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14MAT21

# Second Semester B.E. Degree Examination, June/July 2018
# Engineering Mathematics – II

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting ONE full question from each module.***





## Module – 1

1 a. Solve: $\frac{d^2y}{dt^2} - 4\frac{dy}{dt} + 13y = e^{3t}\cosh 2t + 2^t$. **(06 Marks)**

b. Solve : $y'' - 4y' + 4y = 8\cos 2x$. **(07 Marks)**

c. Solve : $y'' + 4y = x^2 + e^{-x}$ by the method of undetermined coefficients. **(07 Marks)**

**OR**

2 a. Solve : $(4D^4 - 8D^3 - 7D^2 + 11D + 6)y = 0$. **(06 Marks)**

b. Solve : $y'' + 4y' - 12y = e^{2x} - 3\sin 2x$. **(07 Marks)**

c. Solve by the method of variation of parameters $y'' + 2y' + 2y = e^{-x}\sec^3 x$. **(07 Marks)**

## Module – 2

3 a. Solve : $\frac{dx}{dt} + 2y = -\sin t$, $\frac{dy}{dt} - 2x = \cos t$. **(06 Marks)**

b. Solve : $x^4\frac{d^3y}{dx^3} + 2x^3\frac{d^2y}{dx^2} - x^2\frac{dy}{dx} + xy = \sin(\log x)$. **(07 Marks)**

c. Solve : $xy\left(\frac{dy}{dx}\right)^2 - (x^2 + y^2)\frac{dy}{dx} + xy = 0$, using solvable for P. **(07 Marks)**

**OR**

4 a. Solve : $\frac{dy}{dx} + y = z + e^x$, $\frac{dz}{dx} + z = y + e^x$. **(06 Marks)**

b. Solve : $(3x + 2)^2 y'' + 3(3x + 2)y' - 36y = 8x^2 + 4x + 1$. **(07 Marks)**

c. Show that the equation, $xp^2 + px - py + 1 - y = 0$ is Clairaut's equation. Hence obtain the general and singular solution. **(07 Marks)**

## Module – 3

5 a. Form the partial differential equation by eliminating the arbitrary function in $\phi(x + y + z,\ x^2 + y^2 - z^2) = 0$ **(06 Marks)**

b. Derive one dimensional wave equation in the form, $\frac{\partial^2 u}{\partial t^2} = C^2\frac{\partial^2 u}{\partial x^2}$. **(07 Marks)**

c. Evaluate : $\int_0^1\int_0^{\sqrt{1-x^2}}\int_0^{\sqrt{1-x^2-y^2}} xyz\,dz\,dy\,dx$. **(07 Marks)**