K25U 2937

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Supplementary/ Improvement) Examination, November 2025
(2019 to 2023 Admissions)
COMPLEMENTARY ELECTIVE COURSE IN MATHEMATICS
3C03 MAT-BCA : Mathematics for BCA-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. Find the fundamental period of the function $\cos\frac{x}{5}$.
2. Find the order of the ODE $y'' + \pi y^3 = 0$.
3. Write the characteristic equation of $3\frac{d^3y}{dx^3} + 2\frac{d^2y}{dx^3} = x^2$.
4. Define Wronskian.
5. Find the inverse Laplace transform of $\frac{1}{s^2+9}$.

PART – B

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

6. Write down the Euler formula for calculating the Fourier coefficient.
7. Show that a separable equation is also exact.
8. Find the integrating factor of $ydx - xdy = 0$.
9. Solve $\frac{dy}{dx} = xy + x$.
10. Write the standard form of Euler-Cauchy equation. Give one example of it.
11. Find the Wronskian of cosx and sinx.

P.T.O.

12. Solve the differential equation $y'' + 4y' + 4 = 0$.

13. Find the convolution of t and e^{-t}.

14. Show that sum of two odd function is odd.

15. Find the Laplace transform of $f(t) = e^{at} \sin wt$.

PART – C

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

16. State the orthogonality property of the trigonometric system.

17. Solve $2xy\,y' = y^2 - x^2$.

18. Solve the initial value problem $y' + y\tan x = \sin 2x$, $y(0) = 1$.

19. Solve $\frac{d^2y}{dx^2} - 12\frac{dy}{dx} + 36y = e^{6x}$.

20. Find the inverse transform of $\frac{(3s - 137)}{(s^2 + 2s + 401)}$.

21. Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} - 10y = e^{2x}$.

22. Express $f(x) = \frac{1}{2}$, if $0 < x < \pi$ and $f(x) = 0$, if $x > \pi$ as a Fourier sine integral.

PART – D

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

23. Represent $f(x) = e^{-kx}$, where $(x > 0, k > 0)$ as a Fourier cosine integral.

24. Check the exactness and solve $(5xy + 4y^2 + 1)dx + (x^2 + 2xy)dy = 0$.

25. Solve the initial value problem $y'' + 2y' - 3y = 2e^x - 10\sin x$, $y(0) = 2$, $y'(0) = 4$.

26. If $L[f(t)] = F(s)$, then show that $L[f(t - a)u(t - a)] = e^{-as}F(s)$.