44. DIFFERENTIAL EQUATIONS

1 The solution of $\frac{d^2y}{dx^2}=0$ represents

[AP EAMCET 18-09-20_Shift-1]

1. Straight lines 2. A circle
3. A parabola 4. A point

2. The differential equation of the family of all straight lines passing through the origin is

[AP EAMCET 18-09-20_Shift-1]

1. $x=y\frac{dy}{dx}$ 2. $\frac{dy}{dx}=0$
3. $y=x\frac{dy}{dx}$ 4. $\frac{d^2y}{dx^2}=\frac{y}{x}$

3. The solution of the differential equation $\cos(x+y)dy=dx$ given that $y(0)=0$ is

[AP EAMCET 18-09-20_Shift-1]

1. $y=\tan\left(\frac{x+y}{2}\right)$ 2. $y=\sin\left(\frac{x+y}{2}\right)$
3. $y=\tan\left(\frac{y}{2}\right)$ 4. $y=\tan\left(\frac{x}{2}\right)$

4. The general solution of the differential equation $\frac{dy}{dx}+yg'(x)=g(x)g'(x)$ is

[AP EAMCET 18-09-20_Shift-2]

1. $g(x)+\log(1+y+g(x))=c$
2. $g(x)+\log(1+y-g(x))=c$
3. $g(x)-\log(1+y+g(x))=c$
4. $g(x)-\log(1+y-g(x))=c$

5 The particular solution of the differential equation $\frac{dy}{dx}=\sec y, y(0)=0$ is

[AP EAMCET 18-09-20_Shift-2]

1. $x=\cos y$ 2. $x=\sin y+q$
3. $y=\sin x$ 4. $x=\sin y$

6. The solution of $x\frac{dy}{dx}=y(\log y-\log x+1)$ *is*

[AP EAMCET 18-09-20_Shift-2]

1. $y=xe^{cx}$ 2. $y^2=cx^2$
3. $y^2=cx\log(x)$ 4. $\log(y)=cx$

7. Find the sum of the order and degree of the differential equation $y=x(\frac{dy}{dx})^3+\frac{d^2y}{dx^2}$

[AP EAMCET 21-09-20_Shift-1]

1. 2 2. 3
3. 4 4. 5

8. Find the degree of the differential equation $y_3^{2/3}+2+3y_2+y_1=0$

[AP EAMCET 21-09-20_Shift-1]

1. 4 2. 2
3. 3 4. 1

9. On solving $\frac{dy}{dx}=\frac{x-y+3}{2x-2y+5}$, the solution obtained is $x=2(x-y)+\log(t)+c$, *find t*

[AP EAMCET 21-09-20_Shift-2]

1. $x-y+2$ 2. $x+y-2$
3. $x+y+2$ 4. $x-y-2$

10. The general solution of the differential equation $\log\left(\frac{dy}{dx}\right)=ax+by$ is

[AP EAMCET 21-09-20_Shift-2]

1. $ae^{-by}+be^{ax}=c$ 2. $ae^{ax}+be^{-by}=c$
3. $ae^{-by}-be^{ax}=c$ 4. $ae^{by}+be^{-ax}=c$

11. Solve of the differential equation $\frac{dy}{dx}=\frac{1+y^2}{(\tan^{-1}y)-x}$

[AP EAMCET 21-09-20_Shift-2]

1. $xe^{\tan^{-1}y}=e^{-\tan^{-1}y}((\tan^{-1}y)-1)+c$
2. $xe^{\tan^{-1}y}=e^{\tan^{-1}y}((\tan^{-1}y)-1)+c$
3. $xe^{\tan^{-1}y}=e^{\tan^{-1}y}((\tan^{-1}y)+1)+c$
4. $xe^{\tan^{-1}y}=e^{-\tan^{-1}y}((\tan^{-1}y)+1)+c$

12 Solve the D.E. given below

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

[AP EAMCET 22-09-20_Shift-1]

1. $x^2 = c\left(y + \sqrt{y^2 + x^2}\right)$ 2. $y^2 = c\left(x + \sqrt{y^2 - x^2}\right)$

3. $y^2 = c\left(x + \text{Tan}^{-1}\sqrt{1+y^2}\right)$ 4. $y^2 = c\left(x - \sqrt{y^2 + x^2}\right)$

13. If it is mentioned that for a curve passing through (3, 4), the slope of the curve at any point is the reciprocal of twice the ordinate of that point, then that curve is a _______

[AP EAMCET 22-09-20_Shift-1]

1. Ellipse 2. Parabola
3. Hyperbola 4. Circle

14. Eliminating a and b from the relation $y = a\log x + b$, we get ______.

[AP EAMCET 23-09-20_Shift-1]

1. $xy_2 + y_1 = 0$ 2. $xy - y^2 = 0$
3. $xy_1 + y^2 = 0$ 4. $y^2 y_2 + x = 0$

15. The general solution of the differential equation $\tan(y)\, dx + \sec^2(y).\tan(x)\, dy = 0$ is

[AP EAMCET 23-09-20_Shift-1]

1. $\sin(y).\tan(x) = c$ 2. $\sin(x).\tan(y) = c$
3. $\sin(x) + \tan(y) = c$ 4. $\sin(x) - \sin(y) = c$

16. Find the solution of the differential equation given below $\frac{dy}{dx} + y.\operatorname{cosec}^2(x) = \operatorname{cosec}^2(x).\cot(x)$

[AP EAMCET 23-09-20_Shift-1]

1. $ye^{\cot x} = (1+\cot x)\, e^{-\cot x} + c$
2. $ye^{-\cot x} = (1-\cot x)\, e^{-\cot x} + c$
3. $ye^{\cot x} = (1+\cot x)\, e^{\cot x} + c$
4. $ye^{-\cot x} = (1+\cot x)\, e^{-\cot x} + c$

17. Solve the differential equation $\frac{dy}{dx} = \frac{y(1+x)}{-x(1+y)}$

1. y-x+log(xy)=c 2. x-y+log(xy)=c
3. x+y-log(xy)=c 4. x+y+log(xy)=c

18. The differential equation for which $\sqrt{1+y^2} = Cxe^{\tan^{-1}x}$ is the general solution, of

[TS EAMCET 09-09-20_Shift-1]

1. $xy\left(1+y^2\right)dy - e^{\tan^{-1}x}\left(1+x+x^2\right)dx = 0$
2. $xy\left(1+y^2\right)dy - \left(1+x^2\right)\left(1+y+y^2\right)dx = 0$
3. $\left(1+y^2\right)\tan^{-1}x\frac{dy}{dx} = \frac{1+x^2}{xy}$
4. $xy\left(1+x^2\right)dy - \left(1+y^2\right)\left(1+x+x^2\right)dx = 0$

19 The general solution of the differential equation $\frac{dy}{dx} = \frac{x+y-3}{x+y-7}$ is

[TS EAMCET 09-09-20_Shift-1]

1. $(x+y-5)^2 = Ce^{y+x}$
2. $(x+y-5)^2 = Ce^{y-x}$
3. $2\log(x+y-5) = 3x+2y+C$
4. $\log(x+y-3) = 3(x+y-2)^2 + C$

20 If $y = f(x)$ is the solution of the differential equation $x\frac{dy}{dx} = x^2 + 3y, x > 0,\ y(2) = 4$, then $f(4) =$ **[TS EAMCET 09-09-20_Shift-1]**

1. 48 2. 260
3. 80 4. 36

21. The differential equation of which $xy = ae^x + be^{-x} + x^2$ is a solution, is

[TS EAMCET 09-09-20_Shift-2]

1. $xy'' - 2y' + xy + x^2 - 2 = 0$
2. $xy'' + 2y' - x + x^2 + 2 = 0$
3. $xy'' + 2y' - y + x^2 - 2 = 0$
4. $xy'' + 2y' - xy + x^2 - 2 = 0$

22. The general solution of the differential equation $\frac{dy}{dx} = \frac{x+7y+3}{3x+5y+9}$ is

[TS EAMCET 09-09-20_Shift-2]

1. $(x-3)^4(y-x+3)^4 = c(5y+x-3)^5$
2. $(x+3)^4(y-x-3)^4 = c(5y+x+3)^5$
3. $(y-x+3)^4 = c|5y+x-3|$
4. $(y-x+3)^4 = c|5y+x+3|$

23. If the solution of the differential equation $xy' = y + x^2 \sin x$ subject to the condition $y(\pi) = 0$ is $y = f(x)$ and $f(x)$ has an extreme value at $x = \alpha$ then

[TS EAMCET 09-09-20_Shift-2]

1. $\alpha \cos \alpha + 2$
2. $\alpha = (2n-1)\frac{\pi}{2}, n \in Z$
3. $\cos\frac{\alpha}{2} = 1$
4. $\alpha = \cot\frac{\alpha}{2}$

24 If the family of the curves $y = ae^{4x} + be^{-x}$, where a, b are arbitrary constants represents the general solution of the differential equation $f\left(x, y\frac{dy}{dx}, \frac{d^2y}{dx^2}\right) = 0$, then $\frac{df}{dx} =$

[TS EAMCET 10-09-20_Shift-1]

1. $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 4y$
2. $\frac{d^3y}{dx^3} - 3\frac{d^2y}{dx^2} - 4\frac{dy}{dx}$
3. $\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2$
4. $\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} + 3$

25. If the length of the sub tangent at any point $p(x,y)$ on a curve $f(x,y) = 0$ is $x + 7y^2$ then $f(x,y) =$ **[TS EAMCET 10-09-20_Shift-1]**

1. $xy + cy - 7x$
2. $\frac{x}{y} + 7x - c$
3. $7y^2 + cy - x$
4. $7xy + cy - x$

26. If the general solution of the differential equation $(y - x + 1)dy - (y + x + 2)dx = 0$ is $f(x, y, c) = 0$, then the value of c such that $f(1,1,c) = 0$ is **[TS EAMCET 10-09-20_Shift-1]**

1. 4
2. -4
3. 2
4. 1

27. If $y = e^{ax}(\cos bx + \sin bx)$ it satisfies the equation $\frac{d^2y}{dx^2} - K\frac{dy}{dx} + Ly = 0$, then $L + bK =$

