

Regd.No: \_\_\_\_\_

(STA N-5306 A1)  
**B.Sc Degree(CBCS) Examinations- 30 Oct 2024**

SEMESTER-V (REGULAR/SUPPLY)  
(ADMITTED BATCHES 2020-21, 2021-22 AND 2022-23 ONLY)

**OPERATION RESEARCH -I**

TIME: 3.00 Hrs

Max. Marks:60

Pass. Marks:24

Section-A

Answer any FIVE questions

5 x 4 = 20M

1. What are the various types of models
2. Explain the procedure for formulation of LPP
3. Explain Slack and Surplus variables
4. Define Basic and Basic feasible solution
5. Discuss about artificial variable technique
6. What is degeneracy in LPP
7. Define Primal and dual solution
8. What are the advantages of dual simplex method over simplex method
9. Define payoff and payoff matrix
10. Define pure and mixed strategies

Section-B

Answer the following questions

5 x 8=40M

11. Explain the origin and development of OR and Write its applications

(OR)

12. Solve the following LPP by Graphical method

$$\text{Maximize } Z = 300X_1 + 400X_2$$

$$\text{Subject to Constraints } 5X_1 + 4X_2 \leq 200$$

$$3X_1 + 5X_2 \leq 150$$

$$5X_1 + 4X_2 \geq 100$$

$$8X_1 + 4X_2 \geq 80$$

$$X_1, X_2 \geq 0$$

13. Explain Simplex Algorithm

(OR)

P.T.O

14. Solve the following LPP by using Simplex method

$$\text{Maximize } Z = 3X_1 + 5X_2$$

$$\text{Subject to constraints } 3X_1 + 2X_2 \leq 18$$

$$0 \leq X_1 \leq 4$$

$$0 \leq X_2 \leq 6$$

15. Solve the following LPP by Big-M Method

$$\text{Maximize } Z = 3X_1 + 2X_2$$

$$\text{Subject to constraints } 2X_1 + X_2 \leq 2$$

$$3X_1 + 4X_2 \geq 12$$

$$X_1, X_2 \geq 0$$

(OR)

16. Explain the procedure for Two-Phase Simplex Method

17. Use duality to solve the following LPP

$$\text{Minimize } Z = 4X_1 + 3X_2 + 6X_3$$

$$\text{Subject to constraints : } X_1 + X_2 \geq 2$$

$$X_1 + X_3 \geq 5$$

$$X_1, X_2, X_3 \geq 0$$

(OR)

18. Explain Dual simplex method procedure

19. (a) Solve the following game and determine the value of the game

$$\begin{bmatrix} 5 & 1 \\ 3 & 4 \end{bmatrix}$$

(OR)

20. Explain the procedure of 2 x n graphical method in solving a game

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Regd. No: \_\_\_\_\_

**(STA N-5306 A2)**

**B.Sc(MSCS & DSCS) Degree(CBCS) Examinations- 02 Nov 2024**

**SEMESTER-V (REGULAR& BACKLOG)**

**(ADMITTED BATCHES 2020-21, 2021-22 AND 2022-23 ONLY)**

**OPERATIONS RESEARCH - II**

TIME: 3Hrs

Max. Marks:60

Pass. Marks:24

**SECTION – A**

Answer any **FIVE** of the following questions

**(5 x 4= 20 Marks)**

1. Define transportation problem and write its mathematical formulation. ✓
2. Define balanced and unbalanced transportation problems. ✓
3. Show that assignment problem is a special case of TP. ✓
4. How can you solve maximization assignment problem. ✓
5. Define sequencing problem and write its assumptions. ✓
6. Define processing time and idle time.
7. Explain errors in networking.
8. Explain PERT method.
9. Explain about queuing system. ✓
10. Explain briefly about Poisson process in queuing theory.

**SECTION – B**

Answer **ALL** the following Questions.

**(5 x 8 = 40 Marks)**

11. Solve the following Transportation problem by using VAM method.

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

**(OR)**

12. Explain the procedure of MODI method. ✓

13. Explain the Travelling Salesman problem with an illustration.

**(OR)**

14. Solve the following Assignment problem.

	I	II	III	IV	V
1	3	8	10	2	3
2	8	7	2	9	7
3	6	4	2	7	5
4	8	4	2	3	5
5	9	10	6	9	10

15. Explain the procedure of n jobs and 2 machines and calculation of times.

(OR)

16. We have five jobs each of which must go through the two machines A and B in the order AB.

Processing time in hours are given in the table below.

Job(i)	1	2	3	4	5
Machine A (A <sub>i</sub> )	5	1	9	3	10
Machine B (B <sub>i</sub> )	2	6	7	8	4

17. Define CPM and PERT and write the differences between CPM and PERT.

(OR)

18. The following table gives the activities in a construction project and time duration

Activity	Preceding Activity	Normal time (days)
1 – 2	-	20
1 – 3	-	25
2 – 3	1 – 2	10
2 – 4	1 – 2	12
3 – 4	1 – 3, 2 – 3	5
4 – 5	2 – 4, 3 – 4	10

- i. Draw the activity network of the project
- ii. Find the total float and free float for each activity

19. Explain the characteristics of queuing models.

(OR)

20. A drive in bank window has a mean service time of 2 minutes while the customer arrives at a rate of 20 per hour. Assuming that these represent rates with Poisson distribution. Determine

- a. the proportion the teller will be idle
- b. how long will a customer wait before reaching the server
- c. what number of customers will have to wait in line?
- d. the probability that a customer has to wait.