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Total No. of Questions : 07] [Total No. of Pages : 02

BCA (Sem. - 5th)
OPERATIONS RESEARCH
SUBJECT CODE : BC-504
Paper ID : [B0222]

[Note: Please fill subject code and paper ID on OMR]

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:

1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.

Section - A

Q1) ***(10 × 2 = 20)***

a) Explain briefly the applications of O.R.

b) What are the short comings of O.R.?

c) Use graphical method to solve the L.P.P.

Maximize $Z = x_1 + 2x_2$ subject to

$x_1 - x_2 \leq 1$, $x_1 + x_2 \geq 3$ and $x_1 \geq 0$, $x_2 \geq 0$

d) Give the dual of the L.P.P.

Minimize $Z = 4x_1 + 6x_2 + 18x_3$ subject to

$x_1 + 3x_2 \geq 3$, $x_2 + 2x_3 \geq 5$ and $x_j \geq 0$ $(j = 1, 2, 3)$

e) Explain briefly Least-Cost Method.

f) Write a short note on Travelling Salesman Problem.

g) Write a note on Minimax regret criterion.

h) Define EVPI. How is it calculated?

i) What is integer linear programming?

j) What is dynamic programming?

Section - B

(4 × 10 = 40)

Q2) Use Simplex Method to Maximize $Z = x_1 + 2x_2 + x_3$ subject to constraints:

$x_1 + 2x_2 + 3x_3 \leq 10, \quad x_1 + x_2 \leq 5, \quad x_1, x_2, x_3 \geq 0$

Q3) Use duality to solve

Minimize $Z = 15x_1 + 10x_2$ subject to

$3x_1 + 5x_2 \geq 5, \; 5x_1 + 2x_2 \geq 3; \; x_1, x_2 \geq 0$

Q4) Solve the following transportation problem.

Origin	Destination				Availability
	D_1	D_2	D_3	D_4	
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
Requirement	20	40	30	10	

Q5) Solve the following assignment problem.

	A	B	C	D
1	10	25	15	20
2	15	30	5	15
3	35	20	12	24
4	17	25	24	20

Q6) Use Branch and Bound method to solve

Maximize $Z = 7x_1 + 9x_2$ subject to

$-x_1 + 3x_2 \leq 6, \; 7x_1 + x_2 \leq 35, \; x_2 \leq 7, \; x_1, x_2 \geq 0$ and are integers.

Q7) Use dynamic programming to solve

Maximize $Z = y_1 \cdot y_2 \cdot y_3 \ldots y_n$ subject to

$y_1 + y_2 + \ldots + y_n = c$ and $y_j \geq 0; \; j = 1, 2, \ldots n$

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