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K19U 2477

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree (CBCSS - Reg./Sup./Imp.) Examination,  
November - 2019

(2014 Admn. Onwards)

COMPLEMENTARY COURSE IN MATHEMATICS

3C03 MAT-CS:MATHEMATICS FOR COMPUTER SCIENCE-III

Time : 3 Hours

Max. Marks : 40

**SECTION-A**

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

1. Whether the equation  $xy' + y + 4 = 0$  exact.
2. Solve  $(D^2+D)y=0$ .
3. Define the Dirac delta function.
4. Form a partial differential equation by eliminating a and b from  $z=(x+a)(y+b)$ .

**SECTION-B**

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

5. Solve the equation  $y' = 1 + y^2$ .
6. Solve  $(2x+e^y)dx + xe^y dy = 0$ .
7. Solve  $xy' + y = 0$ ,  $y(2) = -2$ .
8. Solve  $y'' + 3y' - 10y = e^{2x}$ .
9. Solve  $y'' + y' + y = \sin 2x$ .
10. Find  $L(\cosh at)$ .
11. Find  $L(e^{3t} \sin^2 t)$ .
12. Solve the partial differential equation  $u_{xy} = -u_x$ .
13. Find the solution of  $u_x - u_y = 0$  by separating variables.

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## SECTION-C

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

14. Solve  $\frac{dy}{dx} + y \tan x = \cos^3 x$ .

15. Solve  $x \frac{dy}{dx} + y = xy^3$ .

16. Find the inverse transform of  $\frac{s}{(s-2)^4}$ .

17. Find the inverse transform of  $\frac{1}{s^2(s-a)}$  using convolution property.

18. Find the Fourier series of  $f(x) = \begin{cases} -k & \text{if } -\pi < x < 0 \\ k & \text{if } 0 < x < \pi \end{cases}$ .

19. Show that the equation  $u_{xx} + u_{yy} = 0$  is elliptic and the equation  $u_t = c^2 u_{xx}$  is parabolic.

## SECTION-D

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

20. Find the orthogonal trajectories of  $xy=c^2$ .

21. Solve the differential equation  $y'' + y = \sec x$  by the method of variation of parameters.

22. Solve  $y'' + 2y' + y = 6te^{-t}$  given that  $y(0)=2$ ,  $y'(0)=5$  by using Laplace transforms.

23. Find the Fourier series of the function  $f(x) = \begin{cases} 0 & \text{if } -2 < x < -1 \\ k & \text{if } -1 < x < 1 \\ 0 & \text{if } 1 < x < 2 \end{cases}$ .