MATHS

BOOKS - NDA PREVIOUS YEARS

DIFFERENTIAL EQUATION

Mcqs

1. Solution of the differential equation $xdy - ydx = 0$ represents

A. Rectangular hyperbola

B. Straight line passing through (0,0)

C. Parabola with vertex at (0,0)

D. Circle with centre at (0,0)

Answer: B

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2. Which one of the following differential equation represents the system of circles touching y-axis at the origin ?

A. $\frac{dy}{dx} = x^2 - y^2$

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

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

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

Answer: B

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3. The solution of the differential equation $\frac{\left(x + 2y^3\right)dy}{dx} = y$ is (a) $(b)(c)(d)\frac{x}{e}\left((f)(g)y^{(h)2(i)}(j)\right)(k)(l) = y + c(m)$ (n) (b) $(o)(p)(q)\frac{x}{r}y(s)(t) = (u)y^{(v)2(w)}(x) + c(y)$ (z) (c)

$(d)(e)(f)\frac{(g)(h)x^{(i)2(j)}(k)}{l}y(m)(n) = (o)y^{(p)2(q)}(r) + c(s)$ (t) (d)

$(u)(v)(w)\frac{y}{x}x(y)(z) = (aa)x^{(bb)2(cc)}(dd) + c(ee)$ (ff)

A. y (1-xy)=cx

B. $y^3 = cy$

C. x(1-xy)=cy

D. x(1+xy)=cy

Answer: B

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4. If $y^2 = P(x)$ is polynomial of degree 3, then $2\left(\frac{d}{dx}\right)\left(y^3.\frac{d^2y}{dx^2}\right)$ is equal to

A. p(x)p"(x)

B. p"(x)p"(x)

C. p(x)p"(x)

D. A constant

Answer: C

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5. what is the degree of the equation

$$\left[\frac{d^2y}{dx^2}\right] = \frac{\left[y + \left(\frac{dy}{dx}\right)^2\right]^1}{4} ?$$

A. 1

B. 2

C. 3

D. 4

Answer: D

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6. What are the oder and degree respectively of the differential equation $y = x\frac{dy}{dx} + \frac{dx}{dy}$?

A. 1,1

B. 1,2

C. 2,1

D. 2,2

Answer: B

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7. What is the equation of the curve passing through the origin and satisfying the differential equation

dy = (ytanx+secx)dx ?

A. y=x cos x

B. y cos x=x

C. xy=cos x

D. y sin x=x

Answer: A

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8. What is the solution of the differential equation

$\frac{dy}{dx} = \sec(x+y)$?

A. y=tan (x+y)=c

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

C. $y + \tan\left\{\frac{(x+y)}{2}\right\} = c$

D. $y + \tan\left\{\frac{(x-y)}{2}\right\} = c$

Answer: B

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9. For what value of k, does the differntial equation $\frac{dy}{dx} = ky$ represent the law of natural decay ?

A. -5

B. 0

C. 0.01

D. $(10)^{-1}$

Answer: A

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10. The solution of the differential equation $(x+y)(dx-dy) = dx+dy$, is

A. x+y+In (x+y)=c

B. x-y+In (x+y) =c

C. y-x+In (x+y) =c

D. y-x-In (x+y)=c

Answer: C

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11. What is the degree of the differential equation $k\frac{d^2y}{dx^2} = \left[1 + \left(\frac{dy}{dx}\right)^3\right]^{3/2}$, where k is a constant ?

A. 1

B. 2

C. 3

D. 4

Answer: B

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12. Under which one of the following conditions does the solution of $\frac{dy}{dx} = \frac{ax+b}{cy+d}$ represent a parabola ?

A. a=0,c=0

B. a=1,b=2, $c \neq 0$

C. $a = 0, c \neq 0, b \neq 0$

D. a=1,c=1

Answer: C

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13. A radioctive element disintegrates at a rate proportional to the eqantity of substance Q present at any time t. what is the differential equation of the disintegration ?

