



DEPARTMENT OF MATHEMATICS

UNIT II PART – B

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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