2023

Time - 3 hours

Full Marks - 80

*Answer **ALL** questions.*
Figures in the right hand margin indicate marks.

1. What is Operations Research (OR) ? What are the essential characteristics of OR ? What are the advantages and disadvantages of OR Model ? [16

OR

Explain the term 'Decision' in a decision making problem. Indicate the differences between decision under risk and decision under uncertainty in decision theory.

2. Use graphical method to solve the following LPP : [16

Maximise $Z = 2x_1 + 3x_2$

subject to the constraints

$$x_1 + x_2 \leq 30$$

$$x_1 - x_2 \geq 0$$

$$x_2 \geq 3,\ 0 \leq x_1 \leq 20$$

and $0 \leq x_1 \leq 20$ and $0 \leq x_2 \leq 12$

OR

Solve the following problem by Vogel's Approximation Method (VAM) : [16

Demand ↓	D_1	D_2	D_3	D_4	Supply
S_1	3	7	6	4	5
S_2	2	4	3	2	2
S_3	4	3	8	5	3
	3	3	2	2	10

3. (a) Solve the following Two Person Zero Sum (TPZS) game : [10

Player-B

Plaery-A		b_1	b_2	b_3
	a_1	15	2	3
	a_2	6	5	7
	a_3	−7	4	0

(b) What is a strictly determinable game ? Explain with a suitable example. [6

OR

What is Goal Programming ? How do you differentiate Goal Programming from Linear programming. Explain with suitable example. [16

4. Describe briefly the EOQ concept. What are its limitations ? Discuss. [16

OR

What is queuing theory ? In what types of problem situations it can be applied successfully ? Discuss giving examples. [16

5. What is simulation ? Discuss the applications of simulations with special reference to Monte-Carlo simulation. [16

OR

A project consists of a series of tasks labelled A, B, ..., H, I with the following Relationships (W < X, Y : means X and Y cannot start until w is completed ; X, Y < W : means w cannot start until both X and Y are completed). With this notation, construct the network diagram having the following constraints : [16

A < D, E ; B, D < F ; C < G ; B, G < H and F, G < I.

Find also the minimum time of completion of the project, when the time (in days) of completion of each task is as follows :

Task	A	B	C	D	E	F	G	H	I
Time	23	8	20	16	24	18	19	4	10