Date- 28/11/19 time- 1:30 pm to 4:30 pm

RollNo. | | | | | | | |

Paper Code: TMA-201

End Semester Examination, 2019

B.Tech – I[st] year II[nd] Semester

Engineering Mathematics- II

Time: Three Hours MM: 100

Note:

1. **This question paper contains five questions with alternative choice. All questions are compulsory**
2. **Each question carries four parts a,b,c and d. Attempt either parts a and b or attempt parts c and d of each question**
3. **Each part carries ten marks .Total marks assigned to each question are twenty.**

Q1 (a) Solve $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+2y=Cos2x$

(b) Use Variation of parameters method to solve $\frac{d^2y}{dx^2}+y=Sec(x)$

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

Q2 (a) Find Laplace transformation of the function $f(t)=\begin{cases}1 & 1<t<2\\ t^2 & 2<t<3\end{cases}$

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

(c) Solve the Differential equation by using Laplace transformation

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

Q3 (a) Find the Fourier series for the function $f(x)=x,-\pi<x<\pi$

(b) Find the Fourier series of the function $f(x)=Sin(x),-\pi<x<\pi$

(c) Find the Fourier series Cosine series of the function $f(x)=\begin{cases}0, & 0<x<\pi/2\\ 1, & \pi/2<x<\pi\end{cases}$

Q4 (a) Prove the Orthogonality of Bessel's function.

(b) State and prove Rodrigue's formula

(c) State and prove generating function of Bessel's polynomial.

Q5 (a)Solve PDE by using separation of variable method

$\frac{\partial^2u}{\partial x^2}-\frac{\partial u}{\partial y}-2u=0,\ where\ u(0,y)=0,\frac{\partial u}{\partial x}(0,y)=1+e^{3y}$

(b) Solve PDE by using separation of variable method $\frac{\partial^2u}{\partial x^2}-2\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=0$

(c) Find the Solution of 1D wave equation by using separation of variable method.