Subject: Mathematics

MATH-H-GE-T-04 (Calculus & Differential Equations)
Full Marks:10

Answer all the questions. $2 \times 5 = 10$

1. If $y = \sin(m \sin^{-1} x)$, then show that

$$(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} + (m^2 - n^2)y_n = 0$$

2. Find the maximum value of $x^{\frac{1}{x}}, x > 0$.

Submit answer script to the mail id: mathematics@nvc.ac.in

MATH-G-CC-T-04 (Linear Programming Problems & Game Theory)
Full Marks: 10

Answer all the questions. $2 \times 5 = 10$

1. Solve graphically the L.P.P

$$\text{Maximize } z = 4x_1 + 7x_2$$

Subject to,

$$2x_1 + 5x_2 \leq 40$$
$$x_1 + x_2 \leq 11$$
$$x_2 \geq 4$$
$$x_1 \geq 0, x_2 \geq 0$$

2. Find the optimal solution of the following transportation problem

	D_1	D_2	D_3	D_4	
O_1	9	8	5	7	12
O_2	4	6	8	7	14
O_3	5	8	9	5	16
	8	18	13	3	

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MATH-G-SEC-T-2A (Graph Theory)
Full Marks:10

Answer all the questions. $2 \times 5 = 10$

1. Let G be a simple graph. Prove that if G is not connected then its complement $\bar{G}$ is connected.
2. Prove that, A simple graph is connected if and only if it has a spanning tree.

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