

FACULTY OF MANAGEMENT
M.B.A (CBCS) II Semester (Backlog) Examination, August 2023
Subject: Operations Research
Paper – MB - 203

Time: 3 Hours

Max. Marks: 80

PART – A

Note: Answer all the questions.

(5 x 4 = 20 Marks)

1. Write the differences between linear programming and goal programming?
2. Explain the economic interpretation of dual variables?
3. Write about degeneracy in transportation problem?
4. Write about Resource Levelling?
5. What are the elements of simulation model?

PART – B

Note: Answer all the questions.

(5 x 12 = 60 Marks)

6. a) Define Operation Research and explain the managerial applications and limitations of Operation Research.

(OR)

- b) Solve the following LPP by graphical method and indicate the solution:

$$\text{Maximize } Z = 40x + 30y$$

$$\text{Subject to constraints: } 2x + y \leq 16$$

$$x + y \leq 10$$

$$\text{Where } x, y \geq 0$$

7. a) Use simplex method to maximize $Z = x_1 + 2x_2 + 3x_3$

$$\text{Subject to constraints } x_1 + 2x_2 + 3x_3 \leq 10$$

$$x_1 + x_2 \leq 5$$

$$\text{Where } x_1, x_2, x_3 \geq 0$$

(OR)

- b) What do you mean by sensitivity analysis? List its implications.

8. a) A travelling salesman has to visit 5 cities. The distance between the cities is given in the matrix. Determine optimum route to reduce the distance travelled.

Cities	A	B	C	D	E
A	--	3	6	2	3
B	3	--	5	2	3
C	6	5	--	6	4
D	2	2	6	--	6
E	3	3	4	6	--

(OR)

- b) Solve the following transportation problem to find the minimum transportation cost.

Source	Destination					Available
	D1	D2	D3	D4	D5	
S1	4	7	3	8	2	4
S2	1	4	7	3	8	7
S3	7	2	4	7	7	9
S4	4	7	2	4	7	2
Required	8	3	7	2	2	

9. a) The following information is given:

Activity	1-2	2-3	2-4	3-5	4-6	5-6	5-7	6-7
Pessimistic time(weeks)	3	9	6	8	8	0	5	8
Most likely time(weeks)	3	6	4	6	6	0	4	5
Optimistic time(weeks)	3	3	2	4	4	0	3	2

Draw the network diagram for the above and also calculate

- (i) Critical path,
- (ii) Expected project length and
- (iii) Find the probability that the project will be completed in 23 weeks.

(OR)

- b) A small project consists of seven activities for which the relevant data are given below:

Activity	Preceding Activities	Activity Duration(Days)
A	--	4
B	--	7
C	--	6
D	A, B	5
E	A, B	7
F	C, D, E	6
G	C, D, E	5

Draw the network and find the project completion time?
Calculate total float for each of the activities?

10. a) Solve the following game problem graphically:

		Player B			
		B1	B2	B3	B4
Player A	A1	2	1	0	-2
	A2	1	0	3	2

(OR)

- b) In a heavy machine shop, the overhead crane is 75 percent utilized. Time study observations gave the average slinging time as 10.5 minutes with a standard deviation of 8.8 minutes. What is the average calling rate for the services of the crane, and what is the average delay in getting service? If the average service time is cut to 8.0 minutes, with standard deviation of 6.0 minutes. How much reduction will occur, on average, in the delay of getting served?