Dronacharya Group of Institutions, Gr. Noida

Department of Applied Sciences (First Year)

Even Semester (2020-2021)

Subject Name & Code: Engineering Mathematics (KAS 203T)

Unit : 01 , Differential Equations

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1. The order of the differential equation $30\frac{d^2y}{dx^2} + 2\left\{1 - (\frac{dy}{dx})^3\right\}^{\frac{1}{2}} = 0$ is

   $a.$ 4 $b.$ 3 $c.$ 2 $d.$ 6

2. What are the order and degree of the differential equation $\frac{d^2}{dx^2}\left(\frac{d^2y}{dx^2}\right)^{-3/2} = 0$

   $a.$ 1,4 $b.$ 4,1 $c.$ 4,4 $d.$ 3,3

3. The type of differential equation $\frac{d^2y}{dx^2} + \sin(x+y) = \sin x$ is

   a) Linear, homogenous
   b) Non linear, homogenous
   c) Linear, non- homogenous
   d) Non-linear, non-homogenous

4. The differential equation $ydx - 2xdy = 0$ reprents a family of

   $a.$ straight lines $b.$ circles $c.$ hyperbola $d.$ parabolas

5. The number of arbitrary constants in the complete primitive of differential equation $\varphi(x, y, \frac{dy}{dx}, \frac{d^3y}{dx^3}) = 0$ is

   $a.$ 4 $b.$ 6 $c.$ 3 $d.$ multiple of 4

6. The particular integral of $(D^3 - D)y = 2coshx$, is

   $a. \frac{1}{2}(e^x + e^{-x})$ $b. x\frac{1}{2}(e^x + e^{-x})$ $c. \frac{1}{2}x^2(e^x + e^{-x})$ $d. \frac{1}{2}(e^x - e^{-x})$

7. The solution of $\frac{d^2y}{dx^2} + y = 0$, satisfying the condition $y(0) = 1, y\,(\frac{\pi}{2}) = 2$ is

   $a. cosx + 2sinx$ $b. cosx + sinx$ $c. 2cosx + 2sinx$ $d. 3cosx + 2sinx$

8. All real solution of the differential equation $y'' + 2ay' + by = \cos x$ (where a and b are real constants are ……..if

a) $a = 1, b = 0$ b) $a = 0$ & $b = 1$ c) $a = 1, b \neq 0$ d) $a = 0, 1 \neq 1$

9. The differential equation whose linearly independent solutions are $\cos 2x, \sin 2x$ and e^{2x} is

a) $\left(D^3 + D^2 + 4D + 4\right)y = 0$

b) $\left(D^3 - D^2 + 4D - 4\right)y = 0$

c) $\left(D^3 + D^2 - 4D - 4\right)y = 0$

d) $\left(D^3 - D^2 - 4D + 4\right)y = 0$

10. Linear combination of solution of an ordinary differential equal are also solution if the differential equation is

a) Linear non-homogenous
b) Linear homogenous
c) Non-linear homogenous
d) Non-linear non homogenous

11. $e^{-x}(\ C_1 \cos\sqrt{3}x + C_2 \sin\sqrt{3}\ x) + C_3 e^{2x}$ is the general solution of

$a. (D^3 + 4)y = 0$ $b. (D^3 + 8)y = 0$ $c. (D^3 - 8)y = 0$ $d. (D^3 - 2D^2 + 2)y = 0$

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

$a. (C_1 + \ C_2\ x)\ e^{2x}$ $b. (C_1 + \ C_2\ x) e^{x}$

$c. (C_1 + \ C_2\ x) log x$ $d.\ \ (C_1 + \ C_2\ log x)\ \ x^2$

13. The particular integral of $(D^2 + a^2)y = sinax\ , D \equiv \frac{d}{dx}$ is

$a. \frac{x}{2a} \cos ax$ $b. \frac{-x}{2a} \cos ax$ $c. \frac{-ax}{2} \cos ax$ $d.\ \ \frac{ax}{4} \cos ax$

14. If $y = \ x^2$ is a solution of of $x^2 \frac{d^2y}{dx^2} + x\ \frac{dy}{dx} - y = 0$,then the second linearly independent solution of this equation is