A. $\frac{dQ}{dt} = -Q$

B. $\frac{dQ}{dt} = 0kQ, k > 0$

C. $\frac{dQ}{dt} = -kQ, k > 0$

D. $\frac{dQ}{dt} = Q$

Answer: C

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14. What is the solution of the difrerential equation (x+y) (dx -dy) =dx+dy ?

A. 2log (x+y)=c (y-x)

B. (y-x)+log (x+y) =c

C. $\left(\frac{y}{x}\right) + \left[\log\left(\frac{y}{x}\right)\right] = c$

D. None of these

Answer: B

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15. What is the only solution of the initial value problem $y^2 = t(1+y), y(0) = 0$?

A. $y = -1 + e^{1^2/2}$

B. $y = 1 + e^{t^2/2}$

C. y=-t

D. y=t

Answer: A

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16. What is the differential equation of the curve $y = ax^2 + bx$?

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

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

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

D. none of the above

Answer: A

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17. What is the degree of the differential equation

$$\left[1+\left(\frac{dy}{dx}\right)^2\right]^{3/2}=k\frac{d^2y}{dx^2}-k\frac{d^2y}{dx^2}\ ?$$

A. 4

B. 3

C. 2

D. 1

Answer: C

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18. if $f(x)=\sqrt{x+\sqrt{x+}\sqrt{x+}\sqrt{\ldots\infty}},$

A. $\frac{1}{1-2f(x)}$

B. $\frac{1}{2f(x)-1}$

C. $\frac{1}{1+2f(x)}$

D. $\frac{1}{2+f(x)}$

Answer: B

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19. What is the solution of the differential equation

$\frac{dy}{dx} = xy + x + y + 1$?

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

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

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

D. $\log(y+1) = x^2 + x + c$

Answer: B

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20. What are the order and degree respectively of the differential equation

$$\left(\frac{d^2y}{dx^2}\right)^{5/6} = \left(\frac{dy}{dx}\right)^{1/3} ?$$

A. 2,1

B. 2,5

C. $2, \frac{5}{6}$

D. $1, \frac{1}{3}$

Answer: B

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21. What is the solution of the differential equation

$-\cos ec^2(x+y)dy = dx$?

A. y-c=sin (x+y)

B. x-c= sin (x+y)

C. y-c = tan (x +y)

D. none of the above

Answer: D

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22. what are the order and degree respectively of the differential equation

$$\left\{\left(d^4y/dx^4\right)^3\right\}^{2/3} - 7x\left(d^3y/dx^3\right)^2 = 8\,?$$

A. 3,2

B. 4,3

C. 4,2

D. 3,3

Answer: C

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23. what is the solution of the differential equaiton

x dy-ydx =xy^2dx ?

A. $yx^2 + 2x = 2cy$

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

C. $y^2x^2 + 2x = 2cy$

D. none of these

Answer: A

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24. Solution of the differential equation $xdy - ydx = 0$ represents

A. Rectangular hyperbola

B. Straight line through the origin

C. parabola whose vertex is at origin

D. circle whose centre is at origin

Answer: B

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25. What is the order of the differential equation ?

$$\frac{dy}{dx} + y = \frac{1}{\frac{dy}{dx}}$$

A. -1

B. 0

C. 1

D. 2

Answer: C

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26. Rate of growth of baster is proportional to the number of bacteria present at that time. If x is the number of bacteria present any instant t, then which one of the following is correct ?(take proportional constant equal to 1)

A. x=log t

B. $x = ce^t$

C. $e^x = t$

D. $x = \sqrt{t}$

Answer: B

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27. what is the solution of the differential equation

$\frac{dy}{dx} = e^{x-y}\left(e^{y-x} - e^y\right)$?

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

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

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

D. none of these

Answer: A

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28. What are the degree and order respectively of differential equation of the family of rectangular hyperbolas whose axis of symmetry are the coordinate axis ?

A. 1,1

B. 1,2

C. 2,1

D. 2,2

Answer: A

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29. What does the equation $xdy = ydx$ represent?

