RAVI MATHS TUITION CENTER, CHENNAI-82. WHATSAPP - 8056206308

Differential Equations

12th Standard

Maths

50 x 1 = 50

1) The degree of the differential equation
$\left(\frac{d^2y}{dx^2}\right)^3+\left(\frac{dy}{dx}\right)^2+sin\left(\frac{dy}{dx}\right)+1=0$

(a) 3 (b) 2 (c) 1 (d) not defined

2) The order of the differential equation $2x^2\frac{d^2y}{dx^2}-3\frac{dy}{dx}+y=0$ is

(a) 2 (b) 1 (c) 0 (d) not defined

3) The number of arbitrary constants in the general solution of a differential equation of fourth order are:

(a) 0 (b) 2 (c) 3 (d) 4

4) 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

5) Which of the following differential equations has y = c_1 e^x + c_2 e^{-x} as the general solution?

(a) $\frac{d^2y}{dx^2}+y=0$ (b) $\frac{d^2y}{dx^2}-y=0$ (c) $\frac{d^2y}{dx^2}+1=0$ (d) $\frac{d^2y}{dx^2}-1=0$

6) Which of the following differential equations has y = x as one of its particular solution?

(a) $\frac{d^2y}{dx^2}-x^2\frac{dy}{dx}+xy=x$ (b) $\frac{d^2y}{dx^2}+x\frac{dy}{dx}+xy=x$ (c) $\frac{d^2y}{dx^2}-x^2\frac{dy}{dx}+xy=0$ (d) $\frac{d^2y}{dx^2}+x\frac{dy}{dx}+xy=0$

7) The general solution of the differential equation $\frac{dy}{dx}$ = e^{x+y} is

(a) e^x + e^{-y} = C (b) e^x + e^y = C (c) e^{-x} + e^y = C (d) e^{-x} + e^{-y} = C

8) A homogeneous differential equation of the from $\frac{dx}{dy}=h\left(\frac{x}{y}\right)$ can be solved by making the substitution.

(a) y = vx (b) v = yx (c) x = vy (d) x = v

9) Which of the following is a homogeneous differential equation?

(a) (4x + 6y + 5) dy – (3y + 2x + 4) dx = 0 (b) (xy) dx – (x^3 + y^3) dy = 0 (c) (x^3 + $2y^2$) dx + 2xy dy = 0

(d) y^2 dx + (x^2 – xy – y^2) dy = 0

10) If P and q areThe degree of differential equation
$\left(\frac{d^2y}{dx^2}\right)^2+3\frac{dy}{dx}+\frac{d^3y}{dx^3}=4$, then the value of 2p – 3q is

(a) 7 (b) -7 (c) 3 (d) -3

11) The degree of the differential equation
$\left(1+\frac{dy}{dx}\right)^3=\left(\frac{dy}{dx}\right)^2$ is

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

12) The degree of the differential equation $\frac{d^2y}{dx^2}+3\left(\frac{dy}{dx}\right)^2=x^2log\left(\frac{d^2y}{dx^2}\right)$

(a) 1 (b) 2 (c) 3 (d) not defined

13) The order of the differential equation of all the circles of given radius 4 is

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

14) The differential equation of the family of lines passing through origin is

(a) y = mx (b) $\frac{dy}{dx} = m$ (c) x dy – y dx = 0 (d) $\frac{dy}{dx} = 0$

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

(a) second order, third degree equation. (b) second order, first degree equation

(c) third order, third degree equation. (d) second order, second degree equation.

16) The differential equation for the equation y = A cos α x + B sin α x is:

(a) $\frac{d^2y}{dx^2} - \alpha^2 = 0$ (b) $\frac{d^2y}{dx^2} + \alpha^2 = 0$ (c) $\frac{d^2y}{dx^2} - \alpha^2 y = 0$ (d) $\frac{d^2y}{dx^2} + \alpha^2 y = 0$

17) Formation of the differential equation of the family of curves represented by y = $Ae^{2x} + Be^{-2x}$ is:

(a) $\frac{d^2y}{dx^2} - 4y = 0$ (b) $\frac{d^2y}{dx^2} - 4y = 0$ (c) $\frac{dy}{dx} = 2y$ (d) $\frac{d^2y}{dx^2} + 4y = 0$

18) The degree of the differential equation $\left(\frac{dy}{dx}\right)^2 + \frac{1}{(dy/dx)} = 1$

(a) 2 (b) 1 (c) 3 (d) 0

19) Differential equation representing the family of curves given by y = ax + x^2 is:

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

20) The order of the differential equation: $\left(\frac{dy}{dx}\right)^4 + 2\frac{d^3y}{dx^3} = 2$

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

21) Formation of the differential equation corresponding to the ellipse major axis 2a and minor axis 2b is:

(a) $xy\frac{d^2y}{dx^2} + x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} = 0$ (b) $xy\frac{d^2y}{dx^2} - x\left(\frac{dy}{dx}\right)^2 + y\frac{dy}{dx} = 0$ (c) $xy\frac{d^2y}{dx^2} + x\left(\frac{dy}{dx}\right)^2 + y\frac{dy}{dx} = 0$

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

22) The differential equation $\frac{d^2y}{dx^2} + \frac{2}{x}\frac{dy}{dx} = 0$ is a solution of the equation:

(a) y = (A/x) + B (b) xy = (A/x) + B (c) x^2y = Ax + B (d) xy = Ax – B

23) The differential equation $3\frac{d^2y}{dx^2} = \left[1 + \left(\frac{dy}{dx}\right)^2\right]^{3/2}$ is a

(a) Third order, third degree equation (b) Second order, second degree equation

(c) Second order, first degree equation (d) Second order, third degree equation

24) The order and degree of the differential equation: $(y'')^2 + (y'')^3 + (y')^4 + y^5 = 0$ is:

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

25) The order and degree of the differential equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^{1/4} + x^{1/5} = 0$, respectively, are

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

26) The degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^2 + \left(\frac{dy}{dx}\right)^2 = x\sin\left(\frac{dy}{dx}\right)$

(a) 1 (b) 2 (c) 3 (d) not defined

27) The differential equation for $y = A\cos\alpha x + B\sin\alpha x$, where A and Bare arbitrary constants is

(a) $\frac{d^2y}{dx^2} - \alpha^2 y = 0$ (b) $\frac{d^2y}{dx^2} + \alpha^2 y = 0$ (c) $\frac{d^2y}{dx^2} + \alpha y = 0$ (d) $\frac{d^2y}{dx^2} - \alpha y = 0$

28) The family $y = Ax + A^3$ of curves is represented by differential equation of degree

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

29) The differential equation of all circles having their centres at origin

(a) $y = x + \frac{dy}{dx}$ (b) $x + y\frac{dy}{dx} = 0$ (c) $y + x\frac{dy}{dx} = 0$ (d) $y - x\frac{dy}{dx} = 0$

30) The general solution of $\frac{dy}{dx} = 2xe^{x^2-y}$ is

(a) $e^{x^2-y} = C$ (b) $e^{-y} + e^{x^2} = C$ (c) $e^y = e^{x^2} + C$ (d) $e^{x^2+y} = C$

31) The number of solutions of $\frac{dy}{dx} = \frac{y+1}{x-1}$, when y(1) = 2 is

(a) none (b) one (c) two (d) infinite

32) Which of the following is not a homogeneous function of x and y

(a) $x^2 + 2xy$ (b) 2x-y (c) $\cos^2\left(\frac{y}{x}\right) + \frac{y}{x}$ (d) sinx-cos y

33) The curve for which the slope of the tangent at any point is equal to the ratio of the abscissa to the ordinate of the point is

(a) an ellipse (b) parabola (c) circle (d) rectangular hyperbola

34) The general solution of differential equation $\frac{dy}{dx} = e^{\frac{x^2}{2}} + xy$ is

(a) $y = Ce^{-x^2/2}$ (b) $y = Ce^{x^2/2}$ (c) $y = (x + C)e^{x^2/2}$ (d) $y = (C - x)e^{x^2/2}$

35) The solution of differential equation $\frac{dy}{dx} + \frac{y}{x} = \sin x$ is