[TS EAMCET 10-09-20_Shift-2]

1. 0
2. $(a+b)^2$
3. $a^2 - b^2$
4. $a^2 + b^2$

28. The differential equation for which $y = ax^2 + bx + c$ is the general solution is

[TS EAMCET 10-09-20_Shift-2]

1. $\frac{d^4y}{dx^4} = 0$
2. $\frac{d^3y}{dx^3} = 0$
3. $\frac{d^5y}{dx^5} = 0$
4. $\frac{d^3y}{dx^3} + \frac{d^4y}{dx^4} = 0$

29. The general solution of the differential equation $(3y - 7x + 7)dx + (7y - 3x + 3)dy = 0$ is

[TS EAMCET 10-09-20_Shift-2]

1. $(x - y + 1)^2 (x + y - 1)^5 = C$
2. $(x + y + 1)^5 (x - y - 1)^2 = C$
3. $(x - y - 1)^2 (x + y - 1)^5 = C$
4. $(x + y - 1)^7 = C$

30 The general solution of the differential equation $x\cos\frac{y}{x}(ydx + xdy) = y\sin\frac{y}{x}(xdy - ydx)$ is

[TS EAMCET 10-09-20_Shift-2]

1. $\log(xy) = \log\cos\frac{x}{y} + C$
2. $\cos\left(\frac{y}{x}\right) = \frac{C}{xy}$
3. $\log(xy) = \log\sec\frac{x}{y} + C$
4. $x + y + C = 0$

31. The differential equation for which $lx^2+my^2=x+y$ is the general solution is

[TS EAMCET 11-09-20_Shift-1]

1. $\begin{vmatrix} x^2 & y^2 & x+y \\ 2x & 2y'y & y'+1 \\ 2 & 2yy'' & y'' \end{vmatrix}=0$

2. $\begin{vmatrix} x^2 & y^2 & x+y \\ 2x & 2y'y & y'+1 \\ 2 & 2\left(y'^2+yy''\right) & y'' \end{vmatrix}=0$

3. $\begin{vmatrix} x^2 & y^2 & x+y \\ 2x & 2y'y & y+1 \\ 2 & 2\left(y'^2+y'y''\right) & y'' \end{vmatrix}=0$

4. $\begin{vmatrix} x^2 & y^2 & x+y \\ 2x & 2y & y'+1 \\ 2 & 2yy'y'' & y'' \end{vmatrix}=0$

32. The general solution of the differential equation $(x-2y+1)dy-(3x-6y+2)dx=0$ is

[TS EAMCET 11-09-20_Shift-1]

1. $\left|x+2y+\frac{3}{5}\right|^{\frac{2}{25}}.e^{115(x+2y)}=C$

2. $\left|x-2y+\frac{3}{5}\right|^{\frac{2}{25}}.e^{\frac{1}{5}(x-2y)}=C$

3. $\left|x-2y+\frac{3}{5}\right|^{\frac{2}{25}}.e^{\frac{1}{5}(6x-2y)}=C$

4. $\left|x-2y+\frac{1}{5}\right|^{\frac{2}{25}}.e^{\frac{1}{5}(x-2y)}=C$

33. The general solution of the differential equation $\left(1+y^2\right)dx=\left(\tan^{-1}y-x\right)dy$ is

[TS EAMCET 11-09-20_Shift-1]

1. $x=\left(\tan^{-1}y\right)-1+Ce^{-\tan^{-1}y}$

2. $x=\left(\tan^{-1}y\right)-1+Ce^{\tan^{-1}y}$

3. $x=\left(\tan^{-1}y\right)-1+C$

4. $x=\left(\tan^{-1}y\right)+Ce^{-\tan^{-1}y}$

34. If α and β are respectively the order and degree of the differential equation for which $ax^2+by^2=1$ is the general solution, then the eccentricity of the ellipse $\alpha x^2+\beta y^2=1$ is

[TS EAMCET 11-09-20_Shift-2]

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

3. $\frac{1}{2\sqrt{2}}$ 4. $\frac{1}{\sqrt{2}+1}$

35. The solution of the differential equation $x\,dy-y\,dx=\sqrt{x^2+y^2}\,dx$, given that $y=1$ when $x=\sqrt{3}$, is **[TS EAMCET 11-09-20_Shift-2]**

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

3. $\left(x^2+y\right)^2=x^2-y^2$ 4. $x^2-y=\left(x+y^2\right)^2$

36. The solution of the differential equation $\frac{d^2y}{dx^2}+y=0$ is _____

[AP EAMCET 19-08-2021_Shift-1]

1. $y=3\sin x+4\cos x$ 2. $y=x^2$

3. $y=x+2$ 4. $y=\log x$

37. If $x^2+y^2=1$, then _____

[AP EAMCET 19-08-2021_Shift-2]

1. $y(y'')-4(y')^2+1=0$

2. $y(y'')+(y')^2+1=0$

3. $y(y'')-(y')^2-1=0$

4. $y(y'')+2(y')^2+1=0$

38. The solution of the differential equation $2x\left(\frac{dy}{dx}\right)-y=4$ represents a family of _____

[AP EAMCET 20-08-2021_Shift-1]

1. Ellipse 2. Parabolas

3. Straight lines 4. Circles

39. The equation of the curve passing through the point $\left(0,\frac{\pi}{4}\right)$ and satisfying the differential equation $(e^x\tan y)dx+((1+e^x)\sec^2 y)dy=0$ is given by___

[AP EAMCET 20-08-2021_Shift-2]

1. $(1+e^x)\tan y=2$
2. $(1+e^x)=2\tan y$
3. $(1+e^x)=2\sec y$
4. $(1+e^x)\tan y=k$

40 Find the particular solution of the following differential equation, given that $y=1$ when $x=0$. $(1+x^2)\frac{dy}{dx}=e^{m(\tan^{-1}(x))}-y$

[AP EAMCET 23-08-2021_Shift-2]

1. $xe^{\tan^{-1}(x)}=\tan^{-1}(x)+1$
2. $xe^{\tan^{-1}(x)}=\tan^{-1}(x)-1$
3. $ye^{\tan^{-1}(x)}=\tan^{-1}(x)+1$
4. $ye^{\tan^{-1}(x)}=\tan^{-1}(x)-1$

41 The order and degree of the differential equation $\sqrt{\frac{dy}{dx}}-4\frac{dy}{dx}-7x=0$ are respectively____

[AP EAMCET 23-08-2021_Shift-1]

1. 1&1/2
2. 2&1
3. 1&1
4. 1&2

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

[AP EAMCET 24-08-2021_Shift-1]

1. $e^x+e^y=c$
2. $e^x-e^y=c$
3. $e^x+e^{-y}=c$
4. $e^x-e^{-y}=c$

43. The equation of a curve passing through the point (0, 1), given that the slope of the tangent to the curve at any point (x,y) is equal to the sum of the $x-$coordinate, and the product of x and y coordinates at that point, is _______

[AP EAMCET 24-08-2021_Shift-2]

1. $y=1-2e^{(x^2/2)}$
2. $y=-1+2e^{(x^2/2)}$
3. $y=-1-2e^{(x^2/2)}$
4. $y=1+2e^{(x^2/2)}$

44. Solve the following differential equation.

$$(x^2+1)\frac{dy}{dx}+4xy=\frac{1}{x^2+1}$$

[AP EAMCET 25-08-2021_Shift-1]

1. $y(x^2-1)^2=x+c$
2. $y(x^2+1)^2=x+c$
3. $y(x^2+1)^2=x^2+c$
4. $y(x^2-1)^2=x^2+c$

45 Let $y=Y(x)$ be the solution of the differential equation $\frac{dy}{dx}+y\tan x=2x+x^2\tan x, x\in\left(\frac{-\pi}{2},\frac{\pi}{2}\right)$, such that $Y(0)=1$, then

[AP EAMCET 25-08-2021_Shift-2]

1. $y\left(\frac{\pi}{4}\right)+Y\left(\frac{-\pi}{4}\right)=\frac{\pi^2}{2}+2$
2. $y'\left(\frac{\pi}{4}\right)+Y'\left(\frac{-\pi}{4}\right)=-\sqrt{2}$
3. $y\left(\frac{\pi}{4}\right)-Y\left(\frac{-\pi}{4}\right)=\sqrt{2}$
4. $y'\left(\frac{\pi}{4}\right)-Y'\left(\frac{-\pi}{4}\right)=\pi-\sqrt{2}$

46. The solution of $\frac{dy}{dx}=e^{-2x}, y(\log 2)=\frac{1}{16}$, is $y=$ **[TS EAMCET 04-08-2021_Shift-2]**

1. $\frac{\log x}{16}$
2. $\frac{4-12e^{-2x}}{16}$
3. $\frac{4e^{-2x}}{16}$
4. $\frac{3-8e^{-2x}}{16}$

47. The general solution of $\frac{dy}{dx}=x+\sin x\cos y+x\cos y+\sin x$ is **[TS EAMCET 04-08-2021_Shift-1]**

1. $\tan\frac{x}{2}=\frac{y^2}{2}-\cos y+C$
2. $\tan\frac{y}{2}=\frac{x^2}{2}-\cos x+C$
3. $\sec^2\frac{y}{2}=\frac{x^2}{2}-\cos x+C$
4. $\tan\frac{y}{2}=\frac{x^2}{2}+\cos x+Cx$

48. The solution of $\frac{dy}{dx}=\sqrt{1-y^2}, y(0)=1$, is

[TS EAMCET 05-08-2021_Shift-1]

1. $\sin^{-1} y = x - \sin^{-1}(1)$
2. $\sin^{-1} y = x + \sin^{-1}(1)$
3. $\cos^{-1} y = x + \cos^{-1}(1)$
4. $\sin^{-1} y + x = \sin^{-1}(1)$

49. If the solution of $\frac{dy}{dx}=(3x+y+4)^2$ is $\frac{1}{\sqrt{3}}\left(\tan^{-1} f(x,y)\right)-x=K$ then $f(12)=$

[TS EAMCET 05-08-2021_Shift-2]