A. A family of circles

B. A family of parabolas

C. A family of hyperbolas

D. A family of straight lines

Answer: D

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30. What is the solution of the differential equation

$xdy - ydx = xy^2dx$?

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

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

C. $y = x^{-1} = c$

D. $x^2 + 2xy^{-1} = c$

Answer: D

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31. When a and b are eliminated from the equation $xy = ae^x + be^{-x}$, the resulting differential equation is of (a) first order and first degree (b) first order and second degree (c) second order and first degree (d) second order and second degree

A. first order and first degree

B. frist order and second degree

C. second order and first degree

D. second order and second degree

Answer: C

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32. what is the solution of the differential equaiton

$3e^x \tan y dx + (1 + e^x)\sec^2 y dy = 0$?

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

B. $(1 + e^x)^3 \tan y = c$

C. $(1 + e^x)^2 \tan y = c$

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

Answer: B

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33. differential equation for $y^2 = 4a(x - a)$

A. $yy' - 2xyy' + y^2 = 0$

B. $yy'(yy' + 2x) + y^2 = 0$

C. $yy'(yy' - 2x) + y^2 = 0$

D. $yy' - 2xyy + y = 0$

Answer: C

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34. What is the degree of the differential equation

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

A. 1

B. 2

C. 3

D. 6

Answer: B

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35. The growth of a quantity N(t) at any instant t is given by $\frac{dN(t)}{dt} = \alpha N(t)$, Given that $N(t) = ce^{kt}$, is constant. What is the value of α ?

A. c

B. k

C. c+k

D. c-k

Answer: B

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36. what is the solution of the differnetial equation

$a\left(x\frac{dy}{dx} + 2y\right) = xy\frac{dy}{dx}$?

A. $x^2 = kye^{\frac{y}{a}}$

B. $yx^2 = kye^{\frac{y}{a}}$

C. $y^2x^2 = ky\frac{e^{y^2}}{a}\Bigg)$

D. none of the above

Answer: D

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37. what is the degree of the differential equation

$\left(1 + \frac{dy}{dx}\right)^4 = \left(\frac{d^2y}{dx^2}\right)^2$?

A. 1

B. 2

C. 4

D. 8

Answer: B

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38. what is the general solution of

$(1+e^x)ydy = e^x dx$?

where 'c' is a constant of integration

A. $y^2 = \ln\left[c^2(e^x+1)^2\right]$

B. $y = \ln[c(e^x+1)]$

C. $y^2 = \ln[c(e^x+1)]$

D. none of these

Answer: A

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39. which one of the following is the differential equation to family of circles having centre at the origin ?

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

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

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

D. xdx + ydy =0

Answer: D

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40. Which does the solution of the differential equation $x\frac{dy}{dx} = y$ represent ?

A. family of straight of straight lines through the origin

B. family of circles with their centres at the origin

C. Family of parabolas with their vertices at the origin

D. Family of straight lines having slope 1 and not passing through the origin

Answer: A

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41. What does the differential equation $y\frac{dy}{dx} + x = k$ (where k is a constant) represents ?

A. A family of circles having centre on the y-axis

B. A family of circles having centre on the x-axis

C. A family of circles touching the x-axis

D. A family of ellipses.

Answer: B

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42. Parabolas having their vertices at the origin and foci on the x-axis.

A. y=-2xy'

B. x=2yy'

C. xy=y'

D. x=yy'

Answer: A

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43. What is the solution of the differential equation

$$\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0?$$

A. $\sin^{-1} y + \sin^{-1} x = C$

B. $\sin^{-1} y - \sin^{-1} x = C$

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

D. $2\sin^{-1} y - \sin^{-1} x = C$

Answer: A

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44. The differential equation of all parabolas whose axis are parallel to the y-axis is (a) $(b)(c)(d)\frac{(e)(f)d^{(g)3(h)}(i)y}{j}\Big((k)d(l)x^{(m)3(n)}(o)\Big)(p)(q)=0(r)$ (s) (b) $(t)(u)(v)\frac{(w)(x)d^{(y)2(z)}(aa)x}{bb}\Big((cc)d(dd)y^{(ee)2(ff)}(gg)\Big)(hh)(ii)=C(jj$ (kk) (c) *[Math Processing Error]* (ii) (d) *[Math Processing Error]* (ggg)

