum is required. When 1000 units are ordered for 2 ordered for in a year are needed, while 500 units are ordered per annum is required. When 1000 units are ordered for 2 orders in a year are needed, while 500 units are ordered to be supplied, then a total of 4 orders per annum are required. Find total cost for different size also find EOQ and related total cost.

- (B) A hardware store produced and sells hardware items. Information on an item is given below. (07)

Expected annual sales = 8000 units
 Ordering cost = Rs. 180 per order
 Holding cost = 10% of the average inventory value

The item can be purchased according to the following schedule:

Lost size	unit price (Rs.)
1-999	22
1000-1499	20
1500-1999	19
2000 and above	18.50

You are required to determine the best order size.

OR

- Q.4 (A) What are different types of inventories? Explain. (07)
 (B) What do you understand by inventory control? Explain in brief. (07)

- Q.5 (A) Solve the game $\begin{pmatrix} 9 & 8 & -7 \\ 3 & -6 & 4 \\ 6 & 7 & -7 \end{pmatrix}$ (07)

- (B) Explain: (1) saddle point (2) Dominance rule in terms of game. (07)

OR

- Q.5 (A) Solve the game using graphic method $\begin{pmatrix} -7 & 6 \\ 7 & -4 \\ -4 & -2 \\ 8 & -6 \end{pmatrix}$ (07)

- (B) What do you understand by zero sum in the context of game theory? (07)