$a. \frac{1}{x}$ $b. \frac{1}{x^2}$ $c. x^2$ d. Constant

15. The number of linearly independent solution of $\frac{d^4y}{dx^4} - \frac{d^3y}{dx^3} - 3\frac{d^2y}{dx^2} + 5\frac{dy}{dx} - 2y = 0$ of the form e^{ax} (a, being a real number) is

$a. LCM\ (4,3,2,1)$ $b.\ 2$ $c.\ 3$ $d.\ 4$

16. The formula $\frac{1}{f(D^2)}\sin(ax+b) = \frac{1}{f(-a^2)}\sin(ax+b)$ is applicable only if

a. $f(a^2) \neq 0$ b. $f'(-a^2) \neq 0$ c. $f(-a^2) \neq 0$ d. $f''(-a^2) = 0$

17. Suppose $y_p(x) = x\cos 2x$ is a particular solution of $y'' + \alpha y = -4\sin 2x$. Then the constant α equals.

a) 1 b) -2 c) 2 d) 4

18. Particular integral for $(4D^2 + 4D - 3)y = e^{2x}$ is

$a. \frac{1}{21}e^{2x}$ $b. e^{2x}$ $c. \frac{1}{21}e^{-2x}$ $d. e^{-2x}$

19. A particular solution of $4x^2\frac{d^2y}{dx^2} + 8x\frac{dy}{dx} + y = \frac{4}{\sqrt{x}}$ is

$a. \frac{logx}{x}$ $b. \frac{log}{x^2}$ $c. x^2 logx$ d. $\frac{(logx)^2}{2\sqrt{x}}$

20. The solution $y(x)$ of the differential equations $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 4y = 0$, satisfying the condition $y(0) = 4, \frac{dy}{dx}(0) = 8$ is

a) $4e^{2x}$ b) $(16x+4)e^{-2x}$ c) $4e^{-2x}$ d) $4e^{-2x} + 16xe^{2x}$

21. The general solution of $x^2\frac{d^2y}{dx^2} - 5x\frac{dy}{dx} + 9y = 0$ is

a) $(c_1 + c_2x)e^{3x}$ b) $(c_1 + c_2\ln x)x^3$ c) $(c_1 + c_2x)x^3$ d) $(c_1 + c_2\ln x)e^{x^3}$

22. Consider the differential equation $\frac{d^2y}{dx^2} = -12x^2 + 24x - 20$ with the condition $x = 0,\ y = 5$ and $x = 2,\ y = 2.$ Then the value of y at $x = 1$ is

a) 15 b) 17 c) 18 d) 0

23. Solution of $y'' + y = 0,\ y(0) = 1,\ y = \pi/2$ is

a) $\frac{1}{2}\cos x + 2\sin x$ b) $\cos x - \sin x$ c) $\cos x + \sin x$ d) $\cos x + 2\sin x$

24. Solution of the simultaneous diff. equation $\frac{dx}{dt}=y,\ \frac{dy}{dt}=x;\quad x(0)=0,\ y(0)$ are

a) $x=0,\ y=0$

b) $x=k_1,\quad y=k_2$

c) $x=\cos t,\ y=\sin t$

d) $x=\cos t,\ \ y=$ any value-

25. The particular integral of $(D^3+a^2D)y=sinax\ ,D\equiv\frac{d}{dx}$ is

$a.\frac{-x}{2a}\cos ax$ $\quad b.\frac{-x}{2a^2}\cos ax$ $\quad c.\frac{-x}{2a^2}sinax$ $\quad d.\frac{-x}{2a^2}\cos ax\ \ sinax$

26. The solution of $\frac{d^2y}{dx^2}-y=k$ (here k is a non zero constant),which vanishes when x=0 and which tends to finite limit as x tends to infinity is

$a.\ \ y=k(1+e^{-x})$ $\quad b.\ \ y=k(e^{-x}-1)$

$c.\ \ y=k(1+e^{-x}+e^{x})$ $\quad$ d. $y=k(1+2e^{-x})$

27. Particular integral for $(D^2+4)y=\cos 2x$ is

$a.\frac{\cos 2x}{8}$ $\quad b.\frac{-\sin 2x}{2}$ $\quad c.\frac{-x\sin 2x}{4}$ $\quad d.\frac{x\sin 2x}{4}$

