TOPIC: "DIFFERENTIAL EQUATIONS"

1.Determine the order and the degree of the differential equation . $\frac{d^2y}{dx^2} = \sqrt[3]{1-\left(\frac{dy}{dx}\right)^4}$

2. Find the order and degree of the differential equation $\frac{d^2y}{dx^2} = \sqrt[3]{1+\frac{dy}{dx}}$

3. State the order and degree of the differential equation $dy + \sqrt{1+\frac{d^3y}{dx^3}}\ dx = 0$

4. Order and degree of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^3\right]^{\frac{7}{3}} = 7\frac{d^2y}{dx^2}$ are respectively ....

(a) 2.3 (b) 3.2 (c). 7.2 (d). 3.7

5. Verify that $y = Ae^2 + Be^{-2a}$ is a solution of the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 0$

6. From the differential equation by eliminating the arbitrary constants A and B from the relation

$y = A\cos(\log x) + B\sin(\log x)$.

7. Find the differential equation of family of parabolas with vertex at (h 0) and the principal axis along the X-axis .

8. Verify $y\sec x = \tan x + c$ *is* a solution of $\frac{dy}{dx} + y\tan x = \sec x$.

9. From the differential equation by eliminating the arbitrary constant from the equation $y = c^2 + \frac{c}{x}$.

10. From the differential equation by eliminating the arbitrary constant 'a" from the relation $(x-a)^2 + y^2 = 1$.

11. From the differential equation by eliminating the arbitrary constants a and b from the relation

$y = ae^{2x} + be^{-2x}$.

12.From the differential equation by eliminating the arbitrary constants from the equation $y = a\cos(\log x) + b\sin(\log x)$.

13. From the differential equation by eliminating the arbitrary constants A and B from the relation $y = Ae^{-2} + Be^{-2x}$.

14. Solve the differential equation $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$

15. Solve the differential equation $\frac{dy}{dx} = (9x + y + 2)^2$,

16. Find the particular solution of the differential equation , $y(1+\log x)\frac{dx}{dy} - x\log x = 0,$ When x=e and $y = e^2$

17. Solve the differential equation $y - x\frac{dy}{dx} = 0$

18. Solve the differential equation $\cos^2 x\frac{dy}{dx} + y = \tan x$.

19. Solve the following differential equation $x\,dy \;\; y\,(1-y)\,dx$ also find the particular solution if y=2 when x = -4

20. Solve : $\frac{dy}{dx} = \cos(x + y)$.

21. Solve the differential equation $\frac{dy}{dx} = e^{x+y} + x^2 e^y$.

22. Show that $y = \cos\,(x+5)$ is a solution of the differential equation $\frac{d^2y}{dx^2} + y = 0$.

23. Solve the differential equation $y\frac{dy}{dx} = \frac{x}{e^2}$

24. Solve the differential equation $x\;dy + 2y\;dx = 0 \quad when \;\; x = 2\,\&\,y = 1$.

25. Solve the differential equation $\cos^2 y\,dx - \mathrm{cosec}\;x\;dy = 0$

26.Find the particular solution of the differential equation $(e^y+1)\cos\,x\;dx + e^y\sin x\;dy = 0$,When $x = \frac{\pi}{4}$, $y = 0$.

27. Solve : $\frac{dy}{dx}=\frac{x+y}{x-y}$

28.Solve : $\frac{dy}{dx}=\frac{1+y^2}{1+x^2}$

29. Solve : $(1+e^{\frac{x}{y}})dx+e^{\frac{x}{y}}\left(1-\frac{x}{y}\right)dy=0.$

30. Solve : $\sin x\frac{dy}{dx}-y\ \log\ y$ also find the particular solution when $x=\frac{\pi}{2},\ y=1$.

31. Solve the differential equation $(x+y)^2\frac{dy}{dx}=a^2.$

32.Solve : $\left(\mathrm{y}+\mathrm{x}\frac{\mathrm{dy}}{\mathrm{dx}}\right)\sin\ (xy)=\cos\ x.$

33. Solve the differential equation $x^2\frac{dy}{dx}=x^2+xy+y^2$

34. Solve the differential equation $(1+y^2)\tan^{-1}x\,dx+2y(1+x^2)\,dy=0.$

35. Solve the differential equation $y-x\frac{dy}{dx}=0.$

36. Solve the differential equation $(x+y)\frac{dy}{dx}=y$

37. Solve the differential equation $e^x\tan^2y\ dx+(e^x-1)\ \sec^2y\ dy=0$

38.. Solve the differential equation. $\frac{dy}{dx}=\frac{y+\sqrt{x^2-y^2}}{x}$.

39. Verify that $y=ae^{-bx}$ is a solution of $\frac{d^2y}{dx^2}=\frac{1}{y}\left(\frac{dy}{dx}\right)^2$

40. Solve the differential equation $\frac{dy}{dx^2}=\frac{y}{x}+\tan\left(\frac{y}{x}\right).$

41. Solve the differential equation $\frac{dy}{dx}=(4x+3y-1)^2$.

42. Find the particular solution of the differential equation $\sec^2 y \tan x\, dy + \sec^2 x \tan y\, dx = 0$ when $x = y = \frac{\pi}{4}$.

43. The slop of the tangent to the curve at any point is equal to $y + 2x$. find the equation of the curve passing through the Origin.

44. The growth of a population is proportional to the number present . if the population of a colony doubles in 50 years in how many years will the population become triple ?
