



K22U 1566

Reg. No. : .....

Name : .....

**IV Semester B.Sc. Degree CBCSS (OBE) Regular/Supplementary/  
Improvement Examination, April 2022  
(2019 Admission Onwards)**

**COMPLEMENTARY ELECTIVE COURSE IN MATHEMATICS  
4C04MAT-CS : Mathematics for Computer Science – IV**

Time : 3 Hours

Max. Marks : 40

**PART – A**

Answer **any four** questions. **Each** question carries **1** mark.

1. Define Graph.
2. Draw complete graph on 5 vertices.
3. What is the error in Simpson's rule ?
4. What is meant by optimal solution of LPP ?
5. Write the objective function of a transportation problem.

**(4×1=4)**

**PART – B**

Answer **any seven** questions. **Each** question carries **2** marks.

6. Draw two non-isomorphic graphs.
7. Draw Petersen graph.
8. What are the three components of an LP model ?
9. What are the necessary basic assumptions for all LP problems ?
10. Write down Modified Euler method.
11. Write the following LPP in standard form.

$$\text{Min } z = 3x_1 - 2x_2 + x_3$$

$$\text{Subject to } x_1 + 2x_2 + 3x_3 \geq 5$$

$$2x_1 + x_2 \leq 3$$

$$x_1 + 2x_3 \geq 2$$

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

12. Evaluate  $\int_{-1}^1 x^3 dx$  using Simpson's one-third rule.

P.T.O.



13. Find an IBFS to the following TP by North-West Corner method.

|    |   |   |   |    |
|----|---|---|---|----|
| 11 | 8 | 3 | 4 | 6  |
| 14 | 3 | 4 | 7 | 10 |
| 5  | 2 | 8 | 1 | 10 |
| 4  | 8 | 8 | 6 |    |

14. Explain degeneracy in a transportation problem.

15. Write down Taylor's series method to solve first order differential equations. (7×2=14)

PART – C

Answer **any four** questions. **Each** question carries **3** marks.

16. In any graph, prove that there is an even number of odd vertices.

17. Show that k-cube  $Q_k$  has  $2^k$  vertices.

18. Evaluate  $\int_0^1 \frac{dx}{1+x^2}$  using Trapezoidal rule with  $h = 0.5$ .

19. Given  $y' = -y, y(0) = 1$ , determine  $y(0.01)$  by Euler method.

20. Explain canonical and standard forms of LPP.

21. Explain Least-Cost method.

22. Write down the steps to find an IBFS to a transportation problem by Vogel's approximation method.

(4×3=12)

PART – D

Answer **any two** questions. **Each** question carries **5** marks.

23. State and prove fundamental theorem of Graph Theory.

24. Solve  $\text{Max } z = 7x_1 + 5x_2$

Subject to  $x_1 + 2x_2 \leq 6$

$4x_1 + 3x_2 \leq 12$

$x_1, x_2 \geq 0$

25. Solve the following TP.

|    |    |    |    |    |
|----|----|----|----|----|
| 21 | 16 | 25 | 13 | 11 |
| 17 | 18 | 14 | 23 | 13 |
| 32 | 27 | 18 | 41 | 19 |
| 6  | 10 | 12 | 15 | 43 |

26. Using Runge-Kutta method of fourth order, find  $y(0.1)$  correct to 4 decimal places if  $y' = -y, y(0) = 1$ .

(2×5=10)