1. $\frac{2}{\sqrt{3}}$
2. 3
3. $3\sqrt{3}$
4. $2\sqrt{3}$

50. The differential equation for which $y^2=4a(x+a)$ (where a is a parameter) is general solution is

[TS EAMCET 06-08-2021_Shift-2]

1. $y-yy'^2=2xy'$
2. $y+yy'^2=2xy'$
3. $y(y+y')=2xy'$
4. $y(y-y')=2xy'$

51. The general solution of

$$\frac{dy}{dx}=\frac{x^3(y^4+1)}{\left[2y^{-2/3}+3\left(\frac{x}{\sqrt[3]{y}}\right)^2\right]^{3/2}}$$

[TS EAMCET 06-08-2021_Shift-1]

1. $\log\left(\frac{y^4}{1+y^4}\right)=\frac{4}{9}\left(\frac{4+3x^2}{\sqrt{2+3x^2}}\right)+C$
2. $\frac{1}{4}\log\left(\frac{y^4}{1+y^4}\right)=\frac{1}{9}\left(\frac{4+3x^2}{\sqrt{2+3x^2}}\right)+C$
3. $\frac{1}{4}\log\left(\frac{y^4}{1+y^4}\right)=\frac{4}{9}\frac{1}{\sqrt{2+3x^2}}+C$
4. $\log\left(\frac{y^4}{1+y^4}\right)=\frac{1}{9}\frac{1}{\sqrt{2+3x^2}}+C$

52. If the solution of

$\frac{dy}{dx}-y\log_e 0.5=0, y(0)=1, and\ y(x)\to k, as\ x\to\infty$

Then k= **[AP EAMCET 04-07-2022_Shift-1]**

1. ∞
2. -1
3. 1
4. 0

53. At any point (x,y) on a curve if the length of the subnormal is $(x-1)$ and the curve passes through $(1,2)$ then the curve is a conic. A vertex of the curve is

[AP EAMCET 04-07-2022_Shift-1]

1. $(1,0)$
2. $(0,1)$
3. $(\sqrt{5},0)$
4. $(0,\sqrt{5})$

54 $y=Ae^x+Be^{-2x}$ satisfies which of the following differential equations?

[AP EAMCET 04-07-2022_Shift-1]

1. $\frac{d^2y}{dx^2}-\frac{dy}{dx}+2y=0$
2. $\frac{d^2y}{dx^2}-2\frac{dy}{dx}-y=0$
3. $\frac{d^2y}{dx}-2\frac{dy}{dx}+y=0$
4. $\frac{d^2y}{dx^2}+\frac{dy}{dx}-2y=0$

55. If l and m are order and degree of a differential equation of all the straight lines at constant distance of P units from the origin, then $lm^2+l^2m=$

[AP EAMCET 04-07-2022_Shift-2]

1. 2
2. 6
3. 12
4. 30

56. If $2x-y+c\log(|x-2y-4|)=k$ is the general solution of $\frac{dy}{dx}=\frac{2x-4y-5}{x-2y+2}$ then c=

[AP EAMCET 04-07-2022_Shift-2]

1. 4
2. 2
3. 3
4. -4

57. By eliminating the arbitrary constants from $y=(a+b)\sin(x+c)-de^{x+e+f}$, the differential equation obtained is of order

[AP EAMCET 04-07-2022_Shift-2]

1. 6
2. 4
3. 3
4. 5

58. The general solution of the differential equation $\frac{dy}{dx}=\cos^2(3x+y)$ is $\tan^{-1}(\frac{\sqrt{3}}{2}\tan(3x+y))=f(x)$. Then $f(x)=$

[AP EAMCET 05-07-2022_Shift-1]

1. $2\sqrt{3}(x+C)$
2. x + C
3. $\frac{x+C}{2\sqrt{3}}$
4. $\frac{\sqrt{3}}{2}(x+C)$

59. If The general solution of the differential equation $\cos^2 x\frac{dy}{dx}+y=\tan x$ is $y=\tan x-1+c.e^{-\tan x}$ satisfies $y\left(\frac{\pi}{4}\right)=1$, then $c=$ **[AP EAMCET 05-07-2022_Shift-1]**

1. e
2. 1
3. −1
4. 1/e

60. **Assertion (A) :** Order of the differential equations of a family of circles with constant radius is two.

Reason (R): An algebraic equation having two arbitrary constants is general solution of 2nd order differential equation.

[AP EAMCET 05-07-2022_Shift-1]

1. (A) and (R) true. (R) is the correct explanation to (A)
2. (A) is true. (R) is false
3. (A) and (R) are false. (R) is not correct explanation to (A)
4. (A) is false. (R) is true.

61. The integrating factor of the linear differential equation $\frac{dy}{dx}+P(x)y=Q(x)$ is a solution of the differential equation

[AP EAMCET 05-07-2022_Shift-2]

1. $\frac{dy}{dx}-P(x)y=0$
2. $\frac{dy}{dx}+P(x)y=0$
3. $\frac{dy}{dx}-\frac{y}{x}=P(x)$
4. $\frac{dy}{dx}+\frac{x}{y}=P(x)$

62. If the slope of the tangent at a point (x, y) on a curve is $\frac{y-4}{x-3}$ and the curve passes through (4, 3), then the point where it cuts the line y = x is **[AP EAMCET 05-07-2022_Shift-2]**

1. (1, 1)
2. (3, 3)
3. $\left(\frac{7}{2},\frac{7}{2}\right)$
4. $\left(-\frac{5}{2},-\frac{5}{2}\right)$

63. By multiplying with $e^{\int Pdx}$ on both sides of the equation $\frac{dy}{dx}+P(x)y=Q(x)$, the left side of the equation takes the form $\frac{d}{dx}(yf(x))$, then $f(x)=$ **[AP EAMCET 05-07-2022_Shift-2]**

1. $\int ye^{\int Pdx}dx$
2. y P(x)
3. $e^{\int Pdx}$
4. $P(x)\,e^{\int Pdx}$

64. The substitution $\frac{dy}{dx}=z$, reduces the differential equation $\frac{d^2y}{dx^2}-\frac{dy}{dx}=0$ to a differential equation whose solution is z=

[AP EAMCET 06-07-2022_Shift-1]

1. logx + C
2. $x+C$
3. Ae^x
4. x^2+C

65. p and q are positive integers and $n<r<m$. if the order and degree of differential equation $\left(\frac{d^my}{dx^m}+\frac{d^ny}{dx^n}\right)^{p/q}=5\frac{d^ry}{dx^r}$ are respectively 4and 3, then **[AP EAMCET 06-07-2022_Shift-1]**

1. $n=4,q=3$
2. $m=4,q=3$
3. $r=4,q=3$
4. $m=4,p=3$

66. The solution of $(1+y^2)dx-xy\,dy=0, y(1)=0$ represents a conic. Its eccentricity is

[AP EAMCET 06-07-2022_Shift-1]

1. 2
2. 1/e
3. 1
4. $\sqrt{2}$

67. a, b, c , d, are real numbers, The general solution of $\frac{dy}{dx}=\frac{ax+b}{cy+d}$ represents a family of straight lines, when

[AP EAMCET 06-07-2022_Shift-2]

1. $a=c=0,\ and\ b^2+d^2\neq 0$
2. $a\neq 0, c=0,\ or$ a=0, c $\neq 0$
3. $bd=0,\ a\neq 0\ \ c\neq 0$
4. $b+d=0,\ a+c=0$

68. If $\cos\frac{y}{x} = A\log x + C$ is the general solution of $\left(x\sin\frac{y}{x}\right)dy = \left(y\sin\frac{y}{x} - x\right)dx$, then A=

[AP EAMCET 06-07-2022_Shift-2]

1. 2
2. 1
3. -1
4. -2

69 Every curve represented by the general solution of $\frac{dy}{dx} - \frac{x\log x}{y^3 e^{y^2-5}} = 0$ cuts every curve represented by the general solution of $\frac{dy}{dx} + \frac{y^3 e^{y^2-5}}{x\log x} = 0$ at angle θ. Then $4\theta - \frac{\pi}{2} =$

[AP EAMCET 06-07-2022_Shift-2]

1. $\pi/2$
2. 2π
3. $3\pi/2$
4. π

70. *If* $\frac{a}{a_1} = \frac{b}{b_1}$, then the substitution to be used to solve the differential equation $\frac{dy}{dx} = \frac{ax+by+c}{a_1x+b_1y+c_1}$ by using separation of variables is

[AP EAMCET 07-07-2022_Shift-1]

1. $x = x+h, y = y+k$
2. $ax+by = Z$
3. $y = V(x).x$
4. $x = at, y = bt$

71. For the differential equation $\frac{d^3y}{dx^3} = 0, y = ax^2 + bx + c\, is$

[AP EAMCET 07-07-2022_Shift-1]

1. The general solution
2. A particular solution
3. Not a solution
4. A solution , but not a particular solution

72. The differential equation of the family of circles passing through(0,0) and having centre on x-axis **[AP EAMCET 07-07-2022_Shift-1]**

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

73. If a and b are respectively the order and degree of a differential equation

$y^2(y'')^2 + 3x(y')^{\frac{1}{3}} + x^2y^2 = \sin x, then$

[AP EAMCET 07-07-2022_Shift-2]

1. b=a
2. a=3b
3. b=3a
4. ab=6

74. An integrating factor of the differential equation $(x^2+1)\frac{dy}{dx} + xy = x^3$

[AP EAMCET 07-07-2022_Shift-2]

1. $\frac{x}{1+x^2}$
2. $\frac{1}{2}\log(1+x^2)$
3. $\sqrt{1+x^2}$
4. $e^{\log(1+x^2)}$

75. If the general solution of $\frac{dy}{dx} = \frac{y^2}{xy - y^2 - x^2}$ is $\tan^{-1}\left(\frac{y}{x}\right) = f(y) + C$, then f($e^3$)=

[AP EAMCET 07-07-2022_Shift-2]

1. 0
2. 1
3. 2
4. 3

76. The equation of the family of curves for which length of the sub normal at any point (x, y) is always a constant (k) is

[AP EAMCET 08-07-2022_Shift-1]

