K25FY3388 Pages: 2 Reg No:................
Name:................

Third Semester FYUGP Degree Examination NOVEMBER 2025

KU3DSCMAT213 - GRAPH THEORY, LINEAR PROGRAMMING AND NUMERICAL METHODS

2024 Admission onwards

Time : 2 hours Maximum Marks : 70

Section A

Answer any 6 questions. Each carry 3 marks.

1. Give an example of a graph that has a circuit.
2. Define walk on a graph. Give an example.
3. Write the charactersitics of canonical form of a Linear Programming Problem.
4. Why do we introduce slack and surplus variables while converting LPP into standard form? Give an example.
5. Express the linear programming in generalised matrix form.
6. What are parallel edges? Give an example.
7. Draw graph representing the problems of two houses and three utilities.
8. Define a subgraph with an example.

Section B

Answer any 4 questions. Each carry 6 marks.

9. Use graphical method to solve: Maximize $z = 3x_1 + 4x_2$
subject to $5x_1 + 4x_2 \leq 200$
$3x_1 + 5x_2 \leq 150$
$5x_1 + 4x_2 \geq 100$
$8x_1 + 4x_2 \geq 80$
$x_1, x_2 \geq 0$

10. Solve graphically: Maximize $Z = 2x_1 + x_2$ subject to
$x_1 + 2x_2 \leq 10$
$x_1 + x_2 \leq 6$
$x_1 - x_2 \leq 2$
$x_1 - 2x_2 \leq 1$
$x_1, x_2 \geq 0$

11. Explain the difference between canonical form and standard form of an LPP with suitable examples.

12. Nine members of a new club meet each day for lunch at a round table. They decided to sit such that every member has different neighbours at each lunch. How many day this arrangement last?

13. Define Graph Isomorphism. Give an example.

14. Draw an edge disjoint subgraphs and vertex disjoint subgraphs of a particular graph.

Section C

Answer any 2 questions. Each carry 14 marks.

15. Evaluate $\int_0^1 \frac{dx}{x+1}$ correct to three decimal places by using both Trapezoidal Rule and Simpson's 1/3 rule with h= 0.5,0.25 and 0.125 respectively.

16. Find the positive root, between 0 and 1, of the equation $x = e^{-x}$ to a tolerance of 0.05

17. a) Define component of a graph.
b)Prove that a simple graph with n vertices and k components can have at most (n-k)(n-k+1)/2 edges.