MCQ- UNIT III (DIFFERENTIAL EQUATIONS)

1.The complementary function of the differential equation $(D-3)^2y = e^{3x}$is …....
a) $(C_1 + C_2)xe^{3x}$ b) $(C_1 + C_2x)e^{3x}$ c) $(C_1e^{3x} + C_2e^{-3x})$ d)none of these

Answer:(b)

2. The complementary function of $y'' - 2y' + y = xe^x sinx$is ----------
a) $(C_1e^x + C_2e^{-x})$ b) $(C_1x + C_2)e^x$ c)$(C_1 + C_2x)e^{-x}$ d)none of these

Answer:(b)

3.The complementary function of $(D^2 + 3D - 4)y = 12e^{2x}$is ----------
a) $(C_1e^{-4x} + C_2e^x)$ b) $(C_1e^{-x} + C_2e^{-4x})$ c)$(C_1e^{-4x} + C_2e^{-x})$ d) none of these

Answer:(a)

4. The complementary function of $y'' + 9y = \sin^2 x$is----------
a$(C_1e^{3x} + C_2e^{-3x})$ b) $(C_1 + C_2x)e^{3x}$ c) $C_1\cos 3x + C_2\sin 3x$ d)
Answer:(c)

5.The particular integral of the differential equation $(D-3)^2y = e^{3x}$is ----------
a) $\frac{x}{2}e^{3x}$ b) $\frac{e^{3x}}{2}$ c) $\frac{x^2}{2}e^{3x}$ d)none of these

Answer:(c)

6.The particular integral of $(D^2 + 3D - 4)y = 12e^{2x}$is ----------
a) e^{2x} b) $2e^{2x}$ c) $3e^{2x}$ d) none of these
Answer:(b)

7.The particular integral of $(D^3 - 6D^2 + 11D - 6)y = e^{-2x}$is ----------
a)$\frac{e^{-2x}}{-60}$ b)$\frac{e^{-2x}}{60}$ c)$\frac{e^{-2x}}{120}$ d)none of these
Answer:(a)

8.The Wronskian of $e^{2x}$and$xe^{2x}$is ----------
a)e^{2x} b)e^{-2x} c)e^{4x} d)e^{-4x}
Answer:(d)

9.The Wronskian of $e^x$and$xe^x$is ----------
a)e^{2x} b)e^{-2x} c)e^{4x} d)e^{-4x}
Answer:(a)

10.The solution of the differential equation $(D^2 - 2D + 5)y = 0$is ----------
a)$e^{-x}(C_1\cos 2x + C_2\sin 2x)$ b)$e^x(C_1\cos 2x + C_2\sin 2x)$
c)$e^x(C_1 cosx + C_2 sinx)$ d)$e^{-x}(C_1 cosx + C_2 sinx)$
Answer:(b)

11.If $f(D) = D^2 - 2, \frac{1}{f(D)}e^{2x}$=----------
a)e^{2x} b)$2e^{2x}$ c)$\frac{e^{2x}}{2}$ d)none of these
Answer:(c)

12.If $f(D) = D^2 + 36, \frac{1}{f(D)}4\cos 6x$=----------
a)$xsin6x$ b)$\frac{x}{3}\sin 6x$ c)$\frac{x}{3}\cos 6x$ d)$xcos6x$
Answer:(b)

13.The solution of the differential equation $(D^2 - D - 2)y = 0$is ----------
a)$(C_1e^{2x} + C_2e^{-x})$ b)$(C_1e^{-2x} + C_2e^{-x})$ c)$(C_1e^{2x} + C_2e^{x})$ d)none of these
Answer:(a)

14. The solution of $(D^3 + 4D^2 + 4D)y = 0$is ----------
a)$(C_1 + C_2x)e^{-2x}$ b)$C_1 + (C_2 + C_3x)e^{-2x}$
c)$C_1 + (C_2 + C_3x)e^{2x}$ d)$(C_1 + C_2x)e^{2x}$
Answer:(b)

15.$(C_1e^{-6x} + C_2e^{2x})$is the general solution of the equation ----------
a)$y'' + 4y' - 12y = 0$ b)$y'' - 4y' - 12y = 0$

c)$y'' - 4y' + 12y = 0$ d)$y'' + 4y' + 12y = 0$
Answer:(a)

16.$C_1\cos 2x + C_2\sin 2x$is the general solution of the equation ----------
a)$y'' - 4y = 0$ b)$y'' + 4y = 0$ c)$y'' - 2y = 0$ d)$y'' + 2y = 0$
Answer:(b)

17.$C_1\cos\sqrt{2}x + C_2\sin\sqrt{2}x$is the general solution of the equation ----------
a)$(D^2 - 2)y = 0$ b)$(D^2 - 4)y = 0$ c)$(D^2 + 2)y = 0$ d)none of these
Answer:(c)

18.The particular integral of $(D^2 + 4)y = \cos 2x$is ----------
a)$\frac{\sin 2x}{2}$ b)$\frac{x\sin 2x}{2}$ c)$\frac{x\sin 2x}{4}$ d)$\frac{x\cos 2x}{2}$
Answer:(c)