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

B. $\frac{d^2x}{dy^2}=C$

C. $\frac{d^3x}{dy^3}=1$

D. $\frac{d^3y}{dx^3}=C$

Answer: A

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45. If the solution of the differential equation

$$\frac{dy}{dx} = \frac{ax + 3}{2y + f}$$

represents a circle, then the value of 'a' is

A. 2

B. 1

C. -2

D. -1

Answer: C

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46. The degree of the differential equation

$$\left(\frac{d^3y}{dx^3}\right)^{2/3} + 4 - 3\frac{d^2y}{dx^2} + 5\frac{dy}{dx} = 0, \text{ is}$$

A. 1

B. 2

C. 3

D. 4

Answer: B

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47. what does the differential equation $y\frac{dy}{dx} + x = a$

(where a is a constant) represent ?

A. A set of circles having centre on the Y-axis

B. A set of circles having centre on the X -axis

C. A set ellipes

D. A pair of straight lines

Answer: B

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48. The degree of the differential equation

$$\left(\frac{d^3y}{dx^3}\right)^{2/3} + 4 - 3\frac{d^2y}{dx^2} + 5\frac{dy}{dx} = 0, \text{ is}$$

A. 3

B. 2

C. $2/3$

D. Not defined

Answer: B

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49. What is the equation of the curve passing through the point $\left(0, \frac{\pi}{3}\right)$ satisfying the differential equation ltbr? Sin x cos y dx + cos x sin y dy =0 ?

A. $\cos x \cos y = \frac{\sqrt{3}}{2}$

B. $\sin x \sin y = \frac{\sqrt{3}}{2}$

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

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

Answer: D

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50. What is the solution of the differential equation

$\frac{dy}{dx} + \frac{y}{x} = 0$?

A. xy=c

B. x =cy

C. y =cx

D. none of the above

Answer: A

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51. What is the degree of the differential equation

$y = x\frac{dy}{dx} + \left(\frac{dy}{dx}\right)^{-1}$?

A. 1

B. 2

C. -1

D. Degree does not exist

Answer: B

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52. which one of the following differential equation is not linear ?

A. $\frac{d^2y}{dx^2} + 4y = 0$

B. $x\frac{dy}{dx} + y = x^3$

C. $(x - y)^2\frac{dy}{dx} = 9$

D. $\cos^2 x \frac{dy}{dx} + y = \tan x$

Answer: A

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53. what is the degree of the differential equation $\frac{d^3y}{dx^3 + 2\left(\frac{d^2y}{dx^2}\right)^2 - \frac{dy}{dx} = y = 0}$?

A. 6

B. 3

C. 2

D. 1

Answer: D

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54. Conssider a differential equation of order m and degree n. which one of the following pairs is not feasible ?

A. (3,2)

B. (2,3/2)

C. (2,4)

D. (2,2)

Answer: B

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55. The differenital equation representing the family of curves $y = a\sin(\lambda x + \alpha)$ is :

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

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

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

D. none of the above

Answer: B

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56. The differential equation $y\frac{dy}{dx} + x = a$ (a is any constant) represents

A. A set of straight lines

B. A set of elipes

C. A set of circles

D. None of the above

Answer: A

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57. The solution of the differential equation $\left(\frac{dy}{dx}\right)^2 - x\frac{dy}{dx} + y = 0$ is

(a) $(b)(c)y = 2(d)$ (e) (b) $(f)(g)y = 2x(h)$ (i) (c) $(d)(e)y = 2x - 4(f)$

(g) (d) $(h)(i)y = 2(j)x^{(k)2(l)}(m) - 4(n)$ (o)

A. y =x-1

B. $4y = x^2$

C. y=x

D. y = -x -1

Answer: C

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58. What is the general solution of the differential equation $x^2dy = y^2dx = 0$?

where c is the constant of intergration.

