Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	**: EEE**	**Semester**	**: 3rd**
Title of the Course	**: Ordinary Differential Equations and Transforms**	**Course Code**	**: MAL 201**

Time: 2 Hours **Maximum Marks: 25**

Note : All questions are compulsory

Q.1. Solve the differential equation **(03 Marks)**

$$[y(1 - xtanx) + x^2 cosx]dx - xdy = 0$$

Q.2. State and Prove the necessary and sufficient conditions for the first order differential equation to be exact. **(04 Marks)**

Q.3. Define the term orthogonal trajectory. Find the orthogonal trajectories to the family of curves represented by $ay^2 = x^3$ **(03 Marks)**

Q.4. Solve the following Differential Equations **(02+03 Marks)**

(a) $y''' - 6y'' + 11y' - 6y = 0\,;\quad y(0) = 6, y'(0) = 0, y''(0) = 2$

(b) $(D - 2)^2 y = 8(e^{2x} + sin2x + x^2)$

Q.5. Solve the Differential Equation by method of undetermined coefficients **(04 Marks)**

$$y'' - 3y' + 2y = x^2 + e^x$$

Q.6. Solve for the power series solution about $x = 0$ **(06 Marks)**

$$2x^2y'' + (2x^2 - x)y' + y = 0$$