Unit-1

Q.1 The general solution of the equation $y = xy' - (y')^3$ is

A. $y = cx - c^3$ B. $y = cx + c^3$ C. $y = cx$ D. $y = c^3$

Q.2 The integrating factor of the differential equation $(3y^2 + 2xy)dx - (2xy + x^2)dy = 0$ is

A. $\frac{1}{xy^2}$ B. $\frac{1}{x^2y}$ C. $\frac{1}{xy\,(x+y)}$ D. $\frac{1}{x+y}$

Q.3 The integrating factor of the differential equation $(1 + xy)y\,dx + (1 - xy\,)x\,dy = 0$ is

A. $\frac{1}{2x^2y^2}$ B. $\frac{1}{2xy}$ C. $\frac{1}{x+y}$ D. $\frac{1}{x-y}$

Q: The solution of $(x - y2)dx + 2xydy = 0$ is

A. $ye^{\frac{y^2}{x}} = A$ B. $xe^{\frac{y^2}{x}} = A$ C. $ye^{\frac{x}{y^2}} = A$ D. $xe^{\frac{x}{y^2}} = A$

Q: Differential equation $xdy - ydx - 2x3dx = 0$ has the solution

(a) $y + x3 = C1x$ (b) -y+x3=C2x (c) y-x2=C3x

(d) $y3 - x3 = C4x$

Q: Solution of $ydx - xdy + (1 + x2)dx + x2sinydy = 0$ is

(a) $-y + x2 - 1 - xcosy = cx$ (b) $-x + y2 - 1 - xcosy = cy$

(c) $-y + x2 - xcosy = cx$ (d) $-x + y2 - xcosy = cy$

Q: The general solution of $\frac{dy}{dx} = \frac{y}{x} + tan\frac{y}{x}$ is

(a) $sin(y/x) = c$ (b) $cos(y/x) = cx$ (c) $sin(y/x) = cx$

(d) $cos(y/x) = c$

Q: The integrating factor corresponding to differential equation $y(x^2y^2 + 2)dx + x(2 - 2x2y2)dy = 0$ is

(a) $\frac{1}{3x^3y^3}$ (b) $\frac{-1}{3x^3y^3}$

(c) $\frac{-1}{3xy}$ (d) $\frac{1}{3xy}$

Q: The integrating factor corresponding to differential equation $(x^3y^3 + x^2y^2 + xy + 1)ydx + (x^3y^3 - x^2y^2 - xy + 1)xdy = 0$ is

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

Q. Solve $(x + y)\,dy = (x - y)\,dx$

a) $x^2 + y^2 = C$

b) $x^2 + 2xy + y^2 = C$

c) $x^2 - 2xy - y^2 = C$

d) $x^2 - 2xy + y^2 = C$

Q. Which of the following equations is an exact DE?

a) $(x^2 + 1)\,dx - xy\,dy = 0$

b) $x\,dy + (3x - 2y)\,dx = 0$

c) $2xy\,dx + (2 + x^2)\,dy = 0$

d) $x^2y\,dy - y\,dx = 0$

Q. Q. The standard form of a clairout differential equation is

a. $y=p^2x+f(x)$

b. $y=p^2x+f(p)$

c. $y=px+f(x)$

d. $y=px+f(p)$

Q: An integrating factor of sinh y dx + cosh y dy = 0 is

(a) $\boldsymbol{e^x}$

(b) x

(c) y

(d) xy

Q: Which of the following is not an integrating factor of x dy - y dx = 0?

(a) $\frac{1}{x^2}$

(b) $\frac{1}{(x^2 + y^2)}$

(c) $\frac{1}{xy}$

(d) $\frac{x}{y}$

Q: If the integrating factor of (x^7 y^2 + 3y) dx + (3 x^8 $y - x$)dy = 0 is $x^m y^n$ then

(a) m = -7, n = 1
(b) m = 1, n = -7
(c) m = n = 0
(d) m = n = 1

Unit-2

Q.1 Which of the following function are linearly independent?

A. $\sin x, \sin 2x, \sin 3x$

B. $2x, 6x+3, 3x+2$

C. $\log x, \log x^2, \log x^3$

D. None of these

Q.2 The wronskian of $1, \sin x, \cos x$ is

A. -1 B. -2 C. -3 D. -4

Q.3 The solution of the differential equation $4y'' - 4y' + y = 0$ is

A. $y(x) = (A + Bx)e^{-\frac{x}{2}}$

B. $y(x)Ae^{-\frac{x}{2}}+Be^{-\frac{x}{2}}$

C. $y(x) = (Ax + Bx)e^{-\frac{x}{2}}$

D. None of these

Q: The solution of the $\frac{d^4y}{dx^4} + 4y = 0$ is

(a)$Ae^{-x} + Be^{x} + Csinx + Dcosx$
(b)$(A + Bx)e^{x} + (C + Dx)e^{-x}$
(c)$e^{x}[Acosx + Bsinx] + e^{-x}[Ccosx + Dsinx]$
(d) None of these

