Roll No. | | | | | | | |

Paper Code:TMA-201

Mid Semester Examination, 2018

Course Name: B.Tech. 2nd Sem

Paper Name: Engineering Mathematics-II

Time: 1.30 Hours

MM: 50

Note:

(i) This question paper contains two sections.

(ii) Both sections are compulsory.

Section - A

Q1. Fill in the blanks/True-False (1x5=5 Marks)

a) Defined existence theorem for Laplace transformation.

b) What is the application of Differential equation ?

c) If the degree of D.E is two and order one, it is linear D.E (True-False)

d) The degree of Non Linear D.E is ten (True-False)

e) The no of arbitrary constant in the solution of O.D.E is, not equal to order of D.E. (True-False)

Q2. Attempt any five (3 x 5= 15 Marks)

a) Find the C.F of $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+1y=\frac{e^{3x}x^2}{10}$

b) Find the P.I of $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+y=x\sin x$

c) Evaluate $L^{-1}\left[\frac{1}{s\left(s^2+a\right)}\right]$

d) Find the inverse Laplace transformation of $\frac{1}{s^2-5s+6}$

e) Find the Laplace transformation of $e^{-t}\sin 2t$.

f) Find the C.F of PDE's $\left(D^3-3D^2D'+4D'^3\right)z=e^{x-2y}$

Section - B

Each question contains three parts a, b & c. Attempt any two parts of choice from each question.

Q3. (5 x 2 = 10 marks)

a) Find the solution of $\frac{d^2y}{dx^2} + 25y = 5Cos5x, \quad y(0) = y'(0) = 0.$

b) Solve $\left(D^4 - m^4\right)y = Cos\ mx$

c) Obtain general solution of the D.E $x^2y'' + xy' - y = x^3e^x$.

Q4. **(5 x 2 = 10 marks)**

a) Find the Laplace transform of $f(t) = \frac{1-Cost}{t}$

b) Solve the Differential equation by using Laplace transformation

$$\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 2y = 5Sin\,t, \quad y(0) = y'(0) = 0.$$

c) Find Laplace transformation of the function $f(t) = \begin{cases} t & 1<t<2 \\ 1 & 2<t<3 \end{cases}$

Q5. **(5 x 2 = 10 marks)**

a) A body executes dumped forced vibrations given by the equation $\frac{d^2x}{dt^2} + 2k\frac{dx}{dt} + b^2x = e^{-kt}Sin\omega t$

Solve the difference equation for both the case when $\omega^2 = b^2 - k^2$ and $\omega^2 \neq b^2 - k^2$

b) Solve $x\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} = x^2 \log x$

c) Solve by using Method of variation of Parameters $\frac{d^2y}{dx^2} + y = \tan x$