



DECA605

Reg. No.

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VI Semester B.C.A Degree Examination, July/August - 2024

COMPUTER SCIENCE**Operation Research****(NEP Scheme)****Time : 2½ Hours****Maximum Marks :60****Instructions to Candidates:****Answer All the Parts.****PART - A****I. Answer any Four questions. Each question carries Two marks. (4×2=8)**

1. Define Operation research. Mention any Two applications.
2. Write down the standard form of LPP.
3. What is optimum solution and basic feasible solution in transportation problem?
4. Give the mathematical formulation of transportation problem.
5. Define Maximum - Minimax principle.
6. What is an activity? Mention its types?

PART - B**II. Answer any Four questions. Each question carries Five marks. (4×5=20)**

7. Explain the different phases of operation research in detail.
8. An agricultural research institute suggested the farmer to spread out atleast 4800 kg of special phosphate fertilizer and not less than 7200 kg of a special nitrogen fertilizer to increase the productivity of crops in his fields. There are two sources of obtaining these mixture A and mixture B. Both of these are available in bags weighing 100 kg each and they cost Rs. 40 and Rs. 24 respectively. Mixture A contains phosphate and nitrogen equivalent of 20 kg and 80 kg respectively, while mixture B contains these ingredients equivalent to 50 kg each. Formulate this as an LPP.
9. Differentiate between assignment and transportation problem.

[P.T.O.]



10. Obtain initial basic feasible solution for the following problem using least cost method.

	D_1	D_2	D_3	D_4	Supply
S_1	21	16	15	3	11
S_2	17	18	14	23	13
S_3	32	27	18	41	19
Demand	6	10	12	15	

11. Determine the optimal strategies for each player in the following game. (With saddle point).

		Player Y			
		Y_1	Y_2	Y_3	Y_4
Player X	X_1	-5	2	0	7
	X_2	5	6	4	8
	X_3	4	0	2	-3

12. Distinguish between PERT and CPM.

PART - C

Answer any Four questions. Each question carries Eight marks.

(4×8=32)

13. Use Simplex method to solve the following LPP.

$$\text{Maximize, } z = 3x_1 + 2x_2 + 5x_3$$

$$\text{Subject to } x_1 + 4x_2 \leq 420$$

$$3x_1 + 2x_3 \leq 460$$

$$x_1 + 2x_2 + x_3 \leq 430$$

14. Determine the initial basic feasible solution to the given transportation problem using Vogel's approximation method.

	D_1	D_2	D_3	D_4	Supply
S_1	21	16	25	13	11
S_2	17	18	14	23	13
S_3	32	17	18	48	19
Demand	6	10	12	15	



15. a) Explain Hungarian algorithm for solving assignment problem. (4)
b) Find the optimum solution to the following assignment problem. (4)

		Jobs		
		X	Y	Z
Workers	A	18	17	16
	B	15	13	14
	C	19	20	21

16. What is saddle point? Solve the following game whose pay-off matrix is given below.

		B ₁	B ₂
A ₁	:	2	5
A ₂		7	3

Determine the optimal strategies and value of the game.

17. a) Describe Fulkerson's Rule for numbering the events of a network. (4)
b) The sequence of activities along with their predecessor requirements is given below. Construct the network diagram. (4)

Activity	Predecessor Activity
A	-
B	A
C	A
D	B
E	B,C
F	E
G	D,F
H	G

18. A small project consists of 7 activities for which the relevant data are given below.

Activity	Preceding Activities	Activity Duration
A	-	4
B	-	7
C	-	6
D	A,B	5
E	A,B	7
F	C,D,E	6
G	C,D,E	5

- i) Draw the network and find the project completion time.
ii) Calculate total float for each of the activities.