K21U 1130

Reg. No. : ....

Name : ....

IV Semester B.Sc. Degree CBCSS (OBE) Regular Examination, April 2021
(2019 Admission Only)
Complementary Elective Course in Mathematics
4C04 MAT-CS : MATHEMATICS FOR COMPUTER SCIENCE – IV

Time : 3 Hours

Max. Marks : 40

PART – A

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

1. What is meant by a simple graph ?
2. Draw a self-complementary graph.
3. What is the error in Simpson's rule ?
4. What is meant by a feasible solution of LPP ?
5. What is an unbalanced transportation problem ?

(4×1=4)

PART – B

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

6. Define graph isomorphism.
7. Draw K_5 and $K_{2,3}$.
8. What are the three components of an LP model ?
9. What are the necessary basic assumptions for all LP problems ?
10. Write down Simpson's rules.
11. Write the following LPP in standard form.

   Max $z = 3x_1 + 2x_2 + 5x_3$
   Subject to $x_1 + 2x_2 + 3x_3 \geq 5$
   $2x_1 - 3x_2 \leq 3$
   $x_1 + 2x_3 \leq 2$
   $x_1, x_2, x_3 \geq 0$

12. Evaluate $\int_{-3}^{3} x^2 dx$ using trapezoidal rule.

13. Find an IBFS to the following TP by Least Cost method.

1	2	3	4	6
4	3	2	0	8
0	2	2	1	10
4	6	8	6	

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14. Explain degeneracy in a transportation problem.

15. Write down Euler and modified Euler formulae for solving first order differential equations.

$(7\times2=14)$

PART – C

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

16. State and prove first theorem of Graph theory.

17. Let G be a k-regular graph where k is an odd number. Prove that the number of edges in G is a multiple of k.

18. Solve $\dfrac{dy}{dx} = x + y$, $y(1) = 0$ to get $y(1.1)$ using Taylor's series.

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

20. Explain canonical and standard forms of LPP.

21. Explain North-West Corner rule.

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

$(4\times3=12)$

PART – D

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

23. Prove that a graph is bipartite iff it contains no odd cycles.

24. Solve Max $z = 3x_1 + 4x_2$

      Subject to $2x_1 + 3x_2 \leq 16$

                 $4x_1 + 2x_2 \leq 16$

                 $x_1, x_2 \geq 0$

25. Solve the following TP.

20	18	18	21	19	100
21	22	23	20	24	125
18	19	21	18	19	175
60	80	85	105	70	400

26. Using Runge-Kutta method of fourth order, find $y(0.8)$ correct to 4 decimal places if $y' = y - x^2$, $y(0.6) = 1.7379$.

$(2\times5=10)$