Q: The primitive of the equation $(D^2 - 2D + 5)^2 y = 0$ is

(a)$e^{x}(Acos2x + Bsin2x)$
(b)$e^{x}\{(A + Bx)cos2x + (C + Dx)sin2x\}$
(c) $e^{x}(Acos2x + Bsin2x) + e^{x}(Ccos2x + Dsin2x)$
(d) None of these

Q: The differential equation whose auxiliary equations roots are 2,2,1 is

(a)$Ae^{x} + Be^{2x} + Ce^{2x}$
(b)$Ae + (B + Cx)e^{2x}$
(c)$Ae^{x} + (B + Cx)e^{2x}$
(d) $Ae + Be^{2x} + Ce^{2x}$

Q: The number of arbitrary constants in the complete primitive of the differential equation $\phi\left(x, y, \frac{dy}{dx}, \frac{d^3y}{dx^3}\right) = 0$ is

(a)1 (b)2 (c)3 (d)4

Q: The order and degree of the differential equation $(D^2+1)^2(D^2+D+1)y = 0$ is

(a)order=6 and degree=2 (b)order=4 and degree=2

(c)order=2 and degree=2 (d) order=6 and degree=1

Q: The primitive of the equation $(D^4 - 5D^2 + 4)y = 0$ is

(a)$Ae^x + Be^{4x}$ (b)$Ae^{-x} + Be^{-4x}$ (c)$Ae^{-2x} + Be^{-x} + Ce^x + De^{2x}$

(d) None of these

Q: The DE $x^2y'' - 4xy' + 6y = 0$ on (0, ∞) has ___ linearly independent solutions.

a) 2 b) 3 c) infinite d) Can't say

Q: What is the least number of LI solutions a homogeneous LDE equation can have, if x^2e^{2x} is its particular solution?

a) 2 b) 3 c) 4 d) 5

Q: What are the characteristic roots of a homogeneous LDE having $4 + x\,e^{2x}$ as its particular solution?

a) 0, 2 b) 4, 2 c) 4, 2 ,2 d) 0, 2, 2

Q: The solution of $(D^2 + 1)\,y = 0$ is

(a) $A\,cosx + B\,sinx$

(b) $〚e^x\ (A\,cosx + B\,sinx)$

(c) $(A + B)\,cosx + (C + D)\,sinx$

(d) $(A + Bx)\,cosx + (C + Dx)\,sinx$

Q: The solution of $(D^2 + 1)y = 0, satisfying\ the\ condition\ y(0) = 1, y(\frac{\pi}{2}) = 2\ is$

(a) $cosx + 2\,sinx$

(b) $cosx + sinx$

(c) $2\,cosx + sinx$

(d) $2(cosx + sinx)$

Q: The primitive of $〚(D)〛^2 - 2D + 5)^2\ y = 0$

(a) $e^x\,\{(a+bx)cos2x + (c+dx)sin2x\}$

(b) $e^{2x}\,\{(a+bx)\,cosx + (c+dx)\,sinx\}$

(c) (a $e^x + b\,e^{2x})\,cosx$ + (c $e^x + d\ \ e^{2x})\,sinx$

(d) $e^x\,(a\,cosx + b\,cos2x + c\,sinx + d\,sin2x)$

Unit-3

Q.1Find the particular integral of $(D^2 + 5D + 6)y = e^x$

A) $e^{\frac{x}{6}}$ B) $e^{\frac{x}{12}}$ C) $e^{\frac{x}{18}}$ D) $e^{\frac{x}{24}}$

Q.2 Which of the following is Euler Cauchy equation?

A) $x^2\ y' + x^3\ y = 2x$ B) $x^2\ y'' - 5xy' + 13y = 30x^2$

C) $x^3\ y'' + xy' + xy = 30x^2$ D) none of these

Q.3 Solve $y^{iv} + 3y'' = 108\,x^2$

A) $A + Bx + C\cos x + D\sin x + 3x^4 + 12\,x^2$

B) $A + Bx + C\cos\sqrt{3}\,x + D\sin\sqrt{3}\,x + 12\,x^2$

C) $A + Bx + C\cos\sqrt{3}\,x + D\sin\sqrt{3}\,x + 3\,x^4$

D) $A + Bx + C\cos\sqrt{3}\,x + D\sin\sqrt{3}\,x + 3\,x^4 - 12\,x^2$

Q: The particular integral of $(D^2 + a^2)y = \sin ax$ is

(a)$\frac{-x}{2a} cosax$ (b)$\frac{x}{2a} cosax$ (c)$\frac{ax}{2} cosax$

(d)$\frac{-ax}{2} cosax$

Q: The particular integral of $\frac{d^2y}{dx^2} + \frac{dy}{dx} = x^2 + 2x + 4$ is