19)The particular integral of $(D^2 + D)y = x^2 + 2x + 4$is ----------
a)$\frac{x^2}{3} + 4x$ b)$\frac{x^3}{3} + 4$ c)$\frac{x^3}{3} + 4x$ d)$\frac{x^3}{3} + 4x^2$
Answer:(c)

20. The complementary function of the differential equation $x^2y'' - xy' - y = logx$is ----------
a)$(C_1 + C_2logx)x$ b) $C_1 + C_2x\log x$ c) $C_1x + C_2\log x$ d)$(C_1 + C_2x)\log x$
Answer:(a)

21.The complementary function of the differential equation $x^2y'' - xy' - y = 2xlogx$is ----------
a)$(C_1 + C_2logx)x$ b)$(C_1 + C_2x)\log x$ c)$(C_1 + C_2logx)e^x$ d)none of these
Answer:(d)

22.The particular integral of $(D^2 - 4)y = \sin 3x$is ----------
a)$\frac{1}{4}$ b)$\frac{-1}{3}$ c)$\frac{1}{5}$ d)none of these
Answer:(d)

23.The homogeneous linear differential equation whose auxiliary equation has the roots 1,-1 is----------
a)$x^2y'' + xy' - y = 0$ b)$x^2y'' - xy' + y = 0$ c)$x^2y'' - xy' - y = 0$ d)none of these
Answer:(a)

24.The differential equation whose auxiliary equation has the roots 0, 1,-1 is----------
a)$(D^3 - 2D^2 + D)y = 0$ b)$(D^3 + 2D^2 + D)y = 0$ c)$(D^3 - 2D^2 - D)y = 0$ d)none of these
Answer:(b)

25.The general solution of $y''' - y'' + y' - y = 0$is ----------
a)$y = e^x(C_1 + C_2\sin 2x + C_3\cos 2x)$ b)$y = C_1e^x + C_2\sin 2x + C_3\cos 2x$
c)$y = C_1e^{-x} + C_2sinx + C_3cosx$ d)$y = C_1e^x + C_2sinx + C_3cosx$
Answer:(d)

26.Solution of the initial value problem$y'' - 4y' - 5y = 0$for y(0)=0 and$y'(0) = 6$is----------

a)$y = e^{3x} + 3e^{-3x}$ b)$y = 5e^{5x} - e^{-x}$ c)$y = -e^{3x} - 3e^{-3x}$ d)$y = e^{5x} - e^{-x}$
Answer:(d)

27.The complementary function of $y'' + y' - 12y = \cos 3x$is----------
a)$(C_1e^{3x} + C_2e^{-4x})$ b)$(C_1xe^{3x} + C_2e^{-4x})$ c)$(C_1e^{-3x} + C_2e^{4x})$ d)$(C_1xe^{3x} + C_2e^{4x})$
Answer:(a)

28.The general solution of $y''' + 2y'' - 11y' - 12y = 0$is ----------
a)$y = C_1e^{-3x} + C_2e^{4x} + C_3e^{x}$ b)$y = C_1e^{2x} + C_2e^{-6x} + C_3e^{-x}$
c)$y = C_1e^{3x} + C_2e^{-4x} + C_3e^{-x}$ d)$y = C_1e^{-3x} + C_2e^{4x} + C_3e^{-x}$
Answer:(c)

29.Consider the differential equation $\frac{d^2y}{dx^2} - 49y = 0$.Which of the following option is correct?
a)The roots of the auxiliary equation are 0 and 7
b)There is no auxiliary equation for a differential equation of this type.
c)The auxiliary equation has a repeated root of 7.
d)The roots of the auxiliary equation are 7 and-7.
Answer:(d)

30.The particular solution to $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 4y = 0$satisfying y(0)=0 and$y'(0) = 5$is ----------
a)$y = e^{x} - e^{-4x}$ b)$y = e^{-x} - e^{4x}$ c)$y = e^{-4x} - e^{x}$ d)$y = e^{4x} - e^{-x}$
Answer:(d)

31.The order of the differential equation $\frac{d^2y}{dx^2} + (\frac{dy}{dx})^3 + y^4 = e^{-x}$is ----------
a)1 b)2 c)3 d)4
Answer:(b)

32.The particular integral of the differential equation $\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 16y = 2e^{4x}$is ----------
a)xe^{4x} b)x^2e^{4x} c)xe^{-4x} d)x^2e^{-4x}
Answer:(b)

33.The particular integral of the differential equation $f(D)y = e^{ax}$where $f(D) = (D-a)^2$is -------
a)$\frac{x^2}{2}e^{ax}$ b)xe^{ax} c)$\frac{x}{2}e^{ax}$ d)x^2e^{ax}
Answer:(a)

34.The complementary function of the differential equation $\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$is ----------
a)$(C_1 + C_2e^{x})$ b)$(C_1 + C_2)e^{x}$ c)$(C_1x + C_2)e^{x}$ d)$C_1e^{-x} + C_2$
Answer:(a)