28. Particular integral for $(D+1)^3y=e^{-x}$ is

$a.\frac{1}{8}e^{-x}$ $\quad b.\frac{x^3e^{-x}}{8}$ $\quad c.\frac{x^2e^{-x}}{4}$ $\quad d.\frac{x^3}{6\ e^{x}}$

29. The general solution of the linear differential equation $\left(D^4-81\right)y=0$ is given by-

a) $(C_1+C_2x)e^{3x}+(C_3+C_4x)\sin 3x$

b) $(C_1+C_2x)e^{3x}+(C_3+C_4x)e^{-3x}+(C_5+C_6x)\cos 3x+(C_7+C_8x)\sin 3x$

c) $C_1e^{3x}+C_2e^{-3x}+C_3\cos 3x+C_4\sin 3x$

d) $C_1e^{3x}+C_2e^{-3x}+e^{3x}(C_3\cos x+C_4\sin x)$

30. $\frac{1}{D-\alpha}Q(x)$ is equal to –

a) $e^{\alpha x}\int Q(x)\,dx$

b) $e^{-\alpha x\int e^{\alpha x}Q(x)dx}$

c) $e^{-\alpha x}\int Q(x)\,dx$

d) $e^{\alpha x}\int e^{-\alpha x}Q(x)\,dx$

31. The general solution of the differential equation $D^2(D+1)^2 y = e^x$ is

a) $y = C_1 + C_2 x + (C_3 + C_4 x)e^x$

b) $y = C_1 + C_2 x + (C_3 + C_4 x)e^{-x} + \frac{1}{4}e^x$

c) $y = (C_1 + C_2 e^{-x}) + (C_3 + C_4)e^{-x} + \frac{1}{4}e^x$

d) None of these

32. The general solution of the d.e. $\frac{d^2y}{dx^2} - y = e^x$ is –

a) $y = A\cos(x+B) + e^x$

b) $y = A\cosh(x+B) + \frac{1}{2}xe^x$

c) $y = A\cosh(x+B) + xe^x$

d) $y = A\cos(x+B) + xe^x$

33. The general solution of the differential equations $(D^2 + D - 2)y = e^x$ is given by –

a) $y = C_1 e^x + C_2 e^{-2x} + \frac{1}{3}xe^x$

b) $y = C_1 e^x + C_2 e^{-2x}$

c) $y = C_1 e^x + C_2 e^{-2x} + \frac{1}{6}x^2 e^x$

d) $y = \frac{1}{3}xe^x + (C_1 + C_2 x)e^{-2x}$

34. The P.I. of the differential equation $(D^2 + 4)y = x$ is –

a) xe^{-2x} b) $x\cos 2x$ c) $x\sin 2x$ d) $x/4$

35. The solution on the d.e. $\frac{d^2y}{dx^2} + \omega^2 y = 10\omega^2$ is –

a) $y = A\cos\omega x + B + 10$

b) $y = A\sin(\omega x + B) + 10\omega^2$

c) $y = Ax + Bx\cos\omega x + 10\omega^2$

d) $y = A\cos(\omega x + B) + 10$

36. The general solution of the differential equation $\frac{d^2y}{dx^2} + a^2 y = \sec ax$ is –

a) $y = C_1\cos ax + C_2\sin ax + x\sin ax + \log(\cos ax)$

b) $y = C_1 \cos ax + C_2 \sin ax + \frac{1}{\alpha}\{x \sin ax + \log(\cos ax)\}$

c) $y = C_1 \cos ax + C_2 \sin ax + \frac{1}{a}\left\{x \sin ax + \frac{1}{a}\log(\cos ax)\right\}$

d) $y = C_1 \cos ax + C_2 \sin ax + \frac{1}{a}\left\{x \sin ax + \frac{1}{a}\log(\cos ax)\cos ax\right\}$