A. x+y=c

B. xy=c

C. c(x+y)=c

D. none of the above

Answer: C

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

$e^x \tan y dx + (1 - e^x)\sec^2 y dy = 0$

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

B. $\cos y = c(1 - e^x)$

C. $\cot y = c(1 - e^x)$

D. none of the above

Answer: C

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60. What is the degree of the differential equation.

$$\left(\frac{d^4y}{dx^4}\right)^{3/5} - 5\frac{d^3y}{dx^3} + 6\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 5 = 0\,?$$

A. 5

B. 4

C. 3

D. 2

Answer: D

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61. The general solution of the differential equation $x\frac{dy}{dx} + x = 0$ is ?

A. xy=c

B. x=cy

C. x+y=c

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

Answer: C

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62. The general solution of the differential equation $\ln\left(\frac{dy}{dx}\right) + x = 0$ is ?

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

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

C. $y = e^x + c$

D. $y = -c^x = c$

Answer: A

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63. The differential equation of the curve y =sin is

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

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

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

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

Answer: B

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64. The degree and order respectively of the differential equation $\frac{dy}{dx} = \frac{1}{x + y + 1}$ are

A. 1,1

B. 1,2

C. 2,1

D. 2,2

Answer: B

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65. what is the order of the differential equation $\left(\frac{dy}{dx}\right)^2 + \frac{dy}{dx} - \sin^2 y = 0$?

A. 1

B. 2

C. 3

D. Undefined

Answer: A

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66. y=2cosx +3 sin x satisfies which of the following differenital equations ?

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

select the correct answer using the code given below.

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A

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67. The differenital equation of all circles whose centres are at the origin is

A. $\frac{dy}{dx} = \frac{y}{x}$

B. $\frac{dy}{dx} = \frac{x}{y}$

C. $\frac{dy}{dx} = -\frac{x}{y}$

D. none of the above

Answer: A

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68. The solution $\frac{dy}{dx} = |x|$ is :

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

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

C. $\frac{dy}{dx} = -\frac{x}{y}$

D. none of the above

Answer: C

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69. What is the solution of $\frac{dy}{dx} + 2y = 1$ satisfying x=0,y=0 ?

A. $y = \frac{1 - e^{-2x}}{2}$

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

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

D. $y = \frac{1 + e^{x}}{2}$

Answer: A

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70. What is the general solution of the differential equation x dy -ydx $= y^2$?

A. x=cy

B. $y^2 = cx$

C. x+xy -cy =0

D. None of these

Answer: A

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71. The general solution of the differential equation $(x^2+x+1)dy+(y^2+y+1)dx=0$ is $(x+y+1)=A(1+Bx+Cy$

where B,C,D are constants and A is parameter.

What is B equal to ?

A. -1

B. 1

C. 2

D. None of these

Answer: A

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72. The general solution of the differential equation $(x^2+x+1)dy+(y^2+y+1)dx=0$ is $(x+y+1)=A(1+Bx+Cy$

where B,C,D are constants and A is parameter.

What is C equal to ?

A. 1

B. -1

C. 2

D. None of these

Answer: A

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73. The general solution of the differential equation $(x^2+x+1)dy+(y^2+y+1)dx=0$ is $(x+y+1)=A(1+Bx+Cy$

where B,C,D are constants and A is parameter.

What is D equal to ?

A. -1

B. 1

C. -2

D. None of these

Answer: B

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74. The number of arbitrary constants in the particular solution of a differential equation of third order are: (A) 3 (B) 2 (C) 1 (D) 0

A. 0

B. 1

C. 2

D. 3

Answer: C

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75. Consider the following statements in respect of the differential equation

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

1. The degree of the differential equation is not defined.

2. The order of the differential equation is 2.

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

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76. what is the degree of the differential equation is

$$\left(\frac{d^3y}{\left(dx^2\right)^{3/2}} = \left(\frac{d^2y}{dx^2}\right)^2 ?\right.$$

A. 1

B. 2

C. 3

D. 4

Answer: C

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77. What is the solution of the equation In $\left(\frac{dy}{dx}\right) + x = 0$?