35. The particular integral of $(3D^2 - D - 14)y = 13e^{2x}$is ----------
a)$\frac{x}{2}e^{2x}$ b)xe^{2x} c)$13xe^{2x}$ d)$\frac{x^2}{2}e^{2x}$
Answer:(b)

36. The particular integral of $(D+5)(D-4)y = 1000$is ----------
a)50 b)-50 c)100 d)-100
Answer:(b)

37.To transform $x\frac{d^2y}{dx^2} + \frac{dy}{dx} = \frac{1}{x}$in to a linear differential equation with constant coefficients put x=-------
a)log t b) e^{-t} c)e^{t} d)$\frac{1}{logt}$
Answer:(c)

38. The solution of $x^2y'' + xy' = 0$is ----------
a) $y = C_1 + C_2logx$ b)$y = C_1 + C_2xlogx$ c)$y = C_1x + C_2logx$ d)$y = (C_1 + C_2logx)x$

Answer:(a)

39.The solution of $\frac{d^3y}{dx^3} - 3\frac{d^2y}{dx^2} + 4y = 0$is ----------

a)$y = C_1e^x + (C_2 + C_3x)e^{-2x}$ b)$y = C_1e^{-x} + (C_2 + C_3x)e^{2x}$

c)$y = C_1e^{-x} + C_2e^{2(1+\sqrt{2})x} + C_3e^{2(1-\sqrt{2})x}$ d) none of these

Answer:(b)

40. The particular integral of $(D^2 - 6D + 9)y = \log 2$is ----------

a)$\frac{\log 2}{4}$ b)$\frac{\log 2}{3}$ c)$\frac{\log 2}{9}$ d)none of these

Answer:(c)

41.The particular integral of $(D^3 + 4D)y = \sin 2x$is ----------

a)$\frac{x}{8}\sin 2x$ b)$\frac{x}{8}\cos 2x$ c)$\frac{-x}{8}\cos 2x$ d)$\frac{-x}{8}\sin 2x$

Answer:(d)

42.The particular integral of $(D^2 - 2D + 4)y = e^x cosx$is ----------

a)$\frac{e^x}{2}cosx$ b)$\frac{e^x}{2}sinx$ c)$\frac{-e^x}{2}sinx$ d)$\frac{-e^x}{2}cosx$

Answer:(a)

43.The complete solution of $\frac{d^2x}{dt^2} + 6\frac{dx}{dt} + 9x = 0$is ----------

a)$x = (C_1 + C_2t)e^{-3t}$ b)$x = C_1 + C_2e^{-3t}$ c)$x = (C_1 + C_2t)e^{3t}$ d)$x = C_1 + C_2e^{3t}$

Answer:(a)

44.The complete solution of $(D^4 - 4D^2 + 4)y = 0$is ----------

a)$(C_1 + C_2x)e^{\sqrt{2}x} + (C_3 + C_4x)e^{-\sqrt{2}x}$ b)$C_1 + C_2xe^{\sqrt{2}x} + C_3 + C_4xe^{-\sqrt{2}x}$

c)$C_1e^{\sqrt{2}x} + C_2e^{-\sqrt{2}x} + C_3e^{\sqrt{2}x} + C_4e^{-\sqrt{2}x}$ d)none of these

Answer:(a)

45.The particular integral of $(D^2 + 5D + 6)y = e^x$is ----------

a)$\frac{e^x}{6}$ b) $\frac{e^x}{12}$ c) $\frac{-e^x}{6}$ d)$\frac{-e^x}{12}$

Answer:(b)

46.The particular integral of $(D^3 + 1)y = \cos 2x$is ----------

a)$\frac{\cos 2x - 8\sin 2x}{65}$ b)$\frac{8\sin 2x - \cos 2x}{65}$ c)$\frac{8\cos 2x - \sin 2x}{65}$ d)$\frac{\sin 2x - 8\cos 2x}{65}$

Answer:(a)

47.The particular integral of $(D + 2)(D - 1)^2y = e^{-2x}$is ----------

a)$\frac{xe^{2x}}{9}$ b) $\frac{-xe^{-2x}}{9}$ c) $\frac{xe^{-2x}}{9}$ d)$\frac{-xe^{2x}}{9}$

Answer:(c)

48.For the differential equation $(D^2 + 4)y = \tan 2x$ the value ofthe Wronskian is ----------

a)2 b)-2 c)4 d)-4

Answer:(a)

49.The linear differential equation with constant coefficients correspondind to the equation

$x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + y = logx$is ----------

a)$(D + 1)^2y = t$ b)$(D - 1)^2y = t$ c)$(D + 1)^2y = x$ d)$(D - 1)^2y = x$

Answer:(b)

50.The linear differential equation with constant coefficients correspondind to the equation

$x^2\frac{d^2y}{dx^2}+4x\frac{dy}{dx}+2y=e^x$is ----------

a)$(D^2+3D+2)y=e^t$ b)$(D^2+3D+2)y=e^{e^t}$

c)$(D^2-4D+2)y=e^t$ d)$(D^2-4D+2)y=e^{e^t}$

Answer:(b)