

E-0409

Sub. Code
1BITSA2

U.G. DEGREE EXAMINATION, APRIL 2019

Information Technology

Allied : OPERATIONS RESEARCH

(CBCS – 2011 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are the advantages of a model in O.R?
2. Write all the steps are involved in LPP using graphical method.
3. Define Optimum solution.
4. Write down any two characteristics of O.R.
5. Write about the use of the artificial variable
6. Define dual of LPP.
7. What do you mean by unbalanced A.P?
8. Write about non degenerate basic feasible solution in T.P.
9. Differentiate feasible solution and basic feasible solution in T.P.
10. What do you mean by rimrequirements loop in T.P?

Part B**(5 × 5 = 25)**

Answer **all** questions choosing either (a) or (b).

11. (a) Write down the characteristics of O.R.

Or

- (b) Explain the merits and demerits of O.R.

12. (a) Define : Slack variable
 Surplus variable
 Artificial variable

Or

- (b) Solve the following LPP using graphical method.

$$\text{Maximize } Z = 3x_1 + 2x_2$$

$$\text{Subject to : } 2x_1 + x_2 \leq 40$$

$$x_1 + x_2 \leq 24$$

$$2x_2 + 3x_3 \leq 60$$

$$x_1, x_2 \geq 0$$

13. (a) Use the simplex method to :

$$\text{Maximize } Z = 10x_1 + x_2 + 2x_3$$

$$\text{Subject to : } x_1 + x_2 - 2x_3 \leq 10$$

$$4x_1 + x_2 + x_3 \leq 20$$

$$x_1, x_2, x_3 \geq 0$$

Or

- (b) Explain Gomory's cutting plane method.

14. (a) Solve the following A.P.

	1	2	3
A	120	100	80
B	80	90	110
C	110	140	120

Or

- (b) Explain the method of solving the Assignment problem.
15. (a) Solve the following Transportation problem using VAM.

	A	B	C	capacities
1	2	2	3	10
2	4	1	2	15
3	1	3	0	40
Demand	20	15	30	

Or

- (b) Explain the mathematical formulation of an Assignment problem.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. What are the scopes of O.R?
17. Solve the following problem using Simplex method.
 Maximize $Z + 2x_1 + 4x_2 + x_3 + x_4$
 Subject to : $x_1 + 3x_2 + x_4 \leq 4$
 $2x_1 + x_2 \leq 3$
 $x_2 + 4x_3 + x_4 \leq 3$
 $x_1, x_2, x_3, x_4 \geq 0$

18. Solve the following by Big M-method

$$\text{Minimize } Z = 12x_1 + 20x_2$$

$$\text{Subject to : } 6x_1 + 8x_2 \geq 100$$

$$7x_1 + 12x_2 \geq 120$$

$$x_1, x_2 \geq 0$$

19. Use dual simplex method to

$$\text{Minimize } z = 3x_1 + x_2$$

$$\text{Subject to : } x_1 + x_2 \geq 1$$

$$2x_1 + 3x_2 \geq 2$$

$$x_1, x_2 \geq 0$$

20. Solve the following Transportation problem.

	A	B	C	Available
I	6	8	4	14
II	4	9	8	12
III	1	2	6	5
Demand	6	10	15	