

AJ-1552 CV-19
M.A./M.Sc. (Final)
Term End Examination, 2021-22
MATHEMATICS (Paper-VIII)
(OPERATIONS RESEARCH)

Time : Three hours]

[Maximum Marks : 100

Note: Answer any five questions. All questions carry equal marks.

1.(a) What is meant by a linear Programming Problem? Describe the necessity of operation research in Industry.

(b) Use simplex method to solve the following linear programming problem.

Maximize: $Z = 4x + 10y$

Subject to $2x + y \leq 50$

$2x + 5y \leq 100$

$2x + 3y \leq 90$

$x \geq 0, y \geq 0$

2. (a) Solve the following transportation problem:

		Destination				
		A	B	C	D	Availability
Source	X	1	2	1	4	30
	Y	3	3	2	1	50
	Z	4	2	5	9	20
Requirement		20	40	30	10	

(b) Write brief notes on Transportation and Assignment problems.

3.(a) What is spanning tree problem?

(b) Draw a network diagram for the following data:

Activity	Preceding Activities
A	None
B	A
C	A
D	B
F	A
E	B, E
G	C
H	D, F
I	G
J	H, I

4. Use dynamic programming to solve the following problem:

$$\text{Minimize } Z = y_1^2 + y_2^2 + y_3^2$$

$$\text{Subject to } y_1 + y_2 + y_3 \geq 15$$

$$y_1, y_2, y_3 \geq 0$$

- 5.(a) Explain the following terms:

(i) Pure strategy,

(ii) Saddle point,

(ii) Pay off matrix,

(iv) Dominance property.

- (b) Solve the following 2×2 game graphically.

		Player B			
		B_1	B_2	B_3	B_4
Players A	A_1	2	1	0	-2
	A_2	1	0	3	2

6. Write short notes on the following:

(i) Input-output analysis,

(ii) Blending Problems,

(iii) Decomposable & indecomposable economies.

- 7.(a) Use matrix oddment method to solve the following 3×3 Games:

$$\begin{bmatrix} 0 & 1 & 2 \\ 2 & 0 & 1 \\ 1 & 2 & 0 \end{bmatrix}$$

- (b) Use a short note on Dynamic Programming method.

8. State and prove fundamental theorem on linear Programming.

- 9.(a) Write a short note on Branch and Bound Technique for solving integer Programming problem.

- (b) What are PERT and CPM. Explain.