MATHS

BOOKS - MTG WBJEE MATHS (HINGLISH)

DIFFERENTIAL EQUATIONS

Wb Jee Workout

1. The degree of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^{5/3} = \frac{d^2y}{dx^2}$ is

A. 1

B. 5

C. $10/3$

D. 3

Answer: D

Watch Video Solution

2. The differential equation of all parabolas whose axis are parallel to y-axis is -

A. $\frac{d^3y}{dx^3} = 0$

B. $\frac{d^2y}{dx^2} = 0$

C. $\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$

D. $\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 0$

Answer: A

Watch Video Solution

3. The solution of the differential equation $\frac{dy}{dx} = e^{y+x} - e^{y-x}$ is

A. $e^{-y} = e^{x} - e^{-x} + c$

B. $e^{-y} = e^{-x} - e^{x} + c$

C. $e^{-y} = e^{x} + e^{-x} + c$

D. $e^{-y} + e^{x} + e^{-x} = c$

Answer: c

Watch Video Solution

4. The slope at any point of a curve y=f(x) is given by $\frac{dy}{dx} = 2x$ and it passes through $(1, -1)$. The equation of the curve is

A. $y = x^2 + 2$

B. $y = -x^2 + 2$

C. $y = x^2 - 2$

D. $y = -x^3 - 2$

Answer: A

Watch Video Solution

5. The differential equation satisfied by all the circles with radius = r(constant) and center on the line x=y is

A. $(x-y)^2\left(1+y_1^2\right) = r^2(1+y_1)^2$

B. $(x-y)y_1 = r^2(1+y_1)(1+y_1)^2$

C. $(x-y)y_1^2 = r^2\left(1+y_1^2\right)y_2$

D. $(x-y)y_1^2 = r^2(1+y_1)y_2^2$

Answer: A

Watch Video Solution

6. The order and degree of the differential equation $x = 1 + \left(\frac{dy}{dx}\right) + \frac{1}{2!}\left(\frac{dy}{dx}\right)^2 + \frac{1}{3!}\left(\frac{dy}{dx}\right)^3 + \ldots$

