DEPARTMENT OF MATHEMATICS

UNIT II
PART – C

1. Solve : $\left(3D^2 - D + 14\right)y = 8e^{2x} + \cos 4x$.

2. Solve : $\left(D^2 - 4D + 13\right)y = e^{2x}\sin 3x$.

3. Solve : $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} + y = xe^x$.

4. Solve : $y'' + y = \sin^2 x$.

5. Solve : $\left(D^2 + 4\right)y = 4e^{2x}\sin 3x$.

6. Solve : $\left(D^2 - 3D + 2\right)y = e^x + x^2$.

7. Solve : $\left(D^2 - 2D + 1\right)y = e^x \sin 3x$.

8. Solve : $\left(D^2 + 4D + 3\right)y = 2e^{-x}\left(x^2 + 2\right)$.

9. Solve : $\dfrac{dx}{dt} + 2y = \sin 2t, \dfrac{dy}{dt} - 2x = \cos 2t$.

10. Solve : $\left(x^2 D^2 - 7xD + 12\right)y = x$.

11. Solve : $x^2 \dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} + y = \log x \sin(\log x)$.

12. Solve : $x^2 \dfrac{d^2y}{dx^2} + 5x\dfrac{dy}{dx} + 4y = x^2$.

13. Solve : $x^2 \dfrac{d^2y}{dx^2} + 4x\dfrac{dy}{dx} + 2y = x\log x$.

14. Solve : $\left(x^2 D^2 + xD + 1\right)y = \sin(2\log x)\sin(\log x)$.

15. Solve : $\dfrac{d^2y}{dx^2} + 4\dfrac{dy}{dx} + 4y = e^{-2x} + e^{3x}\sin x$.

16. Solve : $\dfrac{dx}{dy} - y = t, \dfrac{dy}{dt} + x = t^2$.

17. Solve : $\dfrac{d^2y}{dx^2} - 4\dfrac{dy}{dx} - 4y = e^{2x} + \cos 2x$.

18. Solve : $\dfrac{d^2y}{dx^2} + y = \sec x$.

19. Solve : $\dfrac{d^2y}{dx^2} + a^2y = \tan ax$.

20. Solve the equation $\dfrac{d^2y}{dx^2} + 4y = \tan 2x$ by the method of variation of parameters.

21. Solve : $\dfrac{d^2y}{dx^2} - y = \dfrac{2}{1+e^x}$ using the method of variation of parameters.

22. Find the particular integral of $y'' + 7y' - 8y = e^{2x}$ by the method of variation of parameters.

23. Solve $\dfrac{d^2y}{dx^2} + y = x \cos x$ by the method of variation of parameters.

24. Solve : $y'' + 9y = \cot 3x$.

25. Solve : $\left(D^2 - 4D + 13\right)y = e^{2x}\sin 3x$.

26. Solve : $y'' + 2y' + y = x \cos x$.

27. Solve : $y'' + 9y = \cot 3x$.

28. Solve : $\left(x^2 D^2 - 3xD + 5\right)y = x^2 \sin(\log x)$.

29. Solve : $\left(x^2 D^2 - xD + 1\right)y = \left(\dfrac{\log x}{x}\right)^2$.

30. Solve : $x^2 y'' - 2xy' - 4y = x^4$.

31. Solve : $x^2 \dfrac{d^2y}{dx^2} - 3x\dfrac{dy}{dx} - 5y = \sin(\log x)$.

32. Solve : $x^2 \dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} + y = 4\sin(\log x)$.

33. Solve : $\left(x^2 D^2 - 2xD - 4\right) y = 32 (\log x)^2$.

34. Solve : $\left(D^2 - 1\right) y = x^2 + e^{-2x} \sin 2x$.

35. Solve the system of equation $\dfrac{dx}{dt} + 5x - 2y = t, \dfrac{dy}{dt} + 2x + y = 0$.

36. Solve the system of equation $\dfrac{dx}{dt} + y = e^t, x - \dfrac{dy}{dt} = t$.

37. Solve : $\dfrac{dx}{dt} - \dfrac{dy}{dt} - y = e^{-t}; x + \dfrac{dy}{dt} - y = e^{2t}$.

38. Solve : $\dfrac{dx}{dt} + 2x - 3y = t, \dfrac{dy}{dt} - 3x + 2y = e^{2t}$.

39. Solve the system of equation $\dfrac{dx}{dt} + 2y = -\sin t, \dfrac{dy}{dt} - 2x = \cos t$.

40. Solve the simultaneous equation $\dfrac{dx}{dt} - \dfrac{dy}{dt} + 2y = \cos 2t, \dfrac{dx}{dt} + \dfrac{dy}{dt} - 2x = \sin 2t$.

41. Solve the simultaneous equation $Dx + y = \sin 2t; -x + Dy = \cos 2t$.

42. Solve the simultaneous equation $\dfrac{dx}{dt} + 2x - 3y = 5t, \dfrac{dy}{dt} - 3x + 2y = 2e^{2t}$.

43. Solve $\dfrac{dx}{dt} + y = \sin t, \dfrac{dy}{dt} + x = \cos t$ given that $x = 2, y = 0$ when $t = 0$.

44. Solve $\dfrac{dx}{dt} + 2y = 5e^t, \dfrac{dy}{dt} - 2x = 5e^t$.

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