Code No.: 5003/N

FACULTY OF ENGINEERING AND INFORMATICS
B.E. 1 Year (New) (Common to all Branches) (Suppi.)
Examination, January 2012
MATHEMATICS — II

Time: 3 Hours] [Max. Marks: 75

Note : *Answer all questions from Part **A**, Answer **any five** questions from Part **B**.*

PART - **A** **(25 Marks)**

1. Eliminate arbitrary constant from
   $y = cx + \frac{1}{-}\ c\ 0$ and form a differential equation. **2**
2. Find the solution of the differential equation **3**
   $(y-x+1)dy-(y+x+2)dx.-0.$
3. Show that functions x, x^2, x^3 are linearly independent on any interval 1. **2**
4. Solve $y'' + y^{1} - 2y = 0, y(0) = 0, y'(0)=3$. **3**
5. Find the singular points of $x^2y'' + (x + x^2)y^{1} - y = 0$ and classify them. 2
6. Find the value of $T_3(x)$ (Chebyshev polynomial). 3
7. Find the value of $(9/2, 7/2)$. 2
8. Express $J_3(x)$ in terms of $J_o(x)$ and $J_1(x)$. 3
9. Find Laplace transform of 1 + 2 + 3 2
10. Find the inverse Laplace transform of $\frac{S^2 - 35 + 4}{S^3}$ 3

PART B **(5x10=50 Marks)**

11. a) Solve the initial value problem $3x^2y^4dx + 4x^3y^3dy = 0, y(1) = 2$. 5

    b) Solve the differential equation, $\frac{dy}{dx} y = y (\sin x + \cos x)$. **5**

(This paper contains 2 pages)

P.T.O.

12. a) Find the general solution of the Riccoti equation. 5

$y' = 4xy^2 + (1-8x)y + 4x - 1$, $y = 1$ is a particular solution.

b) Solve the initial value problem y''' _ 2y'' 5y' + 6y = 0, y(0) = 0, y'(0) = 0, y''(0) =1. 5

13. a) Solve $y'' + 4y = \cos^2 x$. 5

b) If y_1 = ex is one of the solutions of y'' + 3y' - 4y = 0 , then find general solution, by reducing order of differential equation. 5

14. Find the series solution about x = 0 of the equation $(1 - x^2)\, y'' - 2xy' + 6y = 0$ 10

0 , min

15. a) Show that $\int_{-1} P_m(x)Pn(x)dx = 2$ / 2n + 1' m = n 5

b) Evaluate je$^{-a^x}$r $^-$ sin bx dx interms of Gamma function. 5

16. a) Prove that p (m + 1, n) + p (m, n+ 1) = p (m, n). 5

b) Show that $J_n(X)$ = - Icos (n9 - x sin nO)de 5
0

17. a) Apply convolution theorem to evaluate L^{1} | /,2 ,2N2 | 5

b) Solve $(D^2 + n^2)$ x = a sin (n t+ a); x Dx = 0 at t = 0 using Laplace transform. 5