A. 3, 4

B. 2, not defined

C. 1, 1

D. both not defined

Answer: C

Watch Video Solution

7. Solution of the differential equation $xdy + ydx = 0$ represents a

A. parabola

B. circle

C. hyperbola

D. straight line

Answer: C

Watch Video Solution

8. The general solution of the differential equation $\log_e\left(\frac{dy}{dx}\right) = x + y$ is

A. $e^x + e^{-y} = c$

B. $e^x + e^y = c$

C. $e^y + e^{-x} = c$

D. $e^{-x} + e^{-y} = c$

Answer: A

Watch Video Solution

9. The differential equation of $y = 2be^{ax}$ (a & b are parameters) is

A. $yy_1 = y_2^2$

B. $yy_2 = y_1^2$

C. $yy_1^2 = y_2$

D. $yy_2^2 = y_1$

Answer: B

Watch Video Solution

10. The integrating factor of the differential equation $3x \log_e x \frac{dy}{dx} + y = 2 \log_e x$ is given by

A. $(\log_e x)^3$

B. $\log_e (\log_e x)$

C. $\log_e x$

D. $(\log_e x)^{1/3}$

Answer: D

Watch Video Solution

11. The order and degree of the differential equation of all tangent lines to the parabola $y^2 = 4x$ are

A. 2,2

B. 3,1

C. 1,2

D. 4,1

Answer: C

Watch Video Solution

12. The differential equation whose solution represents the family $xy = Ae^{ax} + Be^{-ax}$ is

A. $x\left(\frac{d^2y}{dx^2}\right)^2 + 2\frac{dy}{dx} = xy$

B. $x\left(\frac{d^2y}{dx^2}\right)^2 + 2\frac{dy}{dx} = a^2xy$

C. $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = a^2xy$

D. None of these

Answer: C

Watch Video Solution

13. The solution of the differential equation $\frac{dy}{dx} = e^{x+y} + x^2 e^y$ is

A. $e^x = \frac{y^3}{3} + e^y + c$

B. $e^x = \frac{x^2}{3} + e^x + c$

C. $e^{-y} = -\frac{x^3}{3} - e^x - c$

D. None of these

Answer: C

Watch Video Solution

14. The solution of the differential equation $\left(2x^2+2y^2\right)dx-4xydy=0$ is

A. $\frac{x}{x^2+y^2}=c$

B. $\frac{x^2+y^2}{x}=c$

C. $\frac{y^2-x^2}{x}=c$

D. $\frac{x^2-y^2}{x}=c$

Answer: D

Watch Video Solution

15. The order of the differential equation whose general solution is given by $y=(A+B)\cos(x+C)+De^x$ is

A. 4

B. 3

C. 2

D. 1

Answer: B

Watch Video Solution

16. The solution of the differential equation $xdy + ydx = xydx$ when y(1)=1 is

A. $y = \frac{e^x}{x}$

B. $y = \frac{e^x}{ex}$

C. $y = \frac{xe^x}{e}$

D. None of these

Answer: B

Watch Video Solution

17. The differential equation of $y = e^{2x}(A\cos mx + B\sin mx)$ is

A. $\frac{d^2y}{dx^2} - y\frac{dy}{dx} + (4 + m^2)y = 0$

B. $\frac{d^2y}{dx^2} + y\frac{dy}{dx} + (4 + m^2)y = 0$

C. $\frac{d^2y}{dx^2} + y\frac{dy}{dx} - (4 + m^2)y = 0$

D. None of these

Answer: D

Watch Video Solution

18. If $\frac{dy}{dx} = \frac{2}{x + y}$, then $x + y + 2 =$

A. ce^{y}

B. $ce^{\frac{y}{2}}$

C. ce^{-y}

D. $ce^{\frac{y}{2}}$

Answer: B

Watch Video Solution

19. The solution of different equation $\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0 \forall x, y \in R - (2n+1)\frac{\pi}{2}, n \in I$ is

A. $\tan x = \tan y$

B. $\tan x \tan y = c, \forall x, y \in R$

C. $\tan x \tan y = c$

D. None of these

Answer: C

Watch Video Solution

20. If $\frac{dy}{dx} = y \sin 2x, y(0) = 1$, then solution is

A. $e^{\sin^2 x}$

B. $\sin^2 x$

C. $\cos^2 x$

D. $e^{\cos^2 x}$

Answer: A

Watch Video Solution

21. An integrating factor of the differential equation $\frac{dy}{dx}(x \log x) + 2y = \log x$ is

A. $(\log x)^2$

B. x^2

C. log x

D. None of these

Answer: D

Watch Video Solution

22. The order and degree of equation whose solution is given by $y = cx + c^3 - 4c^{3/2} + 7$ where 'c' is arbitrary constant are