A. $y + e^x = c$

B. $y + e^x = c$

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

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

Answer: C

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78. Eliminating the arbitary constants B and C in the expression $y = \frac{2}{3C}(Cx-1)^{3/2} + B$, we get

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

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

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

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

Answer: C

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79. what is the solution of the differential equation $2\frac{dy}{dx} = y(x+1)/x$?

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80. What is the solution of the differential equation

$\sin\left(\frac{dy}{dx}\right) - a = 0$?

A. $y = x\sin^{-1}a + c$

B. $x = y\sin^{-1}a + c$

C. $y = x + x\sin^{-1}a + c$

D. $y = \sin^{-1}a + c$

Answer: C

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81. what is the solution of the differential equation

$\frac{dx}{dy} + \frac{x}{y} - y^2 = 0$?

where c is an arbitraty constant .

A. $xy = x^2 + c$

B. $xy = y^2 + c$

C. $4xy = y^2 + c$

D. $3xy = y^3 + c$

Answer: C

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82. Consider the following statement 1. The general solution of $\frac{dy}{dx} = f(x) + x$ is of the form y = f(x) +c , where c is an arbitary constant. 2. The degree of $\left(\frac{dy}{dx}\right)^2 = f(x)$ is 2 which of the above statements is/are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: D

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83. The degree of the differential equation : $\frac{dy}{dx} - x = \left(y - x\frac{dy}{dx}\right)^{-4}$ is

A. 2

B. 3

C. 4

D. 5

Answer: C

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84. The solution of $\frac{dy}{dx} = \sqrt{1 - x^2 - y^2 + x^2y^2}$ is

Where c is an arbitrary constant.

A. $\sin^{-1} y = \sin^{-1} x + c$

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

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

D. $2\sin^{-1} y = x\sqrt{1-x^2} + \cos^{-1} + c$

Answer: C

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85. The differential equation of the family of circles passing through the origin and having centres on the x-axis is

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

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

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

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

Answer: B

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86. The order and degree of the differential equation of parabolas having vertex at the origin and focus at (a,0) where $a > 0$, are respectively.

A. 1,1

B. 2,1

C. 1,2

D. 2,2

Answer: A

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87. Order of differential equation whose solution is $y = cx + c^2 - 3c^{3/2} + 2$, where c is a parameter is

A. 1,2

B. 2,2

C. 1,3

D. 1,4

Answer: D

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88. Let f(x) be a function such that $f\left(\frac{1}{x}\right) + x^3 f'(x) = 0$, what is $\int_{-1}^{1} f(x)dx$ equal to ?

A. 2f(1)

B. 0

C. 2f(-1)

D. 4 f(1)

Answer: C

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89. What are the degree and order respectively of the differential equation satisfying $e^{y\sqrt{1-x^2}+x\sqrt{1-y^2}} = ce^x$

A. 1,1

B. 1,2

C. 2,1

D. 2,2

Answer: A

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90. If $xdy = y(dx + ydy), y(1) = 1$and $Y(x) > 0$. Then, `y (-3) is epual to

A. 3 only

B. -1 only

C. Both -1 and 3

D. Neither -1 or 3

Answer: A

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91. What is the order of the differential equation $\frac{dx}{dy} + \int y dx = x^3$?

A. 1

B. 2

C. 3

D. cannot be determined

Answer: A

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92. Which one of the following differential equations represents the family of straight lines which are at unit distance from the origin a) $\left(y - x\frac{dy}{dx}\right)^2 = 1 - \left(\frac{dy}{dx}\right)^2$ b) $\left(y + x\frac{dy}{dx}\right)^2 = 1 + \left(\frac{dy}{dx}\right)^2$ c) $\left(y - x\frac{dy}{dx}\right)^2 = 1 + \left(\frac{dy}{dx}\right)^2$ d) $\left(y + x\frac{dy}{dx}\right)^2 = 1 - \left(\frac{dy}{dx}\right)^2$

