CLASS: BE   SEMESTER: VII/ADD
BRANCH: PROD.   SESSION : MO/2018

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.

Q1   Use revised simplex method to solve the following problem: [5]
$Maximize\ Z = 2x_1 + 3x_2$ (Objective function)
Subject to
$x_1 + 2x_2 \leq 6$
$2x_1 + x_2 \leq 9$
Where, $x_1, x_2 \geq 0$

Q2   A Business man has two independent investment portfolios A and B, available to him but   [5]
he lacks the capital to undertake both of them simultaneously. He can either choose A
first and then stop, or if A is successful, then take B vice versa. The probabilities of
success of A is 0.6, while for B is 0.4. Both investment schemes require an initial capital
outlay of Rs 10000 and both return nothing is the venture proves unsuccessful. Successful
completion of A will return Rs 20000 (over cost) and successful completion of B will return
Rs 24000 (over cost). Draw a decision tree in order to determine the best strategy.

Q3   The Data collected in running a machine whose purchase cost is Rs 60000 are given below: [5]

Year	1	2	3	4	5
Resale value (Rs)	42000	30000	20400	14400	9650
Cost of spares (Rs)	4000	4270	4880	6000	7000
Cost of Labour (Rs)	14000	16000	18000	25000	30000

Determine the optimum period of replacement of the machine.

Q4   Use graphical method for solving the following game and find the value of the game.   [5]

			B	
	Strategies	I	II	III
A	I	2	4	10
	II	9	6	3

Q5   A departmental store purchases Christmas trees which can be ordered only in lots of 100.   [5]
Each tree costs Rs 25 and sells at Rs 40 each. Unsold trees, however, have no salvage
value. The probability distribution obtained from analysis of past sales data is given
below:

Trees sold	Probability
100	0.2
200	0.35
300	0.25
400	0.15
500	0.05
Total	1

How many units of tress should the store order? Also find the expected value of perfect
information.

Q6 (a) What is saddle point in game theory?   [2]
    (b) What is a decision? What are the different categories under which decisions are made?   [3]