A. degree=2, order =2

B. order =1, degree=6

C. degree=3, order=3

D. None of these

Answer: B

Watch Video Solution

23. The differential equation of all circles whose radius is 5 centre is any point (h,k) is

A. $25\left(\frac{d^2y}{dx^2}\right)^2+\left(1+\left(\frac{dy}{dx}\right)^2\right)^2=0$

B. $25\left(\frac{d^2y}{dx^2}\right)^2-\left(1+\left(\frac{dy}{dx}\right)^2\right)^2=0$

C. $25\left(\frac{d^2y}{dx^2}\right)+\left(1+\left(\frac{dy}{dx}\right)^2\right)^3=0$

D. $25\left(\frac{d^2y}{dx^2}\right)^2-\left(1+\left(\frac{dy}{dx}\right)^2\right)^3=0$

Answer: D

Watch Video Solution

24. Solve the differential equation $\frac{dy}{dx} = \log(x+1)$

A. $y = (x-1)\log(x+1) + x + c$

B. $y = (x+1)\log(x+1) - x + c$

C. $y = (x+1)\log(x+1) + x + c$

D. $y = (x-1)\log(x+1) - x + c$

Answer: B

Watch Video Solution

25. Solve the following initial value problem: $\frac{dy}{dx} = 2e^x y^3,\ y(0) = \frac{1}{2}$

A. $8y^2 - 4e^x = 1$

B. $8 + 4e^x + y^2 = 1$

C. $y^2(8 - 4e^x) = 1$

D. $8 - 4y^2 = 1$

Answer: C

Watch Video Solution

26. Solve the differential equation $ydx + \left\{x \log\left(\frac{y}{x}\right)\right\}dy - 2xdy = 0$

A. $y = \log(xy + 1) + c, x \neq 0$

B. $cy = \log\left(x^2 + y^2\right), x \neq 0$

C. $y = \log(xy - 1) + c, x \neq 0$

D. $cy = \log\left(\frac{y}{x}\right) + 1, x \neq 0$

Answer: D

Watch Video Solution

27. Solve each of the following initial value problem:

$$2xy + y^2 - 2xy^2 \frac{dy}{dx} = 0,\ y(1) = 2$$

A. $y = \frac{2}{x}, x \neq 0, \pm e$

B. $y = \frac{2x}{1 - \log|x|}, x \neq 0, \pm e$

C. $y = 2\log|x|, x \neq 0, \pm e$

D. $y = 2 + \log|x|, x \neq 0, \pm e$

Answer: B

Watch Video Solution

28. Solution of the differential equation $x\frac{dy}{dx} + 2y = x^2 \log x$ is

A. $x^2y + \frac{x^4}{16} + \frac{x^4 \log x}{4} = c$

B. $x^2y - \frac{x^4}{16} + \frac{x^4 \log x}{4} = c$

C. $x^2y + \frac{x^4}{16} - \frac{x^4 \log x}{4} = c$

D. $x^2y - \frac{x^4}{16} - \frac{x^4 \log x}{4} = c$

Answer: C

Watch Video Solution

29. For $y > 0$ and $x \in R$, $ydx + y^2dy = xdy$ where y = f(x). If f(1)=1, then the value of f(-3) is

A. 6

B. 4

C. 2

D. 1

Answer: C

Watch Video Solution

30. Solution of the differential equation $x^2ydy + \left(x^3 + x^2y - 2xy^2 - y^3\right)dx = 0$ is

A. $\log\left|\frac{y+x}{x^4(y-x)}\right| = \frac{4x}{x+y} + 4c$

B. $\log\left|\frac{y-x}{x^4(y+x)}\right| = \frac{4x}{x+y} + 4c$