1. $y^2 = 4ax$
2. $y^2 - A = 2Kx$
3. $y^2 - K = 2x$
4. $y^2 = K(x+K)$

77. If the differential equation obtained by eliminating A, B from $y = (\sin^{-1}x)^2 + A\cos^{-1}x + B$ is $(a - x^2)y'' - xy' = \text{b}$, then $\frac{b+a}{b-a} =$

[AP EAMCET 08-07-2022_Shift-1]

1. 2
2. -2
3. 3
4. -3

78 $y = ax + b$ is

[AP EAMCET 08-07-2022_Shift-1]

1. General solution of $\frac{d^3y}{dx^3} = 0$
2. General solution of $\frac{dy}{dx} = a + b$
3. General solution for both $\frac{d^2y}{dx^2} = 0\; and\; \frac{d^3y}{dx^3} = 0$
4. General solution for $\frac{d^2y}{dx^2} = 0$

79. If the solution of $\frac{dy}{dx}=\frac{y^3\cos\sqrt{x}}{\sqrt{x}e^{\frac{1}{y^2}}}$,

$y(0)=1$ *is* $\frac{1}{y^2}=\log_e(f(x))$. Then $f(x)=$

[AP EAMCET 08-07-2022_Shift-2]

1. $4+4\sin\sqrt{x}$
2. $e\sin\sqrt{x}$
3. $1-4\sin\sqrt{x}$
4. $e-4\sin\sqrt{x}$

80. Suppose that f(x,y) and g(x,y) are homogeneous functions of same order. If x=Vy reduces the equation $\frac{dy}{dx}=\frac{f(x,y)}{g(x,y)}$ to the form $\frac{dV}{dy}=\frac{1}{y}(F(V))$, then $F(V)=$

[AP EAMCET 08-07-2022_Shift-2]

1. $\left(\frac{f(1,V)}{g(1,V)}-V\right)$
2. $\left(\frac{f(V,1)}{g(V,1)}-V\right)$
3. $\left(\frac{g(1,V)}{f(1,V)}-V\right)$
4. $\left(\frac{g(V,1)}{f(V,1)}-V\right)$

81. The general solution of $xdy-ydx=ydy$ is

[AP EAMCET 08-07-2022_Shift-2]

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

82. The differential equation of the family of circles with fixed radius r units and centre on the line $y=3$, is

[TS EAMCET 18-07-2022_Shift-1]

1. $1+\left(\frac{dy}{dx}\right)^2=\frac{r^2}{(y-3)^2}$
2. $1+\left(\frac{dy}{dx}\right)^2=\frac{r^2}{y-3}$
3. $\left(\frac{dy}{dx}\right)^2=\frac{r^2}{(y-3)^2}$
4. $\left(\frac{dy}{dx}\right)^2=\frac{r^2}{y-3}$

83. The degree of the differential equation

$$x\left(\frac{d^2y}{dx^2}\right)^{1/3}+2x^2\left(\frac{d^2y}{dx^2}\right)^{5/3}+7\frac{dy}{dx}+y=0$$

[TS EAMCET 18-07-2022_Shift-1]

1. 15
2. 5
3. 12
4. 3

84. The curve that satisfies the differential equation $xydy-(1+y^2)dx=0$ passes through (1,0) and intersects the curve $x^2+3y^2=3$ at an angle θ. Then $\frac{2\theta}{\pi}=$

[TS EAMCET 18-07-2022_Shift-1]

1. 2
2. 0
3. 4
4. 1

85 The differential equation corresponding to the family of curves given by $ax^2+by^2=1$ where a and b are arbitrary constants is

[TS EAMCET 18-07-2022_Shift-2]

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

86. For the differential equation

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

[TS EAMCET 18-07-2022_Shift-2]

1.Order is 2 and degree is 3
2.Order is 3 and degree is 3
3.Order is 3 and degree is 2
4.Order is 2 and degree is not defined

87. The general solution of the differential equation $\frac{dy}{dx}=\frac{xy+x-2y-2}{xy-2x+y-2}$ is

[TS EAMCET 18-07-2022_Shift-2]

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

88. The equation of any member of the family of all the ellipses whose axes are along the coordinate axes satisfies the differential equation **[TS EAMCET 19-07-2022_Shift-I]**

1. $xyy''+x(y')^2-yy'=0$
2. $xyy''+x(y')^2-y=y'$
3. $y''+\frac{(y')^2}{y}-\frac{y}{x}=0$
4. $y''+(y')^2+x^2y^2=0$

89. The degree of the differential equation

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

[TS EAMCET 19-07-2022_Shift-I]

1. 4
2. 3
3. 6
4. Not defined

90. The general solution of the differential equation $\frac{dy}{dx}=\frac{2x-3y+5}{6x-9y+7}$ is

[TS EAMCET 19-07-2022_Shift-I]

1. $x-3y+\frac{22}{3}\log|3x-7|+c=0$
2. $x-3y+\frac{8}{3}\log|6x-9y-1|+c=0$
3. $3x-3y+\frac{8}{3}\log|3x-9y+1|+c=0$
4. $3x-2y+\frac{22}{3}\log|2x-3y-7|+c=0$

91. Statement : I The differential equation corresponding to the family of circles having their centres on Y–axis and fixed radius k is

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

Statement –II The differential equation corresponding to the family of circles passing through the origin and having their centres on X–axis is $x^2-y^2+2xy\frac{dy}{dx}=0$

[TS EAMCET 19-07-2022_Shift-2]

1. Statement I is true, but statement II is false
2. Statement II is true, but statement I is false
3. Both statement I and statement II are true
4. Both statement I and statement II are false

92. If m and n are respectively the order and the degree of the differential equation representing the family of curves $y^2-5ax-5a^{\frac{3}{2}}=0$ (a>0 is a parameter), then the value of m–n is

[TS EAMCET 19-07-2022_Shift-2]

1. 1
2. –1
3. 2
4. –2

93. The general solution of

$((1+x^2)y\sin x-2xy)dx-\log y^{1+x^2}dy=0$ *is*

[TS EAMCET 19-07-2022_Shift-2]

1. $\sin x-\log(1+x^2)=\log y+c$
2. $(\log y)^2+2\cos x+\log(1+x^2)^2=c$
3. $\log y=2\cos x+\log(1+x^2)+c$
4. $\frac{\log y}{y}=2\sin x+\cos x\log(1+x^2)+c$

94. The number of arbitary constants that appear in the general solution of the differential equation $\left(\frac{d^4y}{dx^4}+\frac{d^2y}{dx^2}\right)^{\frac{3}{2}}=5\frac{d^3y}{dx^3}$ is

[TS EAMCET 20-07-2022_Shift-1]

1. 4
2. 3
3. 2
4. 5

95. Assertion(A): The degree of the differential equation $y''+2xy'+\log_e\left(\frac{dy}{dx}\right)=0$ is 2

Reason(R): The degree of a differential equation is the highest degree of the highest order derivative occurring in the equation, after the equation is expressed in the form of a polynomial in differential coefficients.

The correct option among the following is:

[TS EAMCET 20-07-2022_Shift-1]

1. (A) is true(R) is true and (R) is the correct explanation for (A)
2. (A) is true (R) is true but (R) is not the correct explanation for (A)
3. (A) is true but (R) is false
4. (A) is false but (R) is true

96. Let S be the family of curves given by the general solution of the differential equation $\frac{y^2 e^{\frac{-1}{y}}}{\sqrt{x}}dx - 2\sec\sqrt{x}dy = 0$. Then the equation of the curve belonging to S and passing through $(\pi^2, 1)$ is**[TS EAMCET 20-07-2022_Shift-1]**

1. $\sin\sqrt{x} + e^{\frac{1}{y}} = 1 + e$
2. $\cos\sqrt{x} + e^{y} = e - 1$
3. $\sin\sqrt{x} + e^{\frac{1}{y}} = e$
4. $\cos\sqrt{x} + e^{y} = e$

97. $f(x, y, c_1, c_2) = 0$ is an equation containing two arbitrary constants C_1 and C_2. If the differential equation having $f(x, y, c_1, c_2) = 0$ as its general solution is of k^{th} order, then the differential equation corresponding to $x^k + y^k = c^2$ (c is an arbitrary constant) is

[TS EAMCET 20-07-2022_Shift-2]

1. $\frac{dy}{dx} + \frac{x}{y} = 0$
2. $\frac{dy}{dx} + \frac{y}{x} = 0$
3. $\frac{dy}{dx} - \frac{x}{y} = 0$
4. $\frac{dy}{dx} - \frac{y}{x} = 0$

98. If l and m are respectively the order and the degree of the differential equation $f(x)y'' + g(x)y' = \frac{4y}{x}$ whose general solution is $y = ax^2 + b\log x$, then $f(m) + g(m) =$

[TS EAMCET 20-07-2022_Shift-2]

1. $2l$
2. l
3. $3m$
4. $l + m$

99. The general solution of the differential equation $dx = (2x + 3y - 4)dy$ is

[TS EAMCET 20-07-2022_Shift-2

1. $2x + 6y - 3\log|4x + 6y - 5| = c$
2. $6y - 3\log|4x + 6y - 5| = c$
3. $2x + 6y - 8 - 3\log|4x + 6y - 5| = c$
4. $6x + 6y - 3\log|4x + 6y - 5| = c$

100. If $y = \frac{\log x}{x}$, then the value of $x^2\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} + y$ at the point $(\sqrt[3]{e}, \sqrt{e})$ is

[15th May 2023 Shift 1]

1. 0
2. 1
3. E
4. 2e

101. Let $f(x)$ be a differentiable function, $A(\theta, \alpha)$ and $B(8, \beta)$ be two points on the curve $y = f(x)$. Given $f(0) = 2$ and $f'(4) = \frac{-3}{4}$. If the chord AB of the curve is parallel to the tangent drawn at the point $(4, f(4))$, then $\beta =$ **[15th May 2023 Shift 1]**

1. -4
2. -6
3. 2
4. 8

102. The substitution x=vy converts which one of the following differential equation to an equation solvable by variable separable method? **[15th May 2023 Shift 1]**

