K24U 3436

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/ Improvement) Examination, November 2024
(2019 to 2023 Admissions)
COMPLEMENTARY ELECTIVE COURSE IN MATHEMATICS
3C03 MAT-CS : Mathematics for Computer Science – III

Time : 3 Hours Max. Marks : 40

PART – A

Answer **any four** questions from this Part. **Each** question carries **1** mark. **(4×1=4)**

1. State fundamental theorem of superposition of solutions of PDE.
2. What do you mean by an ordinary differential equation ?
3. Find the order of the ODE, $7y''' + xy'' - (y')^5 = \sin x$.
4. Find the general form of Euler-Cauchy equation.
5. Write the characteristic equation of $3\frac{d^2y}{dx^2} + 7\frac{dy}{dx} + 4 = 6\sin x$.

PART – B

Answer **any 7** questions from this Part. **Each** question carries **2** marks. **(7×2=14)**

6. Solve $u_{xx} - u = 0$.
7. Verify that $y = ce^{-2.5x^2}$ is a solution of $y' + 5xy = 0$. Also find the particular solution when, $y(0) = \pi$.
8. Solve the ODE $y' + (x + 2)y^2 = 0$.
9. Check whether $\frac{dy}{dx} = \frac{x^2}{y^2}$ is exact or not ?
10. Write a short note on a first order linear and non-linear ordinary differential equations.
11. Solve the differential equation $y'' + 3y' + 2y = 0$.
12. Solve the differential equation $y'' - 6y' + 9y = 0$.

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13. Find a differential equation whose solution is cos3x.
14. Find the Laplace transform of f(t) = cosh 3t.
15. Find the Laplace transform of $f(t) = e^{6t}\sin \omega t$.

PART – C

Answer **any 4** questions from this Part. **Each** question carries **3** marks. **(4×3=12)**

16. Show that if f and g are two even functions, then f + g is also an even function.
17. Under what conditions for the constants a, b, k, l in (ax + by)dx + (kxly)dy = 0 exact ? Solve the exact ordinary differential equation.
18. Solve the differential equation $\frac{dy}{dx} = \frac{y}{x} + \tan\left(\frac{y}{x}\right)$.
19. Solve $y'' + 2y' - 5y = \cos 3x$.
20. Solve $y'' + 4y' + 4y = e^{-3x}$.
21. Find the inverse of the transform $L(f) = \frac{3s - 137}{s^2 + 2s + 401}$.
22. Show that the Laplace transform is a linear operator.

PART – D

Answer **any 2** questions from this Part. **Each** question carries **5** marks. **(2×5=10)**

23. Find the Fourier series of the function $f(x) = x + \pi$ if $-\pi < x < \pi$ and $f(x + \pi) = f(x)$.
24. Solve $y' = (y + 4x)^2$.
25. Solve $x^2y'' + 2xy' - 20y = x^4$.
26. Solve the ODE $ty'' + (1 - t)y' + ny = 0$, using Laplace transform.

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