C. $\log\left|\frac{y+x}{x^4(y-x)}\right| = \frac{2x}{x+y} + 4c$

D. $\log\left|\frac{y-x}{x^4(y+x)}\right| = \frac{2x}{x+y} + 4c$

Answer: D

Watch Video Solution

31. Obtain the differential equation of the family of circles passing through the point (a,0) and (-a,0).

A. $y_1\left(y^2-x^2\right)+2xy+a^2=0$

B. $y_1y^2+xy+a^2x^2=0$

C. $y_1\left(y^2-x^2+a^2\right)+2xy=0$

D. $y_1\left(y^2+x^2\right)-2xy+a^2=0$

Answer: C

Watch Video Solution

32. Find the differential equation of the curve. $\left(x^2-y^2\right)=c\left(x^2+y^2\right)^2$

A. $\frac{dy}{dx} = \frac{x^3 + 3xy^2}{y^3 + 3x^2y}$

B. $\frac{dy}{dx} = \frac{x^3 - 3xy^2}{y^3 - 3x^2y}$

C. $\frac{dy}{dx} = \frac{x^3 - 3xy^2}{y^3 + 3xy^2}$

D. $\frac{dy}{dx} = \frac{x^3 + 3xy^2}{y^3 - 3xy^2}$

Answer: B

View Text Solution

33. The equation of one of the curves whose slope at any point is equal to $y + 2x$ and $y(0) = 0$ is

A. $y2(e^x + x - 1)$

B. $y = 2(e^x - x - 1)$

C. $y = 2(e^x - x + 1)$

D. $y = 2(e^x + x + 1)$

Answer: B

Watch Video Solution

34. The solution of $\frac{dy}{dx} = \frac{y}{x} + (\tan)\frac{y}{x}$ is :

A. $x = c\sin(y/x)$

B. $x = c\sin(xy)$

C. $y = c\sin(y/x)$

D. $xy = c\sin(x/y)$

Answer: A

Watch Video Solution

35. The solution of the equation $\frac{dy}{dx} = \frac{y^2 - y - 2}{x^2 + 2x - 3}$ is

A. $\frac{1}{3}\log\left|\frac{y-2}{y+1}\right| = \frac{1}{4}\log\left|\frac{x-1}{x+3}\right| + c$

B. $\frac{1}{3}\log\left|\frac{y+1}{y-3}\right| = \frac{1}{4}\log\left|\frac{x+3}{x-1}\right| + c$

C. $\frac{1}{4}\log\left|\frac{y+1}{y-2}\right| = \frac{1}{3}\log\left|\frac{x+3}{x+1}\right| + c$

D. $\log\left(y^2 - y - 2\right) = \log\left(x^2 + 2x - 3\right) + c$

Answer: A

Watch Video Solution

36. Solve the differential equation $\frac{dy}{dx} = \frac{2x(\log x + 1)}{\sin y + y\cos y}$, given that $y = 0, whenx = 1.$

A. $2y = x\log x + 1$

B. $y = 2x^2 + x - 1$

C. $2y\sin y = 2x^2\log x + x^2 - 1$

D. $y = \sin y + 2x$

Answer: C

Watch Video Solution

37. The general solution of the differential equation $\frac{dy}{dx} = \frac{x+y+1}{2x+2y+1}$ is:

A. $\log|3x+2y+2| + 3x + 6y = c$

B. $\log \mid 3x+3y+2) \mid -2x+6y = c$

C. $\log \mid 3x+3y+2\} - 3x - 6y = c$

D. $\log|3x+3y+2| + 3x - 6y = c$

Answer: D

Watch Video Solution

38. Let y be the solution of the differential equation $x\frac{dy}{dx} = \frac{y^2}{1 - y\log x}$ satisfying y(1)=1. Then y satisfies

