(DCS / DIT 313)

B.Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Third Year)

Computer Science & IT

Paper - III : OPERATIONS RESEARCH

Time : 3 Hours **Maximum Marks : 75**

Answer question No.1 compulsory ***(15)***

Answer ONE question from each unit ***(4 × 15 = 60)***

1) a) What is optimum solutions.

b) Initial Basic feasible solution.

c) Write standard form of L.P.P.

d) Explain slack variable.

e) Write about Dual simplex method.

f) Characteristics of queuing theory.

g) Characteristics of dynamic programming.

h) Explain two person zero-sum game.

i) Explain about saddle point.

j) Pay off matrix.

k) Max – min and min – max principle.

l) What PERT and CPM.

m) Degeneracy in transportation problem.

n) Explain the setup cost.

o) Explain the holding cost.

UNIT – I

2) a) Solve the LPP.

Max. $z = 4x_1 + 3x_2$

Subject to constraints

$2x_1 + x_2 \leq 72$

$x_1 + 2x_2 \leq 48,$

$x_1 \geq 0, x_2 \geq 0$

b) Solve the Linear programming problem by Graphical method.

Max. $z = 3x_1 + 2x_2$

Subject to constraints

$2x_1 - x_2 \geq -2$

$x_1 + 2x_2 \leq 8$

$x_1, x_2 \geq 0$

OR

3) Use two – phase simplex method

$$\text{Max } z = 2x_1 + x_2 + \left(\frac{1}{4}\right)x_3$$

Subject to constraints

$4x_1 + 6x_2 + 3x_3 \leq 8$

$3x_1 - 6x_2 - 4x_3 \leq 1$

$2x_1 + 3x_2 - 5x_3 \geq 4$

$x_1, x_2, x_3, \geq 0$

UNIT - II

4) The transportation cost in rupees of an electronic equipment from a particular source to a particular destination is given with following matrix

Destination

		D_1	D_2	D_3	D_4	Availability
Source	S_1	10	8	11	7	200
	S_2	9	12	14	6	400
	S_3	8	9	12	10	350
	Demana	160	180	310	300	

OR

5) Solve the following travelling salesman problem given by the following data.

$d_{12} = 20$, $d_{13} = 4$, $d_{14} = 10$, $d_{23} = 5$, $d_{34} = 6$, $d_{25} = 10$, $d_{35} = 6$, $d_{45} = 20$.

Also $d_{ij} = d_{ji}$ and there is no route between cities i and j if a value for d_{ij} is not shown above.

UNIT - III

6) Ram industry needs 5,400 units/year of a bought – out component which will be used in its main product. The ordering cost is Rs. 250 per order and the carrying cost per unit per year is Rs. 30. Find the economic order quantity (EOQ), the number of orders per year and the time between successive orders.

OR

7) Explain the following :

a) Quantity discounts.

b) ABC analysis of inventory.

UNIT – IV

8) The following table lists the jobs of a network along with their time estimates.

Jobs	1-2	1-3	2-4	3-4	4-5	3-5
Optimistic time (a)	2	9	5	2	6	8
Pessimistic time (b)	14	15	17	8	12	20
Most likely time (m)	5	12	14	5	6	17

a) Draw the network

b) Calculate expected duration of each activity.

c) Expected variance of each activity.

d) Expected variance of project length.

e) Find critical path.

OR

9) Cars arrive at a petrol pump, having one petrol unit, in poision fashion with an average of 10 cars per hour. The service time is distributed exponentially with a mean of 3 minutes. Find

a) average number of cars in the system.

b) average waiting time in the queue.

c) average queue length.

d) the probability that the number of cars in the system is 2.

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