Dumkal College

U.G. 4th Semester 2nd Internal Examination-2024

MATHEMATICS

[HONOURS]

Course Code: MATH-H-CC-T-10 & MATH-H-SEC-T-2B

Full Marks: 10+10 Time: 1 Hour

The figures in the right- hand margin indicate marks.

Symbols have their usual meaning.

MATH-H-CC-T-10

1. Answer any two questions: 2 × 3 = 6

   a) Prove that in E^2, the set $X = \{(x, y): y^2 \geq 4x\}$ is not a convex set.

   b) Consider the game G with the following pay off matrix:

	I	II
I	2	7
II	-1	μ

   Show that G is strictly determinable, whatever $\mu(> 0)$ may be.

   c) Prove that dual of the dual is the primal itself.

1. Answer any **one** questions: 1× 4 =4

   a) Find the basic feasible solution of the following transportation problem:

	Destination					a_i
Origin	2	11	10	3	7	4
	1	4	7	2	1	8
	3	9	4	8	12	9
b_j	3	3	4	5	6	

   b) Apply the maximin and minimax principle to solve the games whose payoff matrices are given below.

	B_1	B_2	B_3
A_1	15	2	3
A_2	6	5	7
A_3	-7	4	0

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MATH-H-SEC-T-2B

1. Answer any **five** questions: 5 × 2 = 10

(a) Write the short note of Hamiltonian circuit.

(b) Is any connected graph with 7 vertices and 6 edges a Tree? Justify your answer.;

(c) Give an example of a graph that has Euler Circuit but not Hamiltonian circuit.

(d) Write adjacency matrix of a square.

(e) Draw a graph whose incidence matrix is $\begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix}$.

(f) Write a short note about Travelling-Salesman Problem.

(g) What is a spanning tree? Find all the spanning trees of K_4.

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