A. $y = x^{y-1}$

B. $y = x^{y}$

C. $y = x^{y+1}$

D. $y = x^{y+2}$

Answer: B

Watch Video Solution

39. Solve $\frac{x + y\frac{dy}{dx}}{y - x\frac{dy}{dx}} = x^2 + 2y^2 + \frac{y^4}{x^2}$

A. $\frac{y}{x} + \frac{1}{x^2 + y^2} = c$

B. $\frac{2y}{x} - \frac{1}{x^2+y^2} = c$

C. $\frac{y}{x} - \frac{1}{x^2+y^2} = c$

D. None of these

Answer: B

Watch Video Solution

40. $\frac{dy}{dx} + \frac{y}{x} = \frac{1}{\sqrt{1+x^2}}$

A. $y = \frac{1+x^2}{x} + \frac{c}{x}$

B. $y = \frac{\sqrt{1+x^2}}{x} + \frac{c}{x}$

C. $y = \frac{x}{\sqrt{1+x^2}} + cx$

D. None of these

Answer: B

Watch Video Solution

41. The solution of the differential equation $xdy + (x + y)dx = 0$ is

A. $c = \frac{y^2}{2} + xy$

B. $c = xy + \frac{x^2}{2}$

C. $c = x + \frac{(xy)^2}{2}$

D. None of these

Answer: B

Watch Video Solution

42. The solution of a differential equation is $y = c_1 e^{4x} + c_2 e^{3x}$, the differential equation is given by

A. $\frac{d^2y}{dx^2} - 7\frac{dy}{dx} + 7y = 0$

B. $\frac{d^2y}{dx^2} + 7\frac{dy}{dx} + 12y = 0$

C. $\frac{d^2y}{dx^2} - 7\frac{dy}{dx} + 12y = 0$

D. None of these

Answer: C

Watch Video Solution

43. The solution of differential equation $\frac{dy}{dx} - 3y = \sin 2x$ is

A. $y = e^{-3x}\left(\frac{\cos 2x + 3\sin 2x}{13}\right) + c$

B. $y = e^{-3x}\left(\frac{\cos 2x - 3\sin 2x}{13}\right) + c$

C. $ye^{-3x} = -w^{-3x}\left(\frac{2\cos 2x + 3\sin 2x}{13}\right) + c$

D. None of these

Answer: C

Watch Video Solution

44. If $y = e^{4x} + e^{-3x}$ satisfies the relation $\frac{d^3y}{dx^3} + A\frac{dy}{dx} + By = 0$ then A and B respectively are

A. 12,13

B. $-12, 13$

C. $12, \ -13$

D. $-13, \ -12$

Answer: D

View Text Solution

45. The solution of differential equation

$t = 1 + (ty)\frac{dy}{dt} + \left(\frac{dy}{dt}\right)^2 + \ldots . \infty$ is

A. $y = \pm\sqrt{(\log t)^2 + c}$

B. $ty = t^y + c$

C. $y = \log t + c$

D. $y = (\log t)^2 + c$

Answer: A

Watch Video Solution

46. Find the general solution of each of the following differential equations:

$(e^y + 1)\cos x dx + e^y \sin x dy = 0$

A. $(e^y + 1)\sin x = c$

B. $e^x \sin x = c$

C. $\left(e^{x+1}\right)\cos x = c$

D. None of these

Answer: A

Watch Video Solution

47. The orthogonal trajectories of the family of semicubical parabola is given by

A. $x^2 + 3y^2 = c^2$

B. $3x^2 + y^2 = c^2$

C. $x + 3y^2 = c^2$

D. $3y^2 + 2x^2 = c^2$

Answer: D

View Text Solution

48. Solution of differential equation $\left(x^2 - 2x + 2y^2\right)dx + 2xydy = 0$ is

A. $y^2 = 2x - \frac{1}{4}x^2 + \frac{c}{x^2}$

B. $y^2 = \frac{2}{3}x - x^2 + \frac{c}{x^2}$

C. $y^2 = \frac{2}{3}x - \frac{x^2}{4} + \frac{c}{x^2}$

D. None of these

Answer: C

View Text Solution

49. The solution of the differential equation $\frac{dy}{dx} = \frac{x}{1+x^2}$ is

A. $y = \frac{1}{2}\log|2+x^2| + c$

B. $y = \frac{1}{2}\log|1+x^2| + c$

C. $y = \log\left|\sqrt{1+x^2}\right| + c$

D. None of these

Answer: B::C

Watch Video Solution

50. The solution of differential equation

$\frac{dt}{dx} = \frac{t\left[\frac{d}{dx}\{g(x)\}\right] - t^2}{g(x)}$ is

A. $t = \frac{g(x)+c}{x}$

B. $t = \frac{g(x)}{x} + c$

C. $t = \frac{g(x)}{x + c}$

D. $t = g(x) + x + c$

Answer: C

Watch Video Solution

51. Solution of the differential equation $\frac{dy}{dx} = \frac{x - y}{x + y}$ is

A. $x^2 - y^2 + 2xy + c = 0$

B. $x^2 - y^2 - xy + c = 0$

C. $x^2 - y^2 + xy + c = 0$

D. $x^2 - y^2 - 2xy + c = 0$

Answer: D

Watch Video Solution

52. The rate of growth of a population is proportional to the number present if the population of a city doubled in the past 25 years, and the present population is 100000, when will the city have a population of 500000?

