(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 140851
           187851   Roll No.| | | | | | | | | | |

B. Tech.

(SEM. I) THEORY EXAMINATION, 2015-16

OPERATION RESEARCH

[Time : 3 hours]   [Total Marks : 100]

Note : Attempt **all** questions.

SECTION – A

1. Attempt **any four** of the following :   [5x4=20]

    (a) What is main advantage of an OR model ?

    (b) Describe the difference in standard form L.P.P. and canonical form L.P.P.

    (c) Solve L.P.P. by graphical method :

    Max. $Z = 8000X_1 + 7000 X_2$

    Subject to constraints, $3X_1 + X_2 \leq 66$

    $$X_1 + X_2 \leq 45$$

    $$X_1 \leq 20$$

$$X_2 \leq 40$$

$$X_1, X_2 \geq 0$$

(d) A company has two operational departments (Processing and Packing) with capacity to produce three types of product and yielding profit cost of Rs. 2, Rs. 4 and Rs. 3 per respectively and given information below in hours.

	Processing	Packing
M_1	2	5
M_2	1	2
M_3	7	4

and total run time of each department is 60 and 40 hours. Formulate L.P.P. to find maximize profit.

(e) Solve L.P.P. by Simplex method

Max. $Z = 3x_1 + 5x_2 + 4x_3$

Subject to : $2x_1 + 3x_2 \leq 8$

$3x_1 + 2x_2 + 4x_3 = 15$

$2x_2 + 5x_3 \leq 10$ and

$x_1, x_2, x_3 \geq 0$

2. Attempt **any two** of the following :   (10x2=20)

(a) Find optimum basic feasible solution by VAM in the following transportation problem.

		To			
		A	B	C	Supply
From	a	50	30	220	1
	b	90	45	170	3
	c	250	200	50	4
Required		4	2	2	

(b) What are job assignment which will minimize the cost ?

		Machine			
		W	X	Y	Z
	A	18	24	28	32
Job	B	8	13	17	18
	C	10	15	19	22

(c) What are the essential characteristic of dynamic programming problem ? State Bellman's principle of optimality.

3. Attempt **any two** of the following :   (10x2=20)

(a) Explain any three techniques that are used in decision making under uncertainty.

(b) Find the range of values of p and q which will render the entry cell (2 2) a saddle point from the game.

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                    Player B
                 B₁   B₂   B₃
            A₁ │  2    4    5
Player A    A₂ │ 10    7    q
            A₃ │  4    p    6
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(c) Solve game by Graphic method :

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              Player B
            │ 1  2  3  4 │
Player A  1 │ 3  3  4  0 │
          2 │ 5  4  3  7 │
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4. Attempt **any two** of the following :   (10x2=20)

(a) What is Economic Order Quantity ? Discuss any one, step by step, the development formula.

(b) The demand for an item is deterministic and constant over the time and it is equal to 600 units per year. The per unit cost of item is Rs. 50 while the cost of placing an order is Rs. 5. The inventory carrying cost is 20% of the cost of inventory per annum and the cost of storage is Re. 1 per unit per month. Find the optimal ordinary quantity when stockouts are permitted. If the stock out are not permitted, what would be the loss to the company?

(c) Describe the simulation process. Write the different types of simulation languages.

OR

Explain sequencing problem in n jobs through two machine.

5. Attempt **any two** of the following :   (10x2=20)

(a) Explain characteristics and classification of queing models.

(b) Discuss the following terms :

   (i) Traffic intensity

   (ii) Balking

   (iii) Jockeying

(c) Draw a network diagram and determine the total free and independent floats and identity the critical path.

Activity :	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Duration :	2	8	10	6	3	3	7	5	2	8

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