1. $(y^2 - 2x^2y)dx = (x^2 - 2xy^2)dy$
2. $x^2dy - ydx = \sqrt{x^2 + y^2}dx$
3. $\frac{dy}{dx} = \frac{y^2}{x + \sqrt{xy}}$
4. $\left(1 + 2e^{\frac{x}{y}}\right) + 2e^{\frac{x}{y}}\left(1 - \frac{x}{y}\right)\frac{dy}{dx} = 0$

103. If $\frac{dy}{dx} = f(x, y)$ is a homogeneous differential equation, then the general form of $f(x, y)$ is

[15th May 2023 Shift 1]

1. $x^n\phi\left(\frac{y}{x}\right), n \neq 1$
2. $y^n\phi\left(\frac{y}{x}\right), n \neq 1$
3. $\phi\left(\frac{y}{x}\right)$
4. $K^n f(x, y), n \neq 1$

104.The order and degree of the differential equation $\left(\frac{d^3y}{dx^3}\right)^{\frac{1}{2}} - 2\left(\frac{dy}{dx}\right)^{\frac{1}{4}} + xy = 0$ are respectively [15th May 2023 Shift 1]

1. 3 and 12
2. 3 and 2
3. 3 and 4
4. 3 and 6

105. If $x^{\alpha}\frac{dy}{dx} = y^{\beta}\left(\gamma\log x + \delta\log y + 1\right)$ *is* a homogeneous differential equation , then [15th May 2023 Shift 2]

1. $\alpha = \beta$ and $\gamma = -\delta$
2. $\alpha = \beta$ and $\gamma = \delta$
3. $\alpha \neq \beta$ and $\gamma = \delta$
4. $\alpha \neq \beta$ and $\gamma \neq \delta$

106.The general solution of the differential equation tax x tan y dx+cos^{2}x cosec^2 y dy=0 is [15th May 2023 Shift 2]

1. $\tan^2 x + \cot^2 y = C$
2. $\cot^2 x - \tan^2 y = C$
3. $\tan^2 x - \cot^2 y = C$
4. $\cot^2 x + \tan^2 y = C$

107.If α and β are respectively the order and degree of the differential equation $y = e^{\left(\frac{dy}{dx} + \frac{d^2y}{dx^2}\right)}$, then the value of $\alpha + \alpha^{\beta} + \alpha^{2\beta} + ... + \alpha^{2023\beta} =$ [15th May 2023 Shift 2]

1. $2^{2025} + 2$
2. $2^{2024} + 1$
3. 2^{2024}
4. $2^{2024} - 1$

108. If *If* $\lim_{x\to\infty} y(x) = \frac{\pi}{2}$, then the solution of $x^3 \sin y\frac{dy}{dx} = 2$ is cosy = [16th May 2023 Shift 1]

1. $\frac{3}{x^2}$
2. $\frac{1}{x}$
3. $\frac{1}{x^2}$
4. $\frac{2}{x^3}$

109.a,b,c,d are arbitrary constants. Then the corresponding differential equation to $y = ae^{x} + be^{-x} + c\cos x + d\sin x$ *is* [16th May 2023 Shift 1]

1. $y^{(4)} = y$
2. $y^{(4)} + y = 0$
3. $y^{(4)} - y^{(2)} + 1 = 0$
4. $y^{(4)} + 2y^{(2)} + 1 = 0$

110.If y=y (x) is the solution of $\frac{dy}{dx} = \frac{x - y\cos x}{1 + \sin x}, y\left(\frac{\pi}{2}\right) = \frac{\pi^2}{8}$ *then* $y(\pi) =$ [16th May 2023 Shift 1]

1. $\frac{5\pi^2}{8}$
2. $\frac{7\pi^2}{8}$
3. $\frac{9\pi^2}{8}$
4. $\frac{12\pi^2}{7}$

111.If a curve passes through (1,2) and has the slope of its tangent $1 - \frac{1}{x^2}$ at a point (x,y), then the equation of that curve is [16th May 2023 Shift 2]

1. $y = 3x - \frac{1}{x}$
2. $y = x + \frac{1}{x}$
3. $y = 2x + \frac{1}{x} - 1$
4. $y = x + \frac{2}{x} - 1$

112.The differential equation having $y = (a+b)\, e^{cx+d}$ as its general solution,where a,b,c,d, are arbitrary constants is [16th May 2023 Shift 2]

1. $y^4 + 3yy^{(3)} + 6y^{(2)}y^{(2)} + y = 0$
2. $y^3 + 4yy^{(2)} + 6y^{(2)}y^{(1)} + 12y = 0$
3. $y^{(1)} - y = 0$
4. $yy^{(2)} - (y^{(1)})^2 = 0$

113. The integrating factor of the linear differential equation $\frac{dx}{dy}=\frac{1}{4x+3y}$ is

[16th May 2023 Shift 2]

1. e^{-4x}
2. e^{4x}
3. e^{3y}
4. e^{-3x}

114. The particular solution of the differential equation $\left(1+y^2\right)dx - xy\,dy = 0, y(1)=0$ represents

[17th May 2023 Shift 1]

1. A circle
2. A part of parabola
3. A part of ellipse
4. A part of hyperbola

115. If c and d are arbitrary constants, then $y=e^{2x}\left(c\cosh\sqrt{2}x+d\sinh\sqrt{2}x\right)$ is the general solution of the differential equation **[17th May 2023 Shift 1]**

1. $y''+4y'+2y=0$
2. $y''-4y'+2y=0$
3. $y''-4y'+4y=0$
4. $y''-2\sqrt{2}y'+2y=0$

116. Which one of the following is a homogeneous differential equation?

[17th May 2023 Shift 1]

1. $\frac{dy}{dx}=x^3+(\sin x)y$
2. $\frac{dy}{dx}=\left(x^3+y^3\right)e^{\frac{x}{y}}+x\sqrt{y}$
3. $\left(x^2+y^2\right)dx=2xy\,dy$
4. $x\frac{dy}{dx}=y+e^{\frac{x}{y}}$

117. Let c_1,c_2,c_3,c_4 be arbitrary constants. The order of the differential equation, corresponding to $y=c_1e^x+c_2e^{\log_e x}+c_3\sin^2 x-c_4(\cos^2 x-1)$ is

[17th May 2023 Shift 2]

1. 1
2. 2
3. 3
4. 4

118. The order and degree of the differential equation $3x^2\frac{d^2y}{dx^2}-\sin\left(\frac{d^3y}{dx^3}\right)+\cos(xy)=0$ **[17th May 2023 Shift 2]**

1. Order can't be defined and degree is 3
2. Order is 3 and degree can't be defined
3. Order is 3 and degree is 1
4. Order is 1 and degree is 3

119. If y=y(x) is the solution of $x\frac{dy}{dx}=y+xe^{-\left(\frac{y}{x}\right)}$

y(1)=log e, then y(e) =

[17th May 2023 Shift 2]

1. $\log\left(\frac{1}{e}+1\right)$
2. e log(1+e)
3. $e\log\left(\frac{1}{e}+1\right)$
4. $e\log\left(1-\frac{1}{e}\right)$

120. Which one of the following is a linear differential equation? **[18th May2023 shift -1]**

1. $\frac{dx}{dy}+y^2=e^{e^x}$
2. $dr+(2r^2\cot\theta+\sin 2\theta)d\theta=0$
3. $\frac{dy}{dx}=e^{x-y}(e^x-e^{-y})$
4. $x^2dy+xydx-1=0$

121. If X=x+h, Y=y+k transforms $\frac{dy}{dx}=\frac{2x+3y-7}{3x+2y-8}$ to a homogeneous differential equation, then (h, k)= **[18th May2023 shift -1]**

1. (1, 2)
2. (2, 1)
3. (7, 8)
4. (8, 7)

122. If log y is an integrating factor of $\frac{dx}{dy}$+P(y)x=Q(y), thenP(y)=

[18th May2023 shift -1]

1. $\frac{1}{y+\log y}$
2. $\frac{y}{\log y}$
3. $\frac{\log y}{y}$
4. $\frac{1}{y\log y}$

123 The general solution of
$$\frac{dy}{dx}=\cos^2(x-y-1)\, is\ given\ by\ x=$$
[18th May 2023 Shift 2]
1. C-cot(x-y-1)
2. C-tan(x-y+1)
3. y+C cot(x-y-1)
4. Cy+tan(x-y-1)

124 The degree of the differential equation
$$\log\left(\frac{dy}{dx}\right)=\left(2x+3\frac{dy}{dx}\right)^2$$ is
[18th May 2023 Shift 2]
1. 1
2. 2
3. 3
4. not defined

125.If y=y(x) is a particular solution of
$$\sqrt{1-x^2}\frac{dy}{dx}+\frac{2x}{\sqrt{1-x^2}}y=x, y(0)=1,$$ then
$y\left(\frac{1}{2}\right)=$ [18th May 2023 Shift 2]
1. $\frac{\sqrt{3}}{2}$
2. $\frac{1}{4}$
3. $\frac{1}{2}$
4. 0

126 If m and n are respectively the order and degree of the differential equation of the family of parabolas with origin as its focus and X-axis as its axis, then $mn-m+n=$
[12TH MAY 2023 SHIFT-1]
1. 1
2. 2
3. 3
4. 4

127 The general solution of
$$\frac{dy}{dx}+yf'(x)-f(x)f'(x)=0,\quad y\neq f(x)$$ is
[12TH MAY 2023 SHIFT-1]
1. $y=f(x)+1+ce^{-f(x)}$
2. $y=ce^{-f(x)}$
3. $y=f(x)-1+ce^{-f(x)}$
4. $y=f(x)+ce^{f(x)}$

128 The degree and order of the differential equations of the family of parabolas whose axis is the X-axis, are respectively
[12TH MAY 2023 SHIFT -2]
1. 2,2
2. 2,1
3. 1,2
4. 3,2

129. The general solution of the differential equation $\left(x\sin\frac{y}{x}\right)dy=\left(y\sin\frac{y}{x}-x\right)dx$ is
[12TH MAY 2023 SHIFT -2]
1. $\sin^{-1}\left(\frac{y}{x}\right)=\frac{x}{2}+c$
2. $\sin\left(\frac{x}{y}\right)=\frac{x^2}{2}+c$
3. $\sin\left(\frac{y}{x}\right)=\log|x|+c$
4. $\cos\left(\frac{y}{x}\right)=\log|x|+c$