(a) x (y + cos x) =sin x + C (b) $x(y - \cos x) = \sin x + C$ (c) $xy \cos x = \sin x + C$

(d) $x(y + \cos x) = \cos x + C$

36) If m and n are the order and degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^5 + 4\frac{\left(\frac{d^2y}{dx^2}\right)^3}{\frac{d^3y}{dx^3}} + \frac{d^3y}{dx^3} = x^2 - 1$ then

(a) m = 3, n = 3 (b) m = 3, n = 2 (c) m = 3, n = 5 (d) m = 3, n = 1

37) The order of the differential equation satisfying $\sqrt{1 - x^2} + \sqrt{1 - y^2} = a(x - y)$ is

(a) 1 (b) 2 (c) 3 (d) None of these

38) Let F be the family of ellipses whose centre is the origin and major axis is the Y-axis.Then the differential equation of family F is

(a) $\frac{d^2y}{dx^2} + \frac{dy}{dx}\left(x\frac{dy}{dx} - y\right) = 0$ (b) $xy\frac{d^2y}{dx^2} - \frac{dy}{dx}\left(x\frac{dy}{dx} - y\right) = 0$ (c) $xy\frac{d^2y}{dx^2} + \frac{dy}{dx}\left(x\frac{dy}{dx} - y\right) = 0$

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

39) The solution of differential equation xdy - ydx = 0 represents

(a) a rectangular hyperbola (b) parabola whose vertex is at origin

(c) straight line passing through origin (d) a circle whose centre is at origin

40) The solution of $\frac{dy}{dx} - y = 1, y(0) = 1$ is given by

(a) xy = $-e^x$ (b) xy = $-e^{-x}$ (c) xy = -1 (d) $y = 2e^x - 1$

41) The differential equation $y\frac{dy}{dx} + x = C$ represents

(a) family of hyperbolas (b) family of parabolas (c) family of ellipses (d) family of circles

42) Differential equation corresponding to the function y = e^x (A cos x + B sin x), A, B being arbitrary constants is of order

(a) 1 (b) 2 (c) 3 (d) none of these

43) Differential equation representing the family of curves $(x + a)^2 + 2y^2 = a^2$ is of order

(a) 1 (b) 2 (c) 3 (d) none of these

44) $y=e^{m\cos^{-1}x}$ is a solution of differential equation

(a) $\sqrt{1-x^2}y'=my$ (b) $\left(1-x^2\right)y''+xy'-m^2y=0$ (c) $\left(1-x^2\right)y''-xy'-m^2y=0$

(d) $\left(1-x^2\right)y''-xy'+m^2y=0$

45) Degree of differential equation $t^2\frac{d^2s}{dt^2}-st\left(\frac{ds}{dt}\right)^2=5$ is

(a) 1 (b) 2 (c) 3 (d) none of these

46) Degree of differential equation $\left(\frac{d^3y}{dx^3}\right)^{\frac{2}{3}}=x$ is

(a) 1 (b) 2 (c) 3 (d) does not exist

47) Differential equation $e^x\frac{dy}{dx}=3y^3$ can be solved using the method of

(a) separating the variables (b) homogeneous equations (c) linear differential equation of first order

(d) none of these

48) General solution of differential equation $\frac{dy}{dx}=x^5+x^3-\frac{2}{x}$ is

(a) $y=\frac{x^6}{6}+\frac{x^4}{4}-2\log|x|$ (b) $y=\frac{x^6}{6}+\frac{x^4}{4}-2\log|x|+1$ (c) $y=5x^4+3x^2+\frac{2}{x^2}+C$

(d) $y=\frac{x^6}{6}+\frac{x^4}{4}-2\log|x|+C$

49) Differential equation $x\frac{dy}{dx}=y(\log y-\log x+1)$ can be solved using the method of

(a) separating the variables (b) homogeneous equations (c) linear differential equation of first order

(d) none of these

50) The order of differential equation $y=\frac{dy}{dx}+\sqrt{1+\left(\frac{dy}{dx}\right)^3}$ is

(a) 1 (b) 2 (c) 3 (d) none of these

****