37. The general solution of the differential equation $(D^3+1)y = (e^x+1)^2$ is –

a) $y = C_1 e^{-x} + e^{x/2}\left(C_2 \cos\frac{1}{2}\sqrt{3}x + C_3 \sin\frac{1}{2}\sqrt{3x}\right) + \frac{1}{9}e^{2x} + e^x + 1$

b) $y = C_1 + e^{x/2}\left(C_2 \cos\sqrt{3}x + C_2 \sin\sqrt{3x}\right) + \frac{1}{9}e^{2x} + e^x + 1$

c) $y = C_1 e^{-x} + e^{\frac{x}{2}}\left(C_2 \cos\frac{1}{2}\sqrt{3}x + C_3 \sin\frac{1}{2}\sqrt{3}x\right) + e^{2x} + \frac{1}{3}e^x$

d) None of these

38. The value of $\frac{1}{D^2+a^2}\cos ax$ is…………

a) $\frac{x}{2a}\cos ax$ b) $\frac{-x}{2a}\sin ax$ c) $\frac{x}{2a}\sin ax$ d) None of these

39. If $D = \frac{d}{dx}$, then $\frac{1}{D^2+D+1}\sin x$ equals –

a) $-\cos x$ b) $\cos x$ c) $\cos x - \sin x$ d) $\sin x$

40. The general solution of the d.e. $\frac{d^2y}{dx^2} + 4y = \sin^2 x$ is given by-

a) $y = C_1 e^{2x} + C_2 e^{-2x} + 2\sin x \cos x$

b) $y = C_1 \cos 2x + C_2 \sin 2x + \frac{1}{8} - \frac{x}{8}\sin 2x$

c) $y = (C_1 + C_2 \cos 2x)e^{-2x} - \frac{x}{8}\cos 2x$

d) $y = C_1 \cos(2x + C_2) + \frac{1}{8}$

41. The general solution of the differential equation $\frac{d^2y}{dx^2} = a + bx + cx^2$ given that $\frac{dy}{dx} = 0$ when $x = 0$ and $y = d$ when $x = 0$ is –

a) $\frac{1}{12}\left(ax^2 + 2bx^3 + cx^4 + d\right)$

b) $\frac{1}{12}\left(6ax^2+2bx^3+cx^4+12d\right)$

c) $\frac{1}{12}ax^2+bx^3+\frac{1}{6}cx^4+d$

d) None of these

42. The general solution of the differential equation $\left(D^3+3D^2+2D\right)y=x^2$ is-

a) $C_1+C_2e^{-x}+C_3e^{-2x}+\frac{1}{12}x\left(2x^2-9x+21\right)$

b) $C_1+C_2e^{x}+C_3e^{-2x}+\frac{1}{12}x\left(2x^2-9x+21\right)$

c) $C_1+\left(C_2+C_3x\right)e^{-x}+\frac{1}{12}x\left(2x^2+9x+21\right)$

d) $C_1+C_2e^{x}+C_3e^{-2x}+\frac{1}{12}\left(2x^2+9x+21\right)$

43. P.I. of the differential equation $\left(D^2+2\right)y=x^2e^{3x}+e^x\cos 2x$ is –

a) $\frac{1}{121}e^3x\left(11x^2-12x+50\right)+\frac{1}{17}e^x\left(4\sin 2x-\cos 2x\right)$

b) $\frac{1}{121}e^{3x}\left(11x^2-12x+\frac{50}{11}\right)+\frac{1}{17}e^x\left(4\sin 2x-\cos 2x\right)$

c) $\frac{1}{121}e^{3x}\left(x^2-12x+50\right)+\frac{1}{17}e^x\left(\sin 2x-\cos 2x\right)$