(a)$\frac{x^2}{3} + 4x$ (b) $\frac{x^3}{3} + 4x$ (c) $\frac{x^3}{3} + 4$

(d) $\frac{x^3}{3} + 4x^2$

Q: The complementary function of $(D^2 + 1)^2 y = 2$ is

(a)Asinx+Bcosx (b)e^x(Acosx+Bsinx)

(c)(A+B)sinx+(C+D)cosx

(d)(A+Bx)sinx+(C+Dx)cosx

Q: The trial solution of corresponding to $2e^{3x} si\,n(2x + 4)$is

(a)$Ae^{3x}sin(2x + 4)$ (b) $2Ae^{3x}sin(2x + 4)$

(c) $Ae^{3x}\ sin(2x + 4) + Ae^{3x}cos(2x + 4)$ (d) $2Ae^{3x}sin(2x + 4) + 2Ae^{3x}$ cos(2x+4)

Q: The general solution of the differential equation (d^2 y)/(dx^2)+4y= 〖sin〗^2 x is

(a)$Ae^{2x} + Be^{-2x} + 2sinx\ cosx$ (b)$Acos2x + Bsin2x + \frac{1}{8} - \frac{x}{8}sin2x$

(c)$(A + Bcos2x)e^{-2x} - \frac{1}{8}cos2x$ (d)$Acos(2x + B) + \frac{1}{8}$

Q: On putting $x = e^z$, the transformed differential equation of $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = x$ is

(a) $\frac{d^2y}{dx^2} - y = e^z$ (b) $\frac{d^2y}{dx^2} + y = e^z$ (c) $\frac{dy}{dx} - y = e^{z^2}$

(d) $\frac{dy}{dx} + y = e^z$

Q: For solving the equation y'' + 4y' + 4y = $12e^{-2x}$ by method of undetermined coefficients, we assume the particular integral as

a) Ae^{-2x}
b) Axe^{-2x}
c) Ax^2e^{-2x}
d) $(A + Bx + Cx^2)e^{-2x}$

Q: The general solution of the equation 4y'' - 4y' + y = $8e^{x/2}$ is given by

a) $Ae^{x/2} + Be^{x/2} + x^2e^{x/2}$
b) $Ae^{x/2} + Bxe^{x/2} + x^2e^{x/2}$
c) $Ae^{x/2} + Be^{x/2} + e^{x/2}$
d) $Ae^{x/2} + Bxe^{x/2} + xe^{x/2}$

Q: If then particular integral $y_p(x)$= A(x)cosx + B(x)sinx where B(x) is given by

a) log(sin x) b) tanx c) cos x d) –tanx

Q: The I.F of homogeneous equation a(x,y)dy+b(x,y)dx=0 is

(a) 1/(ax+by), (ax+by) not equal to zero (b) 1/(bx+ay), (ax-by) not equal to zero

(c) 1/(ax+by), (ax-by) not equal to zero (d) 1/(bx+ay), (bx+ay) not equal to zero

Q: The general solution dy/dx=(y/x)+tan(y/x) is

(a) Y=cx sinx (b) y/x=sinx (c) sin(y/x)=cx (d) sin(y/x)=c sinx

Q: If the I.F of (x^7.y^2+3y)dx+(3x^8y-x)dy=0 is (x^m)(y^n) then

(a) m=1, n=-7 b) m=-7, n=1 (c) m=n=0 (d) m=n=1

The integrating factor of the differential equation (1+xy)y dx+(1-xy)x dy=0 is

A. 1/(〖2x〗 ^2 y^2)   B. 1/2xy   C. 1/(x+y)

D.1/(x-y)

Q: The particular integral of (d^2 y)/(dx^2)+dy/dx=x^2+2x+4 is

(a)x^2/3+4x   (b) x^3/3+4x   (c) x^3/3+4

(d) x^3/3+4x^2

Q: The differential equation whose auxiliary equations roots are 2,2,1 is

(a)Aex+Be2x+Ce2x   (b)Ae+(B+Cx)e2x   (c)Aex+(B+Cx)e2x

(d) Ae+Be2x+Ce2x

Q: Which of the following pair of functions is not a linearly independent solutions of $y'' + 9y = 0$?

(a) Sin3x,sin3x-cos3x   (b) sin3x+cos3x, 3sinx-4sin^3x

(c) sin^3x, sin3x cos3x   (d) sin3x+cos3x, 4cos^3x-3cosx

Q: The roots of the equation $D^2y - 4Dy + 3y = 0$are

(a) 1,3   (b) 2,4   © 3,2   (d)6,2

Q: The roots of the equation $D^4y - 7D^3y + 15D^2 - 13Dy + 4y = 0$

(a) 1,1,1,4   (b) 2,2,2,3   (c) 1,1,2,2,   (d)3,3,3,4