

	<p style="text-align: center;">ADAMAS UNIVERSITY</p> <p style="text-align: center;">END (EVEN) SEMESTER EXAMINATION: MAY 2021</p> <p style="text-align: center;">(Academic Session: 2020 – 21)</p>		
Name of the Program:	B. Tech. (CSE)	Semester:	IV
Paper Title :	Operations Research	Paper Code:	ECS42110
Maximum Marks :	40	Time duration:	3 Hours.
Total No of questions:	08	Total No of Pages:	02
Instruction to the Candidate:	<ol style="list-style-type: none"> 1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer. 		

Answer all the Groups

Group A

Answer all the questions of the following

5 × 1 = 5

1.
 - a) In a maximization LPP, what is the coefficient for an artificial variable in objective function?
 - b) What is service utilization factor in queuing theory?
 - c) For any basic feasible solution of a general assignment problem, having a square pay-off matrix of order n , what is the number of assignment?
 - d) How can you classify a game theory problem?
 - e) Define carrying cost in inventory model.

GROUP –B

(Short Answer Type Questions)

Answer *any three* of the following

3 × 5 = 15

2. If possible, solve the following LPP without using graphical method:

$$\text{Max } z = 3x_1 + 5x_2$$

$$\text{subject to, } x_1 - 2x_2 \leq 6$$

$$x_1 \leq 10$$

$$x_2 \geq 1$$

$$x_1, x_2 \geq 0.$$

3.
 - (i) What are the queue disciplines?
 - (ii) What are different characteristics of queuing system?
 - (iii) What is Kendall's notation in queuing theory? Describe all notations. [1+1+3]

4. Solve the following maximization type assignment problem, where the profit matrix is given as follows:

<i>Job</i>	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>
<i>Person</i>				
<i>A</i>	10	14	12	13
<i>B</i>	8	7	8	10
<i>C</i>	15	15	14	12
<i>D</i>	9	11	10	11

5. Solve the game problem, using rule of dominance, whose pay off matrix is as follows:

		Player B's Strategies			
		B1	B2	B3	B4
Player A's Strategy	A1	2	1	4	0
	A2	3	4	2	4
	A3	4	2	4	0
	A4	0	4	0	8

GROUP –C
(Long Answer Type Questions)
 Answer *any two* of the following

2 × 10 = 20

6. Find the optimal solution of the following primal LPP by solving it's dual:

$$\begin{aligned}
 \text{Max } z &= 5x_1 - 2x_2 + 3x_3 \\
 \text{subject to, } &2x_1 + 2x_2 - x_3 \geq 2 \\
 &3x_1 - 4x_2 \leq 3 \\
 &x_2 + 3x_3 \leq 5 \\
 &x_1, x_2, x_3 \geq 0.
 \end{aligned}$$

7. Draw a network of a project which consists of the tasks A,B,C,D,..., H and I. The sequence of performing various tasks is as follows:

A < D, A < E, B < F, D < F, C < G, C < H, F < I, G < I; (where X < Y means X is predecessor of Y).

- (i) Construct a network diagram.
- (ii) Compute earliest and least event time for all events.
- (iii) Identify critical path and total project duration.

The time of completion for each task is as follows:

Task	A	B	C	D	E	F	G	H	I
Duration	8	10	12	10	16	17	18	14	19

8. (i) What are the different form of inventories and their functions?
(ii) What are the different reasons for carrying inventory?

[5+5]