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

B. $\left(y + x\frac{dy}{dx}\right)^2 = 1 + \left(\frac{dy}{dx}\right)^2$

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

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

Answer: C

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93. $\frac{d^2x}{dy^2}$ is equal to :

A. $-\left(\frac{d^2y}{dx^2}\right)^{-1}\left(\frac{dy}{dx}\right)^{-3}$

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

C. $-\left(\frac{d^2y}{dx^2}\right)\left(\frac{dy}{dx}\right)^{-3}$

D. $\left(\frac{d^2y}{dx^2}\right)^{-1}$

Answer: C

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94. If $xdy = y(dx + ydy); y(1) = 1$ and $y(x) > 0$, then what is $y(-3)$ equal to?

A. 3

B. 2

C. 1

D. 0

Answer: A

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95. The degree and the order of the differential $y = x\left(\frac{dy}{dx}\right)^2 + \left(\frac{dx}{dy}\right)^2$ are respectively

A. 1,2

B. 2,1

C. 1,4

D. 4,1

Answer: D

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96. What is the differential equation corresponding to $y^2 - 2ay + x^2 = a^2$ by eliminating a?

A. $(x^2 - 2y^2)p^2 - 4pxy - x^2 = 0$

B. $(x^2 - 2y^2)p^2 + pxy - x^2 = 0$

C. $\left(x^2+2y^2\right)p^2-pxy-x^2=0$

D. $\left(x^2+2y^2\right)p^2-pxy+x^2=0$

Answer: A

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97. Find the general solution of the differential equation $ydx-\left(x+2y^2\right)dy=0.$

A. $x=y^2+cy$

B. $x=2cy^2$

C. $x=2y^2+cy$

D. none of the above

Answer: C

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98. What is the solution of the differential equation In $\left(\frac{dy}{dx}\right) - a = 0$?

A. $y = xe^a + c$

B. $y = ye^a + c$

C. $y = Inx + c$

D. $x = Iny + c$

Answer: A

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99. The general solution fo $\frac{dy}{dx} = \frac{ax + h}{by + h}$ represents a circle only when

A. a=b=0

B. $a = -b \neq 0$

C. $a = b \neq 0, h = k$

D. $a = b \neq 0$

Answer: B

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100. The order and degree of the differential equation

$$\left[1+\left(\frac{dy}{dx}\right)^2\right]^3 = p^2\left[\frac{d^2y}{dx^2}\right]^2$$

A. 3 and 2

B. 2 and 2

C. 2 and 3

D. 1 and 3

Answer: B

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101. The differential equation of minimum order by eliminting the arbitral constants A and C in the equatic

$y = A[\sin(x + C) + \cos(x + C)]$ is

A. $y + (\sin + \cos x)y' = 1$

B. y" = (sin x +cos x) y'

C. $y = (y')^2 + \sin x \cos x$

D. y " +y =0

Answer: D

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102. The solution of the differential $\frac{dy}{dx} = \frac{y\phi'(x) - y^2}{\phi(x)}$ is

A. $y = \frac{x}{\phi(x) + c}$

B. $y = \frac{\phi(x)}{x} + c$

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

D. $y = \frac{\phi(x)}{x + c}$

Answer: D

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103. Solution of the differential equation $xdy - ydx = 0$ represents

A. xy=c

B. y =cx

C. x+y=c

D. x-y=c

Answer: B

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104. Which one of the following differential equations has a periodic solution ?

where $\mu > 0$

A. $\frac{d^2x}{dt^2} + \mu x = 0$

B. $\frac{d^2x}{dt^2} - \mu x = 0$

C. $x\frac{dx}{dt} + \mu t = 0$

D. $\frac{dt}{dx} + \mu x t = 0$

Answer: A

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105. The order and degrree of the differential equation $y^2 = 4a(x - a)$, where 'a' is an arbitrary constant,are respectively .