130. The general solution of the differential equation $(2x-10y^3)dy+ydx=0, y\neq 0$ is
[12TH MAY 2023 SHIFT -2]
1. $x^2y-2y^3=c$
2. $xy^2-2y^5=c$
3. $xy^3+2y=c$
4. $xy^2+3y=c$

131.If A and B are arbitrary constants, then the differential equation having
$y=Ae^x+B\sin 2x$ as its general solution is
[13TH MAY 2023 SHIFT-1]
1. $(\cos 2x-\sin 2x)\frac{d^2y}{dx^2}+(4\sin 2x)\frac{dy}{dx}-4(\sin 2x+\cos 2x)y=0$
2. $(\cos 2x+\sin 2x)\frac{d^2y}{dx^2}+(4\sin 2x)\frac{dy}{dx}-4(\sin 2x-\cos 2x)y=0$
3. $(\cos 2x-\sin 2x)\frac{d^2y}{dx^2}+(4\sin 2x)\frac{dy}{dx}+4(\sin 2x+\cos 2x)y=0$
4. $(\sin 2x-\cos 2x)\frac{d^2y}{dx^2}-(4\sin 2x)\frac{dy}{dx}-4(\sin 2x+\cos 2x)y=0$

132.The general solution of the differential equation $\frac{dy}{dx}=\sin(x-y)+\cos(x-y)$ is
[13TH MAY 2023 SHIFT-1]
1. $\log\left|\frac{\tan\frac{(x-y)}{2}+1}{\tan\frac{(x-y)}{2}}\right|=x+c$
2. $\log\left|\frac{\tan\frac{(x-y)}{2}-1}{\tan\frac{(x-y)}{2}}\right|=x+c$
3. $\log\left|\frac{\tan(x-y)-1}{\tan(x-y)}\right|=x+c$
4. $\log\left|\frac{\sin(x-y)+\cos(x-y)}{\cos(x-y)}\right|=x+c$

133. The general solution of the differential equation $x^2dy-(xy-y^2)dx=0$ *is*
[13TH MAY 2023 SHIFT-1]

1. $y^2 = 3x^2 \log(cx)$ 2. $y^2 = \log x + c$

3. $y \log x = x + cy$ 4. $y \log x = x^2 + c$

134 If the order and degree of the differential equation corresponding to the family of curves $y^2 = 4a(x+a)$ (a is parameter)are m and n respectively, then $m + n^2 =$

[EAPCET 14-05-23 SHIFT-1]

1. 3 2. 4
3. 5 4. 2

135 If the solution of the differential equation $\frac{dy}{dx} = \frac{2x+3y}{3x-2y}$ is $y = x\tan(f(x)) + c$ then $f(x) =$ **[EAPCET 14-05-23 SHIFT-1]**

1. $\frac{1}{3}\log\left(x^2+y^2\right)$ 2. $(2x+3y)\log x$

3. $x\log\frac{y}{x} + y^2$ 4. $\sin\left(x+y^2\right)$

136 The general solution of the differential equation

$$\left(x^2+2\right)dy + 2xydx = e^x\left(x^2+2\right)dx \text{ is}$$

[EAPCET 14-05-23 SHIFT-1]

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

2. $2xy = e^x(x^2-2x+4)+c$

3. $\left(x^2+2\right)y = e^x\left(x^2-2x+4\right)+c$

4. $(x^2+2)^2 y = e^x(x^2+2x-4)+c$

137 The general solution of the differential equation $(3x-4y)(dx-3dy)+(6dx-4dy)=0$ is

[EAPCET 13-05-23 SHIFT-2]

1. $x-2y+\log|3x-4y+6| = c$

2. $5x-15y-4\log|15x-20y-12| = c$

3. $5x-15y+14\log|15x-20y-12| = c$

4. $8y-4x+\log|9x-12y+4| = c$

138 The general solution of the differential equation (sec x+tan x)

$$\frac{dy}{dx} + \left(\sec^2 x + \sec x \tan x\right)y = 1 \text{ is}$$

[EAPCET 13-05-23 SHIFT-2]

1. $(1+\sin x)y = n\cos x + c$

2. $(1+\cos x)y = x\sin x + c$

3. $(\sec x + \tan x)y = x\sec x + c$

4. $(\sec x + \tan x)y = x + c$

KEY

1)	1	2)	3	3)	1	4)	2	5)	4
6)	1	7)	2	8)	2	9)	1	10)	1
11)	2	12)	1	13)	2	14)	1	15)	2
16)	2	17)	4	18)	4	19)	1	20)	1
21)	4	22)	3	23)	4	24)	2	25)	3
26)	2	27)	2	28)	2	29)	3	30)	2
31)	2	32)	3	33)	1	34)	4	35)	2
36)	1	37)	2	38)	2	39)	1	40)	3
41)	4	42)	4	43)	2	44)	2	45)	4
46)	4	47)	2	48)	2	49)	3	50)	1
51)	1	52)	4	53)	4	54)	4	55)	2
56)	3	57)	3	58)	1	59)	1	60)	1
61)	1	62)	3	63)	3	64)	3	65)	4
66)	4	67)	1	68)	2	69)	3	70)	2
71)	1	72)	1	73)	3	74)	3	75)	4
76)	2	77)	3	78)	4	79)	4	80)	4
81)	1	82)	1	83)	2	84)	4	85)	2
86)	4	87)	4	88)	1	89)	4	90)	2
91)	3	92)	4	93)	2	94)	1	95)	4
96)	3	97)	1	98)	2	99)	2		
100)	1	101)	1	102)	4	103)	3	104)	3
105)	1	106)	3	107)	3	108)	3	109)	1
110)	1	111)	2	112)	4	113)	4	114)	4
115)	2	116)	3	117)	3	118)	2	119)	2
120)	4	121)	2	122)	4	123)	1	124)	4
125)	1	126)	3	127)	3	128)	3	129)	4
130)	2	131)	1	132)	2	133)	3	134)	3
135)	1	136)	3	137)	3	138)	4	139)	

SOLUTIONS

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

$\Rightarrow \frac{dy}{dx}=A$

$\Rightarrow y=Ax+B$

It is a straight line

2. Equation of a line passing through (0, 0) is

y=mx $y=\frac{dy}{dx}x$

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

Let $x+y=t$

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

$\frac{dt}{dx}-1=\sec t$

$\int\frac{dt}{1+\sec t}=\int dx$

$\int\frac{1+\cos t-1}{1+\cos t}dt=x+c$

$t-\int\frac{1}{2\cos^2\frac{t}{2}}dt=x+c$

$t-\tan\frac{t}{2}=x+c$

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

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

4. $I.F=e^{\int g'(x)dx}=e^{g(x)}$

$G.S\ is\ y.e^{g(x)}=\int g(x).e^{g(x)}.g'(x)dx$

$=e^{g(x)}\left[g(x)-1\right]+e^{c}$

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

5 $\frac{dx}{dy}+0.x=\cos y$

$I.F=1$

Solution is

$x(1)=\int\cos y\,dy$

$\Rightarrow x=\sin y+c$

$y(0)=0\Rightarrow c=0$

Solution is $x=\sin y$

6. $\frac{dy}{dx}=\left(\frac{y}{x}\log\frac{y}{x}+\frac{y}{x}\right)$.

