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Total No. of Questions : 13] **[Total No. of Pages : 02**

Paper ID [A0224]

(Please fill this Paper ID in OMR Sheet)

BCA (504) (S05) (O) (LE) (Sem. - 5th)

OPERATION RESEARCH

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 × 2 = 30)***

a) Define O.R.

b) What is role of O.R in industrial sector?

c) Define mathematical model in O.R.

d) What is scientific model of O.R.

e) How can we formulate a problem?

f) Define decision variable.

g) The manage of an oil refinery must decide on the optimum mix of two possible blending process of which the input and output production runs are as follows :

Process	INPUT		OUTPUT	
	Crude A	Crude B	Gasoline x	Gasoline y
1	6	4	6	9
2	5	6	5	5

The maximum amount available of crude A and B are 250 units and 200 units respectively market demand shows that at least 150 units of Gasoline x and 130 units of gasoline y must be produced. The profits per production run from process 1 and process 2 are Rs.4 and Rs.5 respectively formulate the problem for maximising the profit.

h) What is the difference between feasible and infeasible solution?

i) What is BIG-M method?

j) Define degenrace.

k) Define integer prog problem.

l) What are various steps for decision making?

m) What is decision tree?

n) What is principle of optimality?

o) Define dynamic prog problem.

Section - B

(9 × 5 = 45)

Q2) What do you mean by a model? What are various types of models in O.R.?

Q3) Explain scientific model in detail.

Q4) What are the limitations of graphical method? Explain.

Q5) Solve Graphically :

Maximize (z) = $X_1 + X_2$

Subject to

$$X_1 + X_2 \leq 1$$
$$-3X_1 + X_2 \geq 3$$

Q6) What are various steps to solve method of penalities?

Q7) Formulate the dual of following problem :

Maximize (Z) = $5X_1 + 3X_2$

Subject to

$$3X_1 + 5X_2 \leq 15$$
$$5X_1 + 2X_2 \leq 10$$

Q8) How can we find an initial basic feasible solution using least cost method?

Q9) What is decision tree? Explain with suitable examples?

Q10) Explain multistage decision tree.

Q11) Explain degeneracy in detail.

Q12) Consider the following transportation problem involving three sources and your destinations. The cell entries represent the cost of transportation unit.

	1	2	3	4	Supply
1	3	1	7	4	300
2	2	6	5	9	400
3	8	3	3	2	500
Demand	250	350	400	200	

Q13) Explain Game Theory.

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