

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE (SPFU) - SEMESTER-I-II (SPFU) - EXAMINATION – SUMMER 2017****Subject Code: MTH002****Date: 25/05/2017****Subject Name: ORDINARY DIFFERENTIAL EQUATION****Time:02:30 PM to 05:00 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) (i) Solve  $(x+1)\frac{dy}{dx} = x(y^2+1)$  (ii)  $y' + 2y = \sinh 2x$  **07**
- (b) Solve  $xy' = y^2 + y$  **07**
- Q.2** (a) Solve the initial value problem  $y'' + y' - 2y = 0, y(0) = 4$  and  $y'(0) = -5$  **07**
- (b) Find the solution of differential equation  $y'' + 4y = 2\sin 3x$  by the method of undetermined coefficients. **07**
- Q.3** (a) Solve  $y'' + 9y = \sec 3x$  by variation of parameters. **07**
- (b) Solve  $y'' - 3y' + 2y = e^x$  **07**
- Q.4** (a) Find the orthogonal trajectories of the circles  $y = x^2 + a$  where  $a$  is parameter. **07**
- (b) Solve  $(D^3 - D^2 - 6D)y = x^2 + 1$  **07**
- Q.5** (a) Solve  $(D+1)^2 y = \frac{e^{-x}}{x^2}$  **07**
- (b) Solve  $x^3 \frac{d^3 y}{dx^3} + x^2 \frac{d^2 y}{dx^2} = x^2$  **07**
- Q.6** (a) Solve  $(1+x)^2 \frac{d^2 y}{dx^2} + (1+x) \frac{dy}{dx} + y = 4 \cos(\log(1+x))$  **07**
- (b) Find power series solution of  $\frac{d^2 y}{dx^2} + xy = 0$  **07**
- Q.7** (a) Find power series solution of  $y'' = y'$  **07**
- (b) Find the power series solution of  $xy'' + y' + xy = 0$  **07**

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