$put\ \frac{y}{x}=v$

$v+x\frac{dv}{dx}=v.\log v+v$

$x\frac{dv}{dx}=v.\log v$

$\int\frac{1}{v.\log v}dv=\int\frac{dx}{x}$

$\log(\log v)=\log x+\log c$

$\log v=cx$

$v=e^{cx}\quad \frac{y}{x}=e^{cx}\quad y=xe^{cx}$

7. Order = 2, degree = 1 Sum = 3

8. $y_3^{2/3}=-(2+3y_2+y_1)$

$y_3^{2}=-(2+3y_2+y_1)^3$

Degree=2

9. Let $x-y=k\ \&\ \frac{dy}{dx}=1-\frac{dk}{dx}$

Now $\frac{k+2}{2k+5}=\frac{dk}{dx}$

$\int 1dx=\int\left(\frac{2k+4+1}{k+2}\right)dk$

$x=2k+\log(k+2)+c$

$x=2(x-y)+\log(x-y+2)+c$

here $t=x-y+2$

10. $\log\left(\frac{dy}{dx}\right)=ax+by$

$\Rightarrow\frac{dy}{dx}=e^{ax+by}$

$\Rightarrow\int e^{-by}dy=\int e^{ax}dx$

$\Rightarrow\frac{e^{-by}}{-b}=\frac{e^{ax}}{a}+c$

$\Rightarrow ae^{-by}+be^{ax}=c$

11. Given $\frac{dy}{dx}=\frac{1+y^2}{(\tan^{-1}y)-x}$ $\frac{dx}{dy}=\frac{\tan^{-1}y-x}{1+y^2}$

$\frac{dx}{dy}+\frac{x}{1+y^2}=\frac{\tan^{-1}y}{1+y^2}$

$here\ P(y)=\frac{1}{1+y^2},Q(y)=\frac{\tan^{-1}y}{1+y^2}$

$I.F=e^{\int P(y)dy}=e^{\int\frac{1}{1+y^2}dy}=e^{\tan^{-1}y}$

$G.S\ x.(I.F)=\int Q(y).(I.F)dy+c$

$x.e^{\tan^{-1}y}=\int\frac{\tan^{-1}y}{1+y^2}.e^{\tan^{-1}y}dy+c$

$x.e^{\tan^{-1}y}=e^{\tan^{-1}y}\left(\tan^{-1}y-1\right)+c$

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

Put y=vx

$\frac{dy}{dx}=v+x\frac{dv}{dx}$

$eq(1)\Rightarrow v+x\frac{dv}{dx}-v=\sqrt{1+v^2}$

$\int\frac{dv}{\sqrt{1+v^2}}=\int\frac{dx}{x}$

$\log\left(v+\sqrt{1+v^2}\right)c=\log x$

$\Rightarrow\left(\frac{y}{x}+\sqrt{1+\left(\frac{y}{x}\right)^2}\right)c=x$

13. $\frac{dy}{dx}=\frac{1}{2y}\Rightarrow\int 2y\,dy=\int dx$ $y^2=x+c$ c=13

$y^2=x+13$ It is a parabola

14. $y_1=\frac{a}{x}\Rightarrow xy_1=a$ $xy_2+y_1=0$

15 $\int\frac{\sec^2 y}{\text{Tan } y}dy=-\int\cot x\,dx$

$\log|\text{Tan } y|+\log|\sin x|=\log C$ $\sin x\tan y=C$

16. $\text{I.F}=e^{\int\text{cosec}^2x\ dx}=e^{-\cot x}$

$ye^{-\cot x}=\int e^{-\cot x}\cot x\,\text{cosec}^2x\ dx$

$-\cot x=t\Rightarrow\text{cosec}^2x\,dx=dt$

$ye^{-\cot x}=-\int te^{t}\ dt=-e^{t}(t-1)+C$

$ye^{-\cot x}=-e^{-\cot x}(-\cot x-1)+C$

$ye^{-\cot x}=e^{-\cot x}(\cot x+1)+C$

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

$-\int\frac{1}{y}dy-\int 1\,dy=\int\frac{1}{x}dx+\int 1\,dx$ $x+y+\log(xy)=c$

18. $\frac{\sqrt{1+y^2}}{xe^{\tan^{-1}x}}=C$

$\frac{xe^{\tan^{-1}x}y}{\sqrt{1+y^2}}\frac{dy}{dx}-\sqrt{1+y^2}\left[\frac{xe^{\tan^{-1}x}}{1+x^2}+e^{\tan^{-1}x}\right]=0$

$xy\left(1+x^2\right)e^{\tan^{-1}x}dy-\left(1+y^2\right)xe^{\tan^{-1}x}-\left(1+y^2\right)\left(1+x^2\right)e^{\tan^{-1}x}=0$

$xy\left(1+x^2\right)dy-\left(1+y^2\right)\left(1+x+x^2\right)dx=0$

19 Put $x+y=t$ $\frac{dt}{dx}=\frac{2(t-5)}{t-7}$

$\int\frac{(t-5)-2}{t-5}dt=2\int dx$

$t-2\log(t-5)=2x+C_1$

$x+y-2\log(x+y-5)=2x+C_1$

$(x+y-5)^2=Ce^{y-x}$

20. $\frac{dy}{dx}-\frac{3}{x}y=x$

I.F= $e^{-3\log x}=\frac{1}{x^3}$ $\frac{y}{x^3}=\int x\times\frac{1}{x^3}dx$

$\frac{y}{x^3}=\frac{-1}{x}+C$ $\frac{4}{8}=\frac{-1}{2}+C\Rightarrow C=1$

$\frac{y}{x^3}=\frac{-1}{x}+1$ $f(4)=48$

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

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

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

$xy''+2y'=xy-x^2+2$

22. I.P.E model Non-homogeneous D.E

23. $xy'=y+x^2\sin x$ $\frac{dy}{dx}=\frac{y}{x}+x\sin x$

$\frac{dy}{dx}-\frac{1}{x}y=x\sin x$ I.F=$e^{-\log x}=\frac{1}{x}$

$$y\left(\frac{1}{x}\right)=\int\frac{1}{x}x\sin x dx+C \quad \frac{y}{x}=-\cos x+C$$

$$y(\pi)=0,\ (x=\pi, y=0)$$

$$0=-(-1)+C,\ C=-1$$

$$\frac{y}{x}=-\cos x-1 \quad y=-x\cos x-x$$

$$f'(x)=-x(-\sin x)-\cos x-1 \quad f'(\alpha)=0$$

$$\alpha\sin\alpha=1+\cos\alpha=2\cos^2\frac{\alpha}{2} \quad \alpha=\cot\frac{\alpha}{2}$$

24. $y=ae^{4x}+be^{-x}$......(1)

$$y'=4ae^{4x}-be^{-x}......(2)$$

$$y''=16ae^{4x}+be^{-x}......(3)$$

$$y''-y=15ae^{4x}\left(\because from(1)\right)$$

$$\frac{y''-y}{15e^{4x}}=a.......(4)$$

(2)+(3)

$$y'+y''=20ae^{4x}$$

$$y'+y''=20\left(\frac{y''-y}{15e^{4x}}\right)e^{4x}\left(\because(4)\right)$$

$$y'+y''=\frac{4}{3}(y''-y)$$

$$3y'+3y''=4y''-4y$$

$$y''-3y'-4y=0$$

$$f=y''-3y'-4y$$

$$\frac{df}{dx}=y'''-3y''-4y'$$

24. Given:

$$\frac{y}{m}=x+7y^2$$

$$\frac{ydx}{dy}=x+7y^2$$

$$\frac{ydx-xdy}{y^2}=7dy$$

$$\int\frac{d}{dx}\left(\frac{x}{y}\right)=7\int dy$$

$$\frac{x}{y}=7y+c$$

$$x=7y^2+cy$$

$$7y^2+cy-x=0$$

26 $ydy-xdy+dy-ydx-xdx-2dx=0$

$$\int ydy+\int dy-\int xdx-2\int dx=\int d(xy)$$

$$\frac{y^2}{2}+y-\frac{x^2}{2}-2x=xy+c$$

$$f(x,y,c)=y^2+2y-x^2-4x-2xy-c$$

$put\ x=1, y=1$ $f(1,1,c)=0$

$$1+2-1-4-2-c=0 \quad c=-4$$

27. $y'=e^{ax}(-b\sin bx+b\cos bx)+ae^{ax}(\cos bx+\sin bx)$

$$y'-ay=e^{ax}(-b\sin bx+b\cos bx)$$

$$y''-ay'=-b^2e^{ax}(\cos bx+\sin bx)+a(y'-ay)$$

$$y''-ay'=-b^2y+ay'-a^2y$$

$$y''+y'(-2a)+y(a^2+b^2)=0$$

$$l=a^2+b^2,\ \ k=2a$$

$$l+bk=a^2+b^2+2ab=(a+b)^2$$

28. Given

$$y=ax^2+bx+c$$

$$y'=2ax+b$$

$$y''=2a$$

$$y'''=0$$

29. Put

$$x=X+h; y=Y+k$$

$$\frac{dy}{dx}=\frac{dY}{dX}$$

$$\frac{dY}{dX}=-\frac{3Y-7X+(3k-7h)+7}{7Y-3X+(7k-3h+3)}$$

Choose h and k such that

$3k-7h+7=0, 7k-3h+3=0$

$$h=1, k=0\Rightarrow\frac{dy}{dx}=-\frac{3Y-7X}{7Y-3X}$$

Put $Y=vX$ then we get

30. $x\cos\frac{y}{x}(ydx+xdy)=y\sin\frac{y}{x}(xdy-ydx)$

$$\frac{1}{x^2dx}\left(x\cos\frac{y}{x}\right)(ydx+xdy)=$$

$$\frac{1}{x^2dx}\left(y\sin\left(\frac{y}{x}\right)\right)(xdy-ydx)$$

$$\cos\frac{y}{x}\left(\frac{y}{x}+\frac{dy}{dx}\right)=\frac{y}{x}\sin\left(\frac{y}{x}\right)\left(\frac{dy}{dx}-\frac{y}{x}\right)$$

Put $\frac{y}{x}=u$ $\frac{dy}{dx}=u+x\frac{dy}{dx}$

$$\cos u\left(u+u+x\frac{du}{dx}\right)=u\sin u\left(u+x\frac{dy}{dx}-u\right)$$

$$\cos u\left(2u+x\frac{du}{dx}\right)=xu\sin u\frac{du}{dx}$$

$$\frac{du}{dx}=\frac{-2u\cos u}{x(\cos u-u\sin u)}$$

$$\int\frac{\cos u-u\sin u}{u\cos u}du=-\int\frac{2}{x}dx$$

$u\cos u=t$

$(\cos u-u\sin u)du=dt$

$$-\int\frac{1}{t}dt=2\int\frac{1}{x}dx$$

$-\log t=2\log x+c$

$-\log u\cos u=2\log x+c$

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

31. Given $lx^2+my^2=x+y$

$\Rightarrow l(2x)+m(2y)y'=1+y'$

$\Rightarrow 2l+2m\left(yy''+(y')^2\right)=y''$

$$\text{Now,}\begin{vmatrix}x^2 & y^2 & x+y\\ 2x & 2yy' & 1+y'\\ 2 & 2\left(yy''+(y')^2\right) & y''\end{vmatrix}=0$$

32. *Given* $\frac{dy}{dx}=\frac{3x-6y+2}{x-2y+1}$

put $x-2y=t$

$$\Rightarrow 1-2\frac{dy}{dx}=\frac{dt}{dx}$$

$$\Rightarrow\frac{1}{2}\left(1-\frac{dt}{dx}\right)=\frac{3t+2}{t+1}$$

after variable separable we get,

$$\int\frac{t+1}{5t+3}dt=-\int dx$$

$$\Rightarrow\left|x-2y+\frac{3}{2}\right|^{\frac{2}{25}}.e^{\frac{1}{5}(6x-2y)}=c$$

