

GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER- 1st / 2nd EXAMINATION – SUMMER 2016

Subject Code: MTH002**Date: 27/05/2016****Subject Name: ORDINARY DIFFERENTIAL EQUATION****Time: 02:30 PM to 5:00 PM****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) 1. Solve: $(1+x)ydx + (1-y)xdy = 0$ **07**
 2. Solve: $\frac{dy}{dx} = e^{x-y} + x^2e^{-y}$
- (b) Solve: $\frac{dy}{dx} = \cos x \cos y - \sin x \sin y$ **07**
- Q.2** (a) Solve: $(1+e^{x/y})dx + e^{x/y}(1-\frac{x}{y})dy = 0$. **07**
 (b) Solve: $(D^3 - D^2 - 6D)y = x^2 + 1$ **07**
- Q.3** (a) Solve $y'' + 4y = \sec 2x$ by variation of parameter method. **07**
 (b) Solve $x^3y''' + 2x^2y'' + 2y = 10\left(x + \frac{1}{x}\right)$ **07**
- Q.4** (a) Find the orthogonal trajectories of the family of the circles $x^2 + y^2 = 2cx$. **07**
 (b) Solve $(D^2 - 1)y = \cosh x \cos x$. **07**
- Q.5** (a) Find the power series solution of the equation $(x^2 + 1)y'' + xy' - xy = 0$ about an ordinary point. **07**
 (b) Find the solution of $(D^4 + 2D^3 - 3D^2)y = x^2 + 3e^{2x} + 4 \sin x$. **07**
- Q.6** (a) Solve $9x(1-x)y'' - 12y' + 4y = 0$ at regular singular point $x = 0$. **07**
 (b) Solve $(x^2D^2 - 3xD + 4)y = x^2$ given that $y(1) = -1$ & $y'(1) = 0$. **07**
- Q.7** (a) Solve in series: $4xy'' + 2(1-x)y' - y = 0$. **07**
 (b) Solve: $\frac{dy}{dx} - 2y \tan x = y^2 \tan^2 x$ **07**