d) None of these

44. P.I. of the differential equation $\left(D^2+4\right)y=\sin 2x+e^x$ is –

a) $-\frac{1}{4}x\cos x+\frac{1}{5}e^x$

b) $-\frac{1}{4}x\cos 2x+\frac{1}{5}e^x$

c) $-\frac{x}{2}\cos 2x+\frac{1}{5}e^x$

d) $-\frac{x}{2}\cos 2x+\frac{1}{3}e^x$

45. $\frac{1}{\varphi(D)(D-a)^n}e^{ax}$ is equal to –

a) $\frac{x^ne^{ax}}{\phi(a)}$

b) $\frac{x^ne^{ax}}{n!\,\phi(a)}$

c) $\dfrac{x^n e^{ax}}{\phi(a)}, \phi(a) \neq 0$

d) $\dfrac{x^n e^{ax}}{n!\,\phi(a)}, \phi(a) \neq 0$

46. The P.I. of $(D^2+1)y = e^x \sin x$ is –

a) $-\dfrac{e^x}{5}(2\cos x - \sin x)$

b) $\dfrac{e^x}{4}(2\cos x + \sin x)$

c) $\dfrac{e^x}{4}(2\sin x + \cos x)$

d) $\dfrac{e^x}{5}(2\sin x + \cos x)$

47. P.I. of the differential equation $(D^4 + 2D^2 + 1)y = x^2 \cos x$ is

a) $\dfrac{x^3}{12}\sin x + \dfrac{1}{48}(9x^2 - x^4)\cos x$

b) $\dfrac{1}{12}x^3 \cos x + \dfrac{1}{48}(9x^2 - x^4)\sin x$

c) $\dfrac{1}{12}x^3 \cos x + \dfrac{1}{16}(9x^2 - x^4)\sin x$

d) $\dfrac{1}{6}x^3 \cos x + \dfrac{1}{16}(9x^2 - x^4)\sin x$

48. If V be any function of x, then $\dfrac{1}{f(D)}xV$ is equal to

a) $\left[x + \dfrac{f(D)}{f'(D)}\right] f'(D).V$

b) $\left[x - \dfrac{f'(D)}{f(D)}\right] f(D).V$

c) $\left[x - 2\dfrac{f'(D)}{f(D)}\right] f(D).V$

d) $\left[x + 2\dfrac{f'(D)}{f(D)}\right] f(D).V$

49. Particular integral for $(D^2 + 2D + 1)y = xCosx$ is

$a.\ \frac{Cosx-2Sinx+xSinx}{2}$ $b.\ \frac{2Cosx-Sinx+xSinx}{2}$

$c.\ \frac{Cosx+Sinx+xSinx}{2}$ $d.\ \frac{Cosx-Sinx+xSinx}{2}$

50. Solution of the simultaneous differential equations $\frac{dx}{dt}=3x+8y, \frac{dy}{dt}=-x-3y$,with $x(0)=6,\ y(0)=-2.$ is obtained. Then solution x is

$a.\ x=4e^{t}+2e^{-t}$ $b.\ x=2e^{t}-3e^{-t}$

$c.\ x=4e^{t}+2te^{-t}$ $d.\ x=4te^{t}+2e^{-t}$

51. The points x & y lie on ………………..,where x & y are solution for $\frac{dx}{dt}=-\omega y, \frac{dy}{dt}=\omega x$.

a. parabola b. straight line

c. circle d. ellipse

52. Solution of the simultaneous differential equations $\frac{dx}{dt}+5x-2y=t, \frac{dy}{dt}+2x+y=0$. Given that $x=y=0$ *when* $t=0$, then

$a.\ x=\frac{1}{27}(1+6t)e^{3t}+\frac{1}{9}\left(t+\frac{1}{3}\right)$

$b.\ x=\frac{1}{27}(1+6t)e^{3t}+\frac{1}{9}(t+\frac{1}{3})$

$c.\ x=-\frac{1}{27}(1+6t)e^{3t}+\frac{1}{9}(t+\frac{1}{3}$

$d.\ x=\frac{-1}{27}(1+6t)e^{-3t}+\frac{1}{9}(t+\frac{1}{3})$

53. Particular solution for the equation $(D^2-1)y=e^{-2x}\sin(e^{-x})$

$a.=-e^{x}Cos(e^{-x})+cos(e^{-x})$ $b.=e^{x}Cos(e^{-x})+Sin(e^{-x})$

$c.=-e^{x}Cos(e^{-x})-Sin(e^{-x})$ $d.\ \frac{Cosx-Sinx+xSinx}{2}$

54. The differential equation $\frac{d^2y}{dx^2}+(3\sin x-\cot x)\frac{dy}{dx}+2y\sin^2 x=\sin^2 xe^{-\cos x}$ is solved by changing the independent variable x into independent variable z then we must have

a. $z=-\sqrt{2}\sin x$ b. $z=\sqrt{2}\cot x$ c. $z=\operatorname{cosec} x$ d. $z=-\cos x$

