Total nos. of printed pages: 02

Roll No:

PRANVEER SINGH INSTITUTE OF TECHNOL

Even Semester Session 2021-22

B. Tech. II Semester

Engineering Mathematics II (KAS203T)

CO Number	Course Outcome (Please include all COs of your Course here)
CO1	**Define (L1-Remember)** the basic terms and concepts of differential equations, sequence and series, calculus and functions of complex variables.
CO2	**Compute (L2-Understand)** various variables involved in differential equations, integral, residues and explain the process of finding convergence of sequence and series including health and society.
CO3	**Apply (L3-Apply)** the concepts to solve various problems of differential equations, sequence and series, calculus and functions of complex variables related to applications in engineering including environment and sustainability.
CO4	**Solve (L4-Aanalysis)** the dynamical system involved in various engineering problems to prove and verify **(L5-Evaluate)** analytical results and to evaluate **(L5-Evaluate)** the value of variables involved in various problems of differential equations, sequence and series, calculus and functions of complex variables including life-long learning.

Time: 1.5 Hrs. M. M. 15

Section A

Q1. Attempt all questions: **(1X3 = 3 Marks)**

a) Find complementary function of $(D^2+D+1)^2(D^2-4D+4)^2y=0$ where $D\equiv\frac{d}{dx}$. CO1

b) Find the value of $\Gamma\left(\frac{1}{3}\right)\Gamma\left(\frac{2}{3}\right)$. CO1

c) Find particulate integral of $(D^2-D+1)y=x^2e^x$ where $D\equiv\frac{d}{dx}$. CO1

Section B

Q2. Attempt all questions: **(2X4 = 8 Marks)**

a i) Discuss the process to find out the solution of $(D-2)^2y=8(e^{2x}+\sin 2x+x^2)$ where $D\equiv\frac{d}{dx}$. CO2

Or

ii) Discuss the process to find out the solution of $\frac{d^2y}{dx^2}-4x\frac{dy}{dx}+(4x^2-3)y=e^{x^2}$ by the method of removal of first derivative. CO2

b i) Discuss the process to find out the solution of $\frac{d^2y}{dx^2}-3\frac{dy}{dx}+2y=xe^{3x}+\sin 2x$. CO2

Or

ii) Discuss the process to find out the solution $x\frac{d^2y}{dx^2}+(4x^2-1)\frac{dy}{dx}+4x^3y=2x^3$ by the method of changing of independent variable. CO2

c i) Apply the method of Cauchy-Euler equation to find out the solution of the differential equation $x^2\frac{d^2y}{dx^2}-x\frac{dy}{dx}+4y=\cos(\log x)+x\sin(\log x)$ CO3

Or

ii) Apply the method of variation of parameter to find out the solution of the differential equation $\frac{d^2y}{dx^2}-3\frac{dy}{dx}+2y=\frac{e^x}{1+e^x}$. CO3

d i) Show that the integral $\int_{-\infty}^{\infty}\frac{dx}{e^x+e^{-x}}$ is convergent and find its value. CO3

Or

ii) Show that $B(m,n)=\frac{\Gamma m\,\Gamma n}{\Gamma(m+n)}$. CO3

Section C

(4X1 = 4 Marks)

Q3

i) Solve $\frac{dx}{dt}+2y+\sin t=0$, $\frac{dy}{dt}-2x-\cos t=0$, given that $x=0$ and $y=1$ when $t=0$. CO4

Or

ii) Prove that $\int_0^{\infty}xe^{-x^8}dx\times\int_0^{\infty}x^2e^{-x^4}dx=\frac{\pi\sqrt{2}}{32}$ CO4