A. 83.04 years

B. 58.02 years

C. 85.05 years

D. 53.03 years

Answer: A

Watch Video Solution

53. Find the particular solution of the differential equation $3e^x \tan y dx + (1+e^x)\sec^2 y dy = 0$, when x= 0, $y = \pi$

A. $(1+e^x)^3 \tan y = 0$

B. $(1+e^x)^2 \tan y = 0$

C. $(1+e^x)\tan y = 0$

D. $(1+e^x)^{-2} \tan y = 0$

Answer: A

View Text Solution

54. The differential equation $\frac{dy}{dx} = \frac{3y}{2x}$ represents a family of hyperbolas (except when it represents a pair of lines) with eccentricity. $\sqrt{\frac{3}{5}}$ (b) $\sqrt{\frac{5}{3}}$ $\sqrt{\frac{2}{5}}$ (d) $\sqrt{\frac{5}{2}}$

A. $\sqrt{\frac{3}{5}}$

B. $\sqrt{\frac{5}{3}}$

C. $\sqrt{\frac{2}{5}}$

D. $\sqrt{\frac{5}{2}}$

Answer: B::D

Watch Video Solution

55. The function $f(\theta) = \frac{d}{dth\eta}\int_0^{\theta} \frac{dx}{1-\cos\theta\cos x}$ satisfies the differential equation (a)

$(b)(c)(d)\frac{(e)df((f)\theta(g))}{h}((i)dth\eta)(j)(k) + 2f((l)\theta(m)) = 0(n)$

(o) (p)

$(q)(r)(s)\frac{(t)df}{u}((v)dth\eta)(w)(x) - 2f((y)\theta(z))\cot\theta = 0(aa)$

(bb) (cc)

$(dd)(ee)(ff)\frac{(gg)df}{hh}((ii)dth\eta)(jj)(kk) + 2f((ll)\theta(mm)) = 0(nn)$

(oo) (d)

$$(pp)(qq)(rr)\frac{(ss)df}{tt}((uu)dth\eta)(vv)(ww)-2((xx)\theta(yy))=0(zz)$$

(aaa)

A. $\frac{df}{d\theta}+2f(\theta)=0$

B. $\frac{df}{d\theta}-2f(\theta)=0$

C. $\frac{df}{d\theta}-2f(\theta)\tan\theta=0$

D. $\frac{df}{d\theta}+2f(\theta)\cot\theta=0$

Answer: D

Watch Video Solution

56. The solution of $\frac{dy}{dx}=\frac{ax+h}{by+k}$ represents a parabola when

A. $a=-2, b=0$

B. $a=-2, b=2$

C. $a = 0, b = 2$

D. $a = 0, b = 0$

Answer: A::C

Watch Video Solution

57. Find the curve which passes through the point (2,0) such that the segment of the tangent between the point of tangency & the y-axis has a constant length equal to 2 .

A. $y = \left[\sqrt{4 - x^2} + 2\log_e\left(\frac{2 - \sqrt{4 - x^2}}{x}\right)\right]$

B. $y = -\left[\sqrt{4 - x^2} + 2\log_e\left(\frac{2 - \sqrt{4 - x^2}}{x}\right)\right]$

C. $y = \left[\sqrt{4 - x^2} - 2\log_e\left(\frac{2 - \sqrt{4 - x^2}}{x}\right)\right]$

D. $y = -\left[\sqrt{4 - x^2} - 2\log_e\left(\frac{2 - \sqrt{4 - x^2}}{x}\right)\right]$

Answer: A::B

Watch Video Solution

58. The solution of the differential equation, $f(x) = \frac{dy}{dx} + f'(x)y = 1$ is (A) $x = yf(x) + c$ (B) $x.\ f^{-1}(x) + c = 0$ (C) $y = \frac{x + c}{f(x)}$ (d) non of these

A. $x = yf'(x) + c$

B. $xf^{-1}(x) + c = 0$

C. $y = \frac{x + c}{f(x)}$

D. $y = xf(x)$

Answer: A::C

Watch Video Solution

59. The general solution of the differential equation $\left(y^2 + e^{2x}\right)dy - y^3 dx = 0$, (c being the constant of integration), is

