C 26043

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2012

(CCSS)

Mathematics (Complementary)

MM 4C 04—MATHEMATICS

Time : Three Hours   Maximum : 30 Weightage

I. Objective Type Questions. Answer _all_ questions

1. Reduce to the first order and hence solve $y'' =$

2. Find a general solution of $y'' + y = 0$.

3. Apply the operator $(D - 4)$ to $3x^2 + 4x$.

4. Solve $x\,y'' \longrightarrow + 4y = 0$.

5. Verify that $y \longrightarrow {}^x$ is a solution of $y'' - y = 8\,e^{-3x}$.

6. Define the Laplace transform of the function $f\,(t)$.

7. Examine whether the function $f(x) = ix\,I$ is odd, even or neither odd nor even.

8. Find a solution of the equation $u\; - u = 0$.

9. Find $\mathcal{L}\left(e^{at} \sin wt\right)$.

10. Examine whether $f(x) = x^2 \; (0 < x < 2\pi)$ is odd, even or neither odd nor even.

11. Find the Laplace transform of $2t + 6$.

12. Solve $y'' + 4y = \sin 3x$.

$$(12 \times \tfrac{1}{4} = 3 \text{ weightage})$$

II. Short Answer Type Questions. Answer all _nine_ questions.

13. Solve the initial value problem

    $y'' - y = 0,\ y(0) = 4,\ y'(0) = -2$.

14. Reduce to the first order and solve $2xy'' = 3y'$.

15. Find the Laplace transform of $f(t) = e^{a}$

16. Find the Laplace transform of t^2 from the Laplace transform of 1.

Turn over

17. Find the inverse transform of $\dfrac{e^{-3s}}{1)^3}$

18. Solve $x\,y'' - 20y = 0.$

19. Let $f(t) = \sin t.$ Find $\mathcal{L}(f).$

20. Solve $x\,y'' + 7xy' + 13y = 0.$

21. Apply the operator $(D^2 + 3D)$ to cosh 3x.

<div align="right">(9 x 1 = 9 weightage)</div>

III. Short Essay Questions. Answer any *five* questions.

22. Find a basis of solutions for $x^2 y'' - xy + y = 0$ where $x > 0.$

23. Solve $8y'' - 2y' - y = 0,\ y(0) = -0.2, y'(0) = -0.325.$

24. Using the method of variation of parameters solve $y'' + y = \sec x.$

25.. Find the inverse Laplace transform of $\dfrac{5s}{s^2 - 25}$

26. Using convolution find the inverse $h(t)$ of $H(\ \dfrac{1}{-a)}$

27. Solve the system $u\qquad = 0$

28, Use the trapezoidal rule with $n = 4$ to estimate

<div align="right">(5 x 2 = 10 weightage)</div>

IV. Essay questions. Answer any *two* questions.

29. ,Using Laplace transform solve $y' + 3y = 10 \sin t,\ y(0) =$

30. Find the Fourier series of $(x) = x^2.$

31. Use Simpson's rule with $n = 4$ to approximate $\int_0 x^4\ dx.$

<div align="right">(2 x 4 = 8 weightage)</div>