A   (Printed Pages 7)

(20622)   Roll No. ....

BCA-IV Sem.

18019

B.C.A. Examination, June-2022

OPTIMIZATION TECHNIQUES

(BCA-404)

Time : Three Hours]   *[Maximum Marks : 75*

Note : Attempt **all** the sections as per instructions.

Section-A

(Very Short Answer Type Questions)

Note : Attempt **all** the **five** questions. Each question carries 3 marks.

1. Define optimal solution of a linear programming problem.

2. Define deterministic model in inventory theory.

P.T.O.

3. Define sequencing problem.

4. Explain queue length, waiting time and traffic intensity.

5. Explain group replacement and individual replacement.

Section-B

(Short Answer Type Questions)

Note : Attempt any **two** questions from this section. Each question carries 7½ marks.

6. Solve the following assignment problem:

Man

	1	2	3	4
I	12	30	31	15
II	18	33	9	31
III	44	25	24	21
IV	23	30	28	14

Job

18019/2

7. The cost of a machine is Rs. 6100 and its scrap value is only Rs. 100. The maintenance costs are found from experience to be as below:

Year	1	2	3	4	5	6	7	8
Maintenance Cost in Rs.	100	250	400	600	900	1250	1600	2000

When should the machine be replaced.

8. we have five jobs each of which must go through two machines A and B in the order AB. Processing times in hours are given in the table below:

Job	1	2	3	4	5
Machine A	5	1	9	3	10
Machine B	2	6	7	8	4

Determine the sequence for the five jobs that will minimize the ellipse time.

Section-C

(Long Answer Type Questions)

Note : Attempt any **three** questions out of the following **five** questions. Each question carries 15 marks.

9. Solve the following LPP:

Max. $Z = 5x_1 + 3x_2$

s.t. $3x_1 + 5x_2 \leq 15$

$5x_1 + 2x_2 \leq 10$

$x_1 > x_2 \geq 0$

10. Solve the following transportation problem:

To

		1	2	3	Supply
From	1	2	7	4	5
	2	3	3	1	8
	3	5	4	7	7
	4	1	6	2	14
Demand		7	9	16	34

11. We have five jobs, each of which must go through the machines A,B and c in the order ABC, Processing times are as follows :

	Processing times in hours		
Jobs	A	B	C
1	4	5	8
2	9	6	10
3	8	2	6
4	6	3	7
5	5	4	11

Determine a sequence for the five jobs that will minimize the elapsed time T.

12. The cost of a new machine is Rs. 5000. The maintenance cost of nth year is given by $C_n = 500(n-1)$, $n = 1,2,3,$ -----.

Suppose that the discount rate per year is 0.5. After how many years it will be economical to replace the machine?

13. Customers arrive at a sales counter manned by a single person according to a poissen process with a mean rate of 20 per hour. The time required to serve a customer has an exponential distribution

with a mean of 100 seconds. Find the

average waiting time of a customer and

queue length.