55. The differential equation $Sin^2x\, y'' + Sinx\, Cosx\, y' + 4\, y = 0$ is solved by changing the Independent variable x into independent variable z then

a. $z = 2logtan\frac{x}{2}$ b. $z = 2logcot\frac{x}{2}$ c. $z = 2logcos\frac{x}{2}$ d. $z = 2cosx$

56. If $\frac{d^2v}{dx^2}+Iv=S$ is the normal form of $\frac{d^2y}{dx^2}+x^{-1/3}\frac{dy}{dx}+\left(\frac{1}{4x^{2/3}}-\frac{1}{6x^{4/3}}-\frac{6}{x^2}\right)y=0$ obtained by solving change of dependent variable **,** then the value of **I** is

a.1 b. 0 c. $6x^{-2}$ d. $-6x^{-2}$

57. If $\frac{d^2v}{dx^2}+Iv=S$ is the normal form of $\frac{d^2y}{dx^2}$ -4x $\frac{dy}{dx} + (4x^2-1)y = -3e^{x^2}sin2x$ then the value of **I** is

a. 1 b. 0 c. x^{-2} d. $-6x^{-2}$

58. A part of C.F for $y''-\cot x\, y'-(1-\cot x)y=e^x\sin x$ is

a. cot x b. sin x c. e^x d. e^{-x}

59. The basis for the equation $sin^2x\frac{d^2y}{dx^2} = 2y$, given that y = cotx is a solution of it, is

a. $tanx + x$ b. $sin\ x + x$ c. $tanx - x$ d. $sec\ x + x$

60. For a differential equation $\frac{d^2y}{dx^2}P(x)\frac{dy}{dx}+Q(x)y=R,\ 1+\frac{P}{a}+\frac{Q}{a^2}=0,$ then one part of complementary function is

a) e^{ax} b) x^m c) $\sin x$ d) $\cos x$

61. For differential equation $\frac{d^2y}{dx^2}P(x)\frac{dy}{dx}+Q(x)y=R,\ P+Qx=0,$ then one part of complementary function is

a) e^{ax} b) x^m c) $\frac{1}{x}$ d) x^2

62. Solution of $x\frac{d^2y}{dx^2}-(3+x)\frac{dy}{dx}+3y=0$ is

a) $y=-c_1\left(x^3+3x^2+bx+6\right)+c_2e^x$

b) $y=(c_1+c_2x)e^x+3x^2+4x$

c) $y=c_1x+c_2x^2+\frac{1}{x^4}+x-9$

d) $y=(c_1+c_2x)e^x+\frac{1}{4}$

63. Solution of $y''-4xy'+\left(4x^2-2\right)y=0,$ given that $y=e^{x^2}$ is a solution.

a) $y=x(x-1)e^{x^2}+c_1x^{ex}+c_2x$

b) $y=e^{x^2}(c_1x+c_2)$

c) $y=\frac{A}{x}+c_2\left(x+\frac{1}{x}\right)$

d) None

64. The solution of diff. equation $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}-y=0,$ given that $x+\frac{1}{x}$ is an integral.

a) $y=e^{x^2}(c_1x+c_2)$ c) $y=\frac{A}{x}+c_2\left(x+\frac{1}{x}\right)$

b) $y=c_1x+\frac{c_2}{x}+x^2$ d) None

65. $\cos x\frac{d^2y}{dx^2}+\sin x\frac{dy}{dx}-2y\cos^3x=2\cos^5x$ is being solved by changing of independent variable from x into $z.$ Here

a) $z=\cos x$ b) $z=e^x$ c) $z=-\sin x$ d) $z=\cos x$

66. Solving by variation of parameter $y''-2y'+y=e^x\log x$ then the value of wornskion is

a) e^{2x} b) e^{-2x} c) 2 d) x^2

67. Complementary function for $(D^2-2)^3y=0$ is............

68. The general solution of the equation $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}-\lambda^2 y=0$ is ……………

69 . Particular integral for the equation $x^2y''-2xy'-4y=x^2+2\log x$ is …………..

