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Total No. of Questions : 13] **[Total No. of Pages : 03**

J-3032[S-32] [2037]

BCA (Semester - 5th)

OPERATION RESEARCH (BCA - 504)

Time : 03 Hours **Maximum Marks : 75**

Instruction to Candidates:

1) Section - A is **compulsory.**
2) Attempt any **Nine** questions from Section - B.

Section - A

Q1) ***(15 x 2 = 30)***

a) What are the characteristics of OR?

b) List the general methods involved in graphical solution method.

c) Represent the standard LPP into matrix form.

d) What are the data required to construct the initial simplex table?

e) State fundamental theorem of duality.

f) Draw the decision tree diagram.

g) What is integer LPP?

h) Define terms in dynamic programming : stage and state.

i) What are the various types of decision making environments?

j) How branch and bound technique is used?

k) What is unbalanced transportation model?

l) For what type of problems, dynamic programming is used?

m) Assignment problem is a special case of transportation problem. Comment.

n) What is the use of artificial variable?

o) What are the two types of degeneracy in transportation problem?

P.T.O.

Section - B *(9 x 5 = 45)*

Q2) Describe the different models for solving O.R. problems.

Q3) (a) Give three definitions of O.R.
(b) What are the steps involved in solving a problem in O.R.?

Q4) What are the rules for converting a primal problem into its dual?

Q5) A firm manufactures 3 products A, B and C. The profits are Rs. 3, Rs. 2 and Rs. 4 respectively. The firm has two machines and below is the required processing time in minutes for each machine on each product.

		Product		
		A	B	C
Machine	G	4	3	5
	H	2	2	4

Machine G and H have 2000 and 2500 machine minutes respectively. The firm must manufacture 100 A's, 200 B's and 50 C's, but no more than 150 A's. Formulate this problem to maximize profit. Do not solve it.

Q6) Solve the following problem using two phase simplex method.
Minimize Z = 15/2 X - 3Y, subject to constraints
3X - Y - Z > = 3, X - Y + Z > = 2 and X, Y, Z > = 0.

Q7) Find the dual of the following primal problem.
Minimize Z = 2X + 3Y + 4Z, subject to constraints
2X + 3Y + 5Z > = 2, 3X + Y + 7Z = 3, X + 4Y + 6Z < = 5 and X, Y > = 0 and Z is unrestricted.

Q8) Solve the assignment problem given by following matrix :

		Man			
		1	**2**	**3**	**4**
	A	12	30	21	15
Work	**B**	18	33	9	31
	C	44	25	24	21
	D	23	30	28	14

Q9) Write short notes on : decision making under
(a) certainty
(b) risk.

Q10) Find the initial basic feasible solution using Vogel's method.

	1	**2**	**3**	**4**	**Supply**
A	13	11	15	20	2000
B	17	14	12	13	6000
C	18	18	15	12	7000
Demand	3000	3000	4000	5000	

Q11) (a) Write the mathematical formulation of assignment problem.
(b) Give the tabular representation of Transportation problem.

Q12) Solve the traveling salesman problem given by following data :

	A	**B**	**C**	**D**	**E**
A	∞	2	4	7	1
B	5	∞	2	8	2
C	7	6	∞	4	6
D	10	3	5	∞	4
E	1	2	2	8	∞

Q13) Write short notes on :
(a) Dynamic programming
(b) Decision tree analysis.

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