K24U 3716

Reg. No. : ....

Name : ....

III Semester B.Sc. Degree (CBCSS – Supplementary) Examination, November 2024
(2018 Admission)
COMPLEMENTARY COURSE IN MATHEMATICS
3C03MAT-BCA : Mathematics for BCA – III

Time : 3 Hours Max. Marks : 40

SECTION – A

All the first 4 questions are compulsory. They carry 1 mark each. (4×1=4)

1. Under what condition the equation $(ax + by)dx + (kx + ly)dy = 0$ exact.
2. Evaluate $(D + 5)^2 (5x + \sin 5x)$.
3. State the linearity of the laplace transform.
4. Give an example of a even function.

SECTION – B

Answer any 7 questions from among the 5 to 13. These questions carry 2 marks each. (7×2=14)

5. Solve $2\frac{dy}{dx} = y\cot x$.
6. Solve $(1 + x^2)dy + 2xydx = 0$.
7. Find the orthogonal trajectories of the family of curves $x^2 - y^2 = c$.
8. Reduce to first order and solve $y'' = 2y' \coth 2x$.
9. Solve $8y'' - 2y' - y = 0$.
10. Find $L(t \cosh at)$.
11. Find the value of c if $u = x^2 + t^2$ is a solution of one dimensional wave equation $u_{tt} = c^2 u_{xx}$.

P.T.O.

12. Solve $u_y = u$.

13. Solve $u_x - u_y = 0$ by separating variables.

SECTION – C

Answer **any 4** questions from among the **14** to **19**. **These** questions carry **3** marks **each**. **(4×3=12)**

14. Solve $\frac{dy}{dx}\cos y + x\sin y = 2x$.

15. Reduce to Cauchy's form and solve $2(3z + 1)^2 y'' + 21 (3z + 1) y' + 18y = 0$.

16. Evaluate $L^{-1}\left(\frac{6s-4}{s^2-4s+20}\right)$.

17. Using laplace transform solve $y'' + y = t$ given $y(0) = 1$. $y'(0) = 2$.

18. Express $f(x) = \pi - x$. $0 \le x \le \pi$ as sin series.

19. Solve $xu_{xy} = yu_{yy} + u_y$ using the transformation $v = x$ and $z = xy$.

SECTION – D

Answer **any 2** questions from among the **20** to **23**. **These** questions carry **5** marks **each**. **(2×5=10)**

20. What curves in the xy-plane have the property that at each point (x. y) their tangent has the slope $-4x/y$?

21. Solve $(x^2 D^2 + xD - 9) y = 48x^5$.

22. Using Convolution property evaluate $L^{-1}\left(\frac{1}{s^2(s-a)}\right)$.

23. Find Fourier series for $|x|$ in $[-\pi, \pi]$, and deduce that
$$\frac{\pi^2}{8} = 1 + \frac{1}{3^2} + \frac{1}{5^2} + \frac{1}{7^2} + \ldots$$