70. The general solution for $(D-1)^3=\sin hx$ is $y=$………………..

71. By changing the independent variable, we get the solution y = ……….. of $y''-\frac{1}{x}y'+4x^2y=x^4$.

72. The reduced normal form of the differential equation $y''-4xy'+(4x^2-1)\,y=-3e^{x^2}Sin2x,$ is given by ………..

73.. You are going to solve the given differential equation $Cosx\,y''+Sinx\,y'-2Cos^3x\,y=2Cos^5$,by changing the independent variable. The reduced equation with constant coefficients is …………

74. The order and degree of the differential equations $\left(\frac{d^3y}{dx^3}\right)^{3/2}+\left(\frac{d^3y}{dx^3}\right)^{2/3}=0$ are

(A) 3, 3 (B) 3,9 (C) 3, 6 (D) 9, 6

75. The solution of the differential equation $(D-1)^2(D+2)y=0$ is

(A) $y=c_1+c_2x+c_3e^{-2x}$ (B) $y=c_1e^x+c_2x+c_3e^{-2x}$

(C) $y=c_1e^{-2x}+c_2x+c_3$ (D) Both (A) and (C)

76. The P.I. of $\left(D^2+a^2\right)y=\cos ax,$ where $a\neq 0,$ is

(A) $\frac{x\sin ax}{2a}$ (B) $-\frac{x\sin ax}{2a}$ (C) $\frac{x\cos ax}{2a}$ (D) $-\frac{x\cos ax}{2a}$

77. Solution of the differential equation $\frac{d^3y}{dt^3}-3\frac{d^2y}{dt^2}+4y=0$ is

(A) $y=c_1e^{-t}+\left(c_2+tc_3\right)e^{2t}$ (B) $y=c_1e^{-x}+\left(c_2+xc_3\right)e^{2x}$

(C) $y=c_1e^{t}+\left(c_2+tc_3\right)e^{2t}$ (D) $y=c_1e^{t}+\left(c_2+tc_3\right)e^{-2t}$

78. The P.I. of $\left(D^2-1\right)y=x^2$ is

(A) $\left(x^2+2\right)$ (B) $-\left(x^2+2\right)$

(C) $-\left(x^2-2\right)$ (D) $-\left(x^2+1\right)$

79. The P.I. of $(D-2)^3 y = 17e^{2x}$ is

(A) $\frac{17}{6}x^3e^x$ (B) $\frac{17}{6}x^2e^{2x}$

(C) $\frac{17}{6}x^3e^{2x}$ (D) $\frac{17}{6}x^4e^{2x}$

80. The P.I. of differential equation $\frac{d^2y}{dx^2}+4\frac{dy}{dx}-12y=(x-1)e^{2x}$ is

(A) $\frac{e^{2x}}{8}\left(\frac{x^2}{2}-\frac{9x}{7}\right)$ (B) $\frac{e^{2x}}{8}\left(\frac{x^2}{2}-\frac{9x}{8}\right)$

(C) $\frac{e^{2x}}{8}\left(\frac{x^3}{2}-\frac{9x}{8}\right)$ (D) $9\frac{e^{2x}}{8}\left(\frac{x^2}{2}-\frac{9}{8}\right)$

81. The solution of the simultaneous differential equations $\frac{dx}{dt}=-\omega y$, $\frac{dy}{dt}=\omega x$ lies on

(A) An ellipse (B) Parabola (C) Hyperbola (D) Circle

Ans. (D)

82. The P.I. of the differential equation $\frac{d^2y}{dx^2}-2\frac{dy}{dx}+y=xe^x\cos x$

(A) $e^x\left(-x\cos x+2\sin x\right)$ (B) $e^x\left(-x\cos x+\sin x\right)$

(C) $e^x\left(x\cos x+2\sin x\right)$ (D) $e^x\left(-2x\cos x+\sin x\right)$

83. Order of the differential equations is the

(A) highest order derivative involving equation (B) lowest order derivative involving equation

(C) Two derivatives (D) None of these.

84. The degree of the differential equation is the power of highest order derivative involving in the equation provided the

(A) the differential equation is free from radical signs

(B) the differential equation is free from fractional powers

(C) Both A &B   (D) None of these.