A. $y^2 e^{-2x} + 2\ln y = c$

B. $y^2 e^{-2x} - 2\ln y = c$

C. $y^2 e^{-x} - 2\ln y = c$

D. $y^2 e^{-x} + 2\ln y = c$

Answer: A

View Text Solution

60. Find the orthogonal trajectories of $xy = c$

A. $x^2 + y^2$= constant

B. $x^2 - y^2 =$ constant

C. xy= constant

D. x=ky where k is a constant

Answer: B

Watch Video Solution

Wb Jee Previous Years Questions

1. If $\sqrt{y} = \cos^{-1} x$, then it satisfies the dIfferential equation $\left(1 - x^2\right) \frac{d^2y}{dx^2} - x\frac{dy}{dx} = c$, where c is equal to

A. 0

B. 3

C. 1

D. 2

Answer: D

Watch Video Solution

2. The integrating factor of the differential equaion $\left(1+x^2\right)\frac{dy}{dx}+y=e^{\tan^{-1}x}$ is-

A. $\tan^{-1}x$

B. $1+x^2$

C. $e^{\tan^{-1}x}$

D. $\log_e\left(1+x^2\right)$

Answer: C

Watch Video Solution

3. The solution of the differential equation $y\frac{dy}{dx} = x\left[\frac{y^2}{x^2} + \frac{\phi\left(\frac{y^2}{x^2}\right)}{(\phi')\left(\frac{y^2}{x^2}\right)}\right]$ is (where c is a constant)

A. $\phi\left(\frac{y^2}{x^2}\right) = cx$

B. $x\phi\left(\frac{y^2}{x^2}\right) = c$

C. $\phi\left(\frac{y^2}{x^2}\right) = cx^2$

D. $x^2\phi\left(\frac{y^2}{x^2}\right) = c$

Answer: C

Watch Video Solution

4. The curve $y = (\cos x + y)^{\frac{1}{2}}$ satisfies the differential equation :

A. $(2y-1)\frac{d^2y}{dx^2} + 2\left(\frac{dy}{dx}\right)^2 + \cos x = 0$

B. $\frac{d^2y}{dx^2} - 2y\left(\frac{dy}{dx}\right)^2 + \cos x = 0$

C. $(2y-1)\frac{d^2y}{dx^2} - 2\left(\frac{dy}{dx}\right)^2 + \cos x = 0$

D. $(2y-1)\frac{d^2y}{dx^2} - \left(\frac{dy}{dx}\right)^2 + \cos x = 0$

Answer: A

Watch Video Solution

5. If $y = e^{-x}\cos 2x$ then which of the following differential equations is satisfied?

A. $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 5y = 0$

B. $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 2y = 0$

C. $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} - 2y = 0$

D. $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} - 5y = 0$

Answer: A

Watch Video Solution

6. The integrating factor of the differential equation $\frac{dy}{dx} + \left(3x^2 \tan^{-1} y - x^3\right)\left(1 + y^2\right) = 0$ is

A. e^{x^2}

B. e^{x^3}

C. e^{3x^2}

D. e^{3x^3}

Answer: B

Watch Video Solution

7. If the solution of the differential equation $x\frac{dy}{dx} + y = xe^x$be, $xy = e^x\phi(x) + c$, then $\phi(x)$ is equal to

A. $x + 1$

B. $x - 1$

C. $1 - x$

D. x

Answer: B

View Text Solution

8. The order of the differential equation of all parabols whose axis of symmetry is along x-axis, is

A. 2

B. 3

C. 1

D. None of these

Answer: A

View Text Solution

9. General solution of $(x+y)^2 \frac{dy}{dx} = a^2, a \neq 0$ is (c is an arbitrary constant)

A. $\frac{x}{a} = \tan\frac{y}{a} + c$

B. $\tan xy = c$

C. $\tan(x+y) = c$

D. $\tan\frac{y+c}{a} = \frac{x+y}{a}$

Answer: D

View Text Solution

10. The integrating factor of the first order differential equation $x^2(x^2-1)\frac{dy}{dr}+x(x^2+1)y=x^2-1$ is

A. e^x

B. $x-\frac{1}{x}$

C. $x+\frac{1}{x}$

D. $\frac{1}{x^2}$

Answer: B

Watch Video Solution

11. The differential equation representing the family of curves $y^2 = 2d\left(x + \sqrt{d}\right)$ where d is a parameter, is of