A. 1,2

B. 2,1

C. 2,2

D. 1,1

Answer:

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106. what is the solution of (1 +2x) dy-(1 -2y) dx=0 ?

A. x -y-2xy =c

B. y -x-2xy =c

C. y +x-2xy =c

D. x+y+2xy =c

Answer: A

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107. what are the order and degree, respectively , of the differential equation $\frac{d^3y}{\left(dx^3\right)^2} = y^4 + \left(\frac{dy}{dx}\right)^5$?

A. 4,5

B. 2,3

C. 3,2

D. 5,4

Answer: C

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108. The differential equation of the family of cruves y = p cos (ax) + q sin (ax) , where p,q are arbitrary constants, is

A. $\frac{d^2y}{dx^2} - a^2y = 0$

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

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

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

Answer: D

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109. The equation of the curve passing through the point (-1,-2) which satisfies $\frac{dy}{dx} = -x^2 - \frac{1}{x^3}$ is

A. $17x^2y - 6x^2 + 3x^5 - 2 = 0$

B. $6x^2y + 17x^2 + 2x^5 - 3 = 0$

C. $6xy - 2x^2 + 17x^5 = 3 = 0$

D. $17x^2y + 6xy - 3x^5 + 5 = 0$

Answer: B

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110. what is the order of the differential equation whpse solution is y = acos x + b sin x + $ce^{-x} + d$, where a,b,c and d are arbitarty constants ?

A. 1

B. 3

C. 2

D. 4

Answer: D

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111. what is the solution of the differential equation $\ln\left(\frac{dy}{dx}\right) = ax + by$?

A. $a \quad e^{ax} + \frac{1}{b}e^{by} = c$

B. $\frac{1}{a}e^{ax} + \frac{1}{b}e^{by} = c$

C. $a \quad e^{ax} + \frac{1}{b}e^{-by} = c$

D. $\frac{1}{a}e^{ax} + \frac{1}{b}e^{-by} = c$

Answer: D

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112. If $u = e^{ax} \sin bx$ and $v = e^{ax} \cos bx$, then what is

A. ae^{2ax}

B. $\left(a^2 + b^2\right)e^{ax}$

C. abe^{2ax}

D. $(a + b)e^{ax}$

Answer: A

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113. If $y = \sin(Inx)$, then which one of thefollowing is correct?

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

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

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

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

Answer: C

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114. what is the solution of the differential equation $\frac{dx}{dy} = \frac{x+y+1}{x+y-1}$?

A. y -x +4 In (x+y) =c

B. y+z +c In (x +y) =c

C. y -x+In (x +y) =c

D. y +x+2 In (x +y) =c

Answer: C

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115. The solution of the differential equation

$\frac{dy}{dx} = \cos(y-x) + 1$ is

A. $e^x[\sec(y-x)-\tan(y-x)]=c$

B. $e^x[\sec(y-x)+\tan(y-x)]=c$

C. $e^x[\sec(y-x)\tan(y-x)]=c$

D. $e^x=c\sec(y-x)\tan(y-x)$

Answer: A

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116. If y= a cos 2x + b sin 2x , then

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

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

C. $\frac{d^2y}{dx^2}-4y=0$

D. $\frac{d^2y}{dx^2}+4y=0$

Answer: C

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117. The differential equation of the system of circles touching the y-axis at the origin is

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

B. $x^2 + y^2 + 2xy\frac{dy}{dx} = 0$

C. $x^2 - y^2 + 2xy\frac{dy}{dx} = 0$

D. $x^2 - y^2 - 2xy\frac{dy}{dx} = 0$

Answer: C

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118. Consider the following in respect of the differential equation :

$$\frac{d^2y}{dx^2} + 2\left(\frac{dy}{dx}\right)^2 + 9y = x$$

1. The degree of yhe differential equation is 1.

2. The order of the differential equation is 2.

which of the above satatements is/are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

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119. what is the general solution of th differential equation

$\frac{dy}{dx} + \frac{x}{y} = 0$?

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

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

C. $x^2 + y^2 = cxy$

D. x +y =c

Answer: A

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