

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: BE
BRANCH: PRODUCTION**

**SEMESTER: VII
SESSION : MO/2019**

SUBJECT : PE7019 ADVANCED OPERATIONS RESEARCH

TIME: 1.5 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 30.
 2. Candidates may attempt for all 30 marks.
 3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. The missing data, if any, may be assumed suitably.
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Q1 Use revised simplex method to solve the following problem: [5]

Maximize $Z = x_1 + 2x_2$ (Objective function)

Subject to

$$x_1 + 2x_2 \leq 3$$

$$x_1 + 3x_2 \leq 1$$

Where, $x_1, x_2 \geq 0$

Q2 In the problem given in Q 1, find the range on the values of the coefficient of the variable x_1 in the objective function such that the current optimal solution remains optimal. Also find the range on the values of the coefficient of the variable x_2 in the objective function such that the current optimal solution remains optimal. [5]

Q3 M/s C K Singh & company have 3 alternatives open, each of which can be followed by any of the four possible events. The conditional payoffs (in Rs) for each action event combination are given below: [5]

Strategies	States of Nature			
	A	B	C	D
	Rs.	Rs.	Rs.	Rs.
X	8	0	-10	6
Y	-4	12	18	-2
Z	14	6	0	8

Identify the decision taken under the following approaches: (i) Pessimistic, (ii) Optimistic, (iii) Equal probability, (iv) Hurwicz criterion. The decision maker's degree of optimism (α) being 0.7 (v) criterion of regret

Q4 An auto-rickshaw driver finds from his past records that the cost per year of running an auto-rickshaw whose purchase price is Rs. 7000.00 are given as under. At what stage the replacement is due? [5]

Year:	1	2	3	4	5	6	7	8
Running cost in Rs	1100	1300	1500	1900	2400	2900	3500	4100
Resale value in Rs	3100	1600	8500	475	300	300	300	300

Q5 Use graphical method for solving the following game and find the value of the game. [5]

		B		
		I	II	III
A	I	1	3	11
	II	8	5	2

PTO

Q6 Find the optimum strategies for P and Q and the value of the game for the payoff matrix [5]
as given below.

		Q		
		I	II	III
P	I	-6	10	11
	II	-1	-2	-3
	III	-1	-2	-4

:::: 20/09/2019M ::::