A. order 2

B. degree 2

C. degree 3

D. degree 4

Answer: C

View Text Solution

12. Let y(x) be a solution of $\left(1 + x^2\right)\frac{\mathrm{dy}}{\mathrm{dx}} + 2xy - 4x^2 = 0$ and $y(0) = -1$

Then $y(1)$ is equal to

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{6}$

D. -1

Answer: C

Watch Video Solution

13. Solution of the differential equation $\left(1+e^{\frac{x}{y}}\right)dx+e^{\frac{x}{y}}\left(1-\frac{x}{y}\right)dy=0$ is

A. $x-ye^{x/y}=c$

B. $y-xe^{x/y}=c$

C. $x+ye^{x/y}=c$

D. $y+xe^{x/y}=c$

Answer: C

Watch Video Solution

14. The solution of the differential equation $\left(y^2+2x\right)\frac{dy}{dx}=y$ satisfies x=1, y=1. Then, the solution is

A. $x=y^2(1+\log_e y)$

B. $y=x^2(1+\log_e x)$

C. $x=y^2(1-\log_e y)$

D. $y=x^2(1-\log_e x)$

Answer: A

Watch Video Solution

15. The solution of the differential equation $y\sin(x/y)dx = (x\sin(x/y) - y)dy$ satisfying $y(\pi/4) = 1$ is

A. $\cos\frac{x}{y} = \log_e y + \frac{1}{\sqrt{2}}$

B. $\sin\frac{x}{y} = \log_e y + \frac{1}{\sqrt{2}}$

C. $\sin\frac{x}{y} = \log_e x - \frac{1}{\sqrt{2}}$

D. $\cos\frac{x}{y} = -\log_e x\frac{1}{\sqrt{2}}$

Answer: C

Watch Video Solution

16. The solution of the differential equation $\frac{dy}{dx} + \frac{y}{x\log_e x} = \frac{1}{x}$ under the condition y=1 when x=e is

A. $2y = \log_e x + \frac{1}{\log_e x}$

B. $y = \log_e x + \frac{2}{\log_e x}$

C. $y \log_e x = \log_e x + 1$

D. $y = \log_e x + e$

Answer: A

Watch Video Solution

17. General solution of $y\frac{dy}{dx} + by^2 = a\cos x, 0 < x < 1$ is

A. $y^2 = 2a(2b\sin x + \cos x) + ce^{-2bx}$

B. $(4b^2 + 1)y^2 = 2a(\sin x + 2b\cos x) + ce^{-2bx}$

C. $(4b^2 + 1)y^2 = 2a(\sin x + 2b\cos x) + ce^{2bx}$

D. $y^2 = 2a(2b\sin x + \cos x) + ce^{-2bx}$

Answer: B

Watch Video Solution

18. If $u(x)$ and $v(x)$ are two independent solution of the differential equation $\frac{d^2y}{dx^2} + b\frac{dy}{dx} + cy = 0$ then additional solution (s) of the given differential equation is (are) :

A. $y = 5u(x) + 8v(x)$

B. $y = c_1\{u(x) - v(x)\} + c_2v(x), c_1$ and c_2 are arbitrary constants

C. $y = c_1u(x)v(x) + c_2u(x)/v(x), c_1$ and c_2 are arbitrary constant

D. $y = u(x)v(x)$

Answer: A::B

Watch Video Solution

19. If cos x and sinx are the solution of differential equation $a_o\frac{d^2y}{dx^2}+a_1\frac{dy}{dx}+a_2y=0$ where a_0, a_1, a_2 are real constants then which of the following is true

A. $A\cos x + B\sin x$ is a solution, where A and B are real constants

B. $A\cos\left(x+\frac{\pi}{4}\right)$ is a solution, where A is a real constant

C. $A\cos x \sin x$ is a solution, where A is a real constant

D. $A\cos\left(x+\frac{\pi}{4}\right)+B\sin\left(x-\frac{\pi}{4}\right)$ is a solution, where A and B are real constants

Answer: A::B::D

Watch Video Solution