

2020**BBA****[HONOURS]****Paper : BBA3.2****(Operations Research)**

Full Marks : 80

Time : 4 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer **Q.No.1** and any other **five** from the rest:1. Answer any **ten** questions from the following:

2×10=20

- a) What do you mean by O.R?
- b) What is unbalanced Transportation problem?
- c) What is assignment problem?
- d) State the significance of a saddle point in the payoff matrix.
- e) Name any two techniques used to solve decision making problem under risk.
- f) What is Total float?

- g) Give the full form of 'PERT' and 'CPM'.
- h) What is dummy activity in Network analysis?
- i) Give the full form of 'MODI' and 'VAM'.
- j) What is loop in Transportation problem?
- k) What do you know by feasible solution?
- l) When does degeneracy appear in the L.P.P.?
- m) What are the main differences between Assignment problem and Transportation problem?
- n) What do you mean by Mixed Strategy?
- o) What is Laplace criterion?

2. a) Name the various phases of O.R.
- b) Briefly discuss the various operation research models. 2+10
3. Define linear programming. Graphically solve the following LPP:

$$\text{Minimize } z = 6x_1 + 4x_2$$

Subject to the constraints

$$10x_1 + 2x_2 \geq 20, 2x_1 + 2x_2 \geq 12$$

$$2x_1 + 8x_2 \geq 24 \text{ and } x_1, x_2 \geq 0$$

2+10

[Turn Over]

4. Obtain the initial solution for the following Transportation problem using i) NWCR ii) Least Cost Method and iii) VAM: $4 \times 3 = 12$

		Destination			
Source	A	B	C	Supply	
I	2	7	4	5	
II	3	3	1	8	
III	5	4	7	7	
IV	1	6	2	14	
Demand	7	9	18		

5. Give the mathematical formulation of the 'Assignment problem'. Solve the following Assignment problem:

		Job			
		A	B	C	D
Man	1	10	6	4	16
	2	7	18	4	12
	3	12	8	10	14
	4	10	14	14	16

4+8

6. a) Explain the following two terms:
 i) Two person zero sum game
 ii) Principle of dominance
 b) Solve the following game:

		Player B		
		B_1	B_2	B_3
Player A	A_1	1	7	2
	A_2	6	2	7
	A_3	5	1	6

2+2+8

7. a) Define the following terms:
 i) Event float,
 ii) Activity float,
 iii) Free float and
 iv) Independent float.
 b) Draw a network diagram for the project with following activities and their predecessors:

Activity	A	B	C	D	E	F	G	H	I	J
Predecessor	-	A	B	B	B	C	C	F,G	D,E	I
Activity									H	

6+6

8. What is operation Research and how has it evolved?
 What are its characteristic features? 2+5+5

9. The linear programming problem is stated below:

$$\begin{aligned} \text{Maximize } & z = 4x + 6y \\ \text{Subject to } & \frac{1}{2}x + y \leq 4 \\ & 2x + y \leq 8 \\ & 4x - 2y \leq 2 \\ & x \geq 0, y \geq 0 \end{aligned}$$

Find out the optimal solution of the problem through simplex method. 12

10. For a small project of 12 activities, the details are given below. Draw the network and complete earliest occurrence time, latest occurrence time, critical activities and project completion time.

Activity:	A	B	C	D	E	F	G	H
Dependence:	-	-	-	B,C	A	C	E	E
Duration (Days):	9	4	7	8	7	5	10	8

I	J	K	L
D,F,H	E	I,J	G
6	9	10	2

4+2×4