

Roll. No. 6120300EP

(Pages 1)

NATIONAL INSTITUTE OF TECHNOLOGY CALICUT

Department of Mathematics

FIRST SEMESTER B.TECH. DEGREE EXAMINATIONS, TEST-I AUGUST 2012

MA 1001 MATHEMATICS I

Time: 1 Hour

Max. Marks: 20

Answer ALL Questions

1. Find the general solution of $(x^2 - 9)\frac{dy}{dx} + xy = 0$; $x \neq \pm 3$. (2)

2. Check whether $(xy^3 + y)dx + 2(x^2y^2 + x + y^4)dy = 0$ is an exact differential equation or not. If not, find an integrating factor and hence solve it. (2)

3. Find the value of n such that the curves $x^n + y^n = c_1$ are orthogonal trajectories of the family $y = \frac{x}{1 - c_2x}$ (3)

4. Solve: (a) $\frac{d^2y}{dx^2} - y = x \sin x + (1 + x^2)e^x$ (4)

(b) $x^2y'' - 5xy' + 13y = 8x^3 \sin 2(\log x)$. (3)

5. When a thermometer reads 36°F , it is placed in an oven. After 1 and 2 minutes respectively, it reads 60°F and 82°F . What is the temperature of the oven? (3)

6. Solve the Initial Value Problem $y'' + y = 4x + 10 \sin x$, $y(\pi) = 0$, $y'(\pi) = 2$ using the method of undetermined coefficients. (3)
