Code No. 9356 / N

FACULTY OF ENGINEERING

B.E. I — Year (New) (Main) Examination, May / June 2015

Subject : Mathematics - II

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part - A and answer any five questions from Part - B.

PART — A (25 Marks)

1 Find the values of a and b such that $(3ax^2 + 2eY)dx + (2bxeY+3y)dy=0$ is exact. (2)

2 Obtain the general solution of the Clairaut's equation $y = xy' + (y')^3$. (3)

3 If $y=e^{2x}$ is a solution of y" — 5y' + 6y = 0, find the second linearly independent solution. (2)

4 Find a particular integral of (D2-1)y=x4. (3)

5 Does the differential equation $x^3y''+xy'+y=0$ have a Frobenius-series.solution about x = 0? Give a reason. (2)

6 Using Rodrigue's formula, find P2(x). (3)

7 Define error function. Prove that erf(-x) = -erf(x). (2)

8 Evaluate $x^4 J_3(x)dx$ in terms of Besse' functions. (3)

9 Find L ____ (2)

10 Find the inverse Laplace transform $f\frac{e^{-s}}{(s+1)}$. (3)

PART — B (50 Marks)

11 (a) Solve $(x^3 - 2y^2)dx + 2xy$ (5)

(b) If the temperature of air is: 0 °C,:pnd a body cools from 140 °C to 80 °C in 20 minutes, find when the temperature will be 35 °C. (5)

12 (a) Solve y" y' 6y xe^{-2x}. (5)

(b) Find the solution ofthe system of equations $\frac{dy_1}{di} = y_1 + y_2$, $\frac{dy_2}{di} = 9y_1 + y_2$ (5)

13 Find the poweseries solution of the differential equation (1 + x)y" + y' + 3y =0 about x 0. (10)

14 (a) EVNU4te sin B cos'0 dO using Beta and Gamma functions. (5)
0

(b) Prove that $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}} \sin x$ (5)

15 (a) Find $L\{e^{-2t}(2\sin t — 4\cosh t)\}$. (5)

(b) Solve y" + 2y' — 3y =0, y(0)=0, y'(0)=4 using Laplace transforms. (5)

16 (a) Find the orthogonal trajectories of the family of curves $r^n \cos n\theta = a^n$, a is the parameter, (5)

(b) Solve $x^3y''' + 4x^2y'' + 2xy' — 2y = 0$. (5)

17 (a) Prove that f (x)dx
2
2/7 +1 (5)

(b) Find L^{-1} $\frac{1}{\quad}\}$ using convolution theorem, (5)