33. $\frac{dx}{dy}+\frac{x}{1+y^2}=\frac{\tan^{-1}y}{1+y^2}$

$I.F=e^{\tan^{-1}y}$

$$\Rightarrow x.e^{\tan^{-1}y}=\int e^{\tan^{-1}y}.\frac{\tan^{-1}y}{1+y^2}dy$$

put $e^{\tan^{-1}y}=t\to\frac{e^{\tan^{-1}y}}{1+y^2}dy=dt$

$=\int te^t dt=e^t(t-1)+c$

$\therefore x=\tan^{-1}y-1+c.e^{\tan^{-1}y}$

34 $ax^2+by^2=1$

$2ax+2by.\frac{dy}{dx}=0$

$\Rightarrow x(yy')'-yy'=0$

$\Rightarrow x\{y'.y'+y''.y\}-y.y'=0$

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

Order=2, degree=1 $\Rightarrow\alpha=2,\beta=1$

$2x^2+y^2=1,\quad a^2=\frac{1}{2},\ b^2=1$

$$e=\sqrt{\frac{b^2-a^2}{b^2}}=\frac{1}{\sqrt{2}}$$

35 $xdy=\left(y+\sqrt{x^2+y^2}\right)dx$

$\frac{dy}{dx}=\frac{y}{x}+\frac{\sqrt{x^2+y^2}}{x}$, *put* $y=vx$

$v+x.\frac{dv}{dx}=v+\sqrt{1+v^2}$

$$\int\frac{1}{\sqrt{1+v^2}}dv=\int\frac{1}{x}dx$$

$\Rightarrow c=0$

$$\Rightarrow\frac{y}{x}+\frac{\sqrt{x^2+y^2}}{x}=x$$

$\Rightarrow y+\sqrt{x^2+y^2}=x^2$

$\Rightarrow\left(x^2-y\right)^2=x^2+y^2$

36. Consider $y = 3\sin x + 4\cos x$

$$\frac{dy}{dx} = 3\cos x - 4\sin x$$

$$\frac{d^2y}{dx^2} = -3\sin x - 4\cos x$$

$$\Rightarrow \frac{d^2y}{dx^2} = -y \Rightarrow \frac{d^2y}{dx^2} + y = 0$$

37 $x^2 + y^2 = 1$

$$\Rightarrow 2x + 2yy' = 0$$

$$\Rightarrow 1 + y.y'' + y'(y') = 0$$

$$\Rightarrow y.y'' + (y')^2 + 1 = 0$$

38. $2x.\left(\frac{dy}{dx}\right) - y = 4$

$$\Rightarrow 2x.\frac{dy}{dx} = y + 4$$

$$\Rightarrow \frac{dy}{y+4} = \frac{dx}{2x}$$

$$\Rightarrow \int \frac{dy}{y+4} = \int \frac{dx}{2x}$$

$$\Rightarrow \log(y+4) = \frac{1}{2}\log x + \log c$$

$$\Rightarrow (y+4) = cx^2,$$

represents a parabola (family of)

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

$$\Rightarrow \frac{e^x}{1+e^x}dx + \frac{\sec^2 y}{\tan y}dy = 0$$

$$\Rightarrow \int\left(\frac{e^x}{1+e^x}\right)dx + \int \frac{\sec^2 y}{\tan y}dy = \log c$$

$$\Rightarrow \log(1+e^x) + \log\tan y = \log c$$

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

Passes through $\left(0, \frac{\pi}{4}\right) \Rightarrow c = 2$

$$\therefore (1+e^x)\tan y = 2$$

40. $(1+x^2)\frac{dy}{dx} = e^{m.Tan^{-1}x} - y$

$$\Rightarrow \frac{dy}{dx} + y\frac{1}{1+x^2} = \frac{e^{m.Tan^{-1}x}}{1+x^2}$$

I.F: $y.e^{Tan^{-1}x} = \int \frac{e^{(m+1).Tan^{-1}x}}{1+x^2}dx$

$$y.e^{\tan^{-1}x} = \frac{e^{(m+1).\tan^{-1}x}}{m+1} + C$$

Given $(x, y) = (0,1) \Rightarrow c = \frac{m}{m+1}$

$$\therefore y.e^{Tan^{-1}x} = \frac{e^{(m+1).\tan^{-1}x}}{m+1} + \frac{m}{m+1}$$

41. $\sqrt{\frac{dy}{dx}} - 4\frac{dy}{dx} - 7x = 0$

$$\Rightarrow \frac{dy}{dx} = \left(4.\frac{dy}{dx} + 7x\right)^2$$

$\therefore$ Order = 1, Degree = 2

42. $\frac{dy}{dx} = e^x.e^y$

$$\Rightarrow e^{-y}.dy = e^x dx$$

$$\Rightarrow \int e^{-y}.dy = \int e^x dx$$

$$\Rightarrow -e^{-y} = e^x + C$$

$$\Rightarrow e^x + e^{-y} + C = 0$$

43 Given $\frac{dy}{dx} = x + xy$

$$\Rightarrow \frac{dy}{dx} = x(1+y)$$

$$\Rightarrow \frac{dy}{1+y} = x.dx$$

$$\Rightarrow \int \frac{dy}{1+y} = \int x.dx$$

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

$$\Rightarrow \log\left(\frac{1+y}{c}\right) = x^2$$

$$\Rightarrow (1+y) = c.e^{x^2}$$

Given $(0,1) \Rightarrow c = 2$ $\quad \therefore 1 + y = 2.e^{x^2}$

44. IPE

45. IPE

46. IPE

47 $\frac{dy}{dx}=x+\sin x\cos y+x\cos y+\sin x$

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

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

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

$\frac{1}{2}\sec^2\frac{y}{2}dy=(x+\sin x)dx$

I.O.B.S

$\Rightarrow\frac{1}{2}\int\sec^2\frac{y}{2}dy=\int(x+\sin x)dx$

$\Rightarrow\frac{1}{2}\left(\frac{\tan\frac{y}{2}}{\frac{1}{2}}\right)=\frac{x^2}{2}-\cos x+C$

$\therefore\tan\frac{y}{2}=\frac{x^2}{2}-\cos x+C$

48. IPE

49 Let $3x+y=t$

$3+\frac{dy}{dx}=\frac{dt}{dx}\Rightarrow\frac{dy}{dx}=\frac{dt}{dx}-3$

$\frac{dt}{dx}-3=(t+4)^2$

$\frac{dt}{dx}=t^2+8t+19$

$\int\frac{dt}{t^2+8t+19}=\int dx$

$\int\frac{dt}{(t+4)^2+\left(\sqrt{3}\right)^2}=x+K$

$\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{t+4}{\sqrt{3}}\right)-x=K$

$\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{3x+y+4}{\sqrt{3}}\right)-x=K$

$\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{3x+y+4}{\sqrt{3}}\right)-x=\frac{1}{\sqrt{3}}\left(\tan^{-1}(x,y)\right)-x$

Then $f(1,2)=\frac{3+2+4}{\sqrt{3}}=\frac{9}{\sqrt{3}}=3\sqrt{3}$

50. $y^2=4a(x+a).......(1)$

$2yy'=4a$

From (1), $y^2=2yy'\left(x+\frac{yy'}{2}\right)$

$y=2y'x+y(y')^2$

$y(y')^2+2xy'-y=0$

$2xy'=-y(y')^2+y$

51 Conceptual

52. $\frac{dy}{y}=\log_e 0.5dx$

$\log y=x\log_e 0.5+c$

$(0,1)\Rightarrow$

$y=(0.5)^x$

$\underset{x\to\infty}{Lt}(0.5)^x=0=k$

53. $y\frac{dy}{dx}=x-1$

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

$(1,2)\Rightarrow 2=\frac{1}{2}-1+c$

$c=\frac{5}{2}$

$\therefore x^2-y^2-2x+5=0$

54. $y_1=Ae^x-2Be^{-2x}$

$y_1=Ae^x+Be^{-2x}-3Be^{-2x}$

$\Rightarrow y_1-y=-3Be^{-2x}$

$\Rightarrow y_2-y_1=-2(y_1-y)$

$\Rightarrow y_2+y_1-2y=0$

55. $y=mx+c$

$\Rightarrow mx-y+c$

$P=\frac{|c|}{\sqrt{1+m^2}}$

$\Rightarrow P^2(1+y_1^2)=(xy_1-y)^2$

$\therefore L=1,m=2$

$lm^2+l^2m=4+2=6$

56. $x-2y=t \Rightarrow 1-2\frac{dy}{dx}=\frac{dt}{dx}$

$\therefore \frac{1}{2}\left(1-\frac{dt}{dx}\right)=\frac{2t-5}{t+2}$

$\frac{12-3t}{t+2}=\frac{dt}{dx}$

$\int\frac{t-4}{t+4}dt+\int\frac{6}{z-4}dt=-3\int dx$

$\Rightarrow t+6\log|t-4|=3x+c$

$\Rightarrow 2x-y+3\log|x-2y-4|=c$

57. $y=(a+b)\sin(x+c)-de^{e+f}e^{x}$

$y=A\sin(x+B)-ce^{x}$

58 $3x+y=t$

$\therefore \frac{dt}{dx}=3+\cos^2 t$

$\frac{1}{3}\int\frac{dt}{3+\cos^2 t}=\int dx$

put $\tan t=s$

$\frac{1}{3}\int\frac{ds}{s^2+\left(\frac{2}{\sqrt{3}}\right)^2}=\int dx$

$\frac{1}{2\sqrt{3}}Tan^{-1}\left(\frac{\sqrt{3}}{2}Tan(3x+y)\right]$

$=x+c$

59. $If=e^{\int\sec^2 xdx}=e^{Tanx}$

$G.S\ ye^{Tanx}=\int e^{Tanx}Tanx.\sec^2 x\,dx$

put $Tanx=t$

$y.e^{Tanx}=e^{Tanx}(Tanx-1)+c$

$\left(\frac{\pi}{4},1\right)\Rightarrow\boxed{C=e}$

60. $(x-h)^2+(y-k)^2=r^2$

61. Conceptual

62. $\frac{dy}{y-4}=\frac{dx}{x-3}$

$y-4=c(x-3)$

$\Rightarrow\boxed{C=-1}$

$\therefore x+y=7$

63 $e^{\int pdx}dy+e^{\int pdx}ydx=Q(x)dx$

$\Rightarrow d(y.e^{\int pdx})=Q(x)dx$

$\Rightarrow f(x)=e^{\int pdx}$

64. $\frac{d}{dx}\left(\frac{dy}{dx}\right)-\frac{dy}{dx}=0$

$\frac{dy}{dx}=z$

$\frac{dz}{dx}-z=0$

$\Rightarrow \log z=x+c$

$\Rightarrow z=e^{x+c}=e^{c}.e^{x}$

$\Rightarrow z=Ae^{x}$

65. $\left(\frac{d^m y}{dx^m}+\frac{d^m y}{dx^n}\right)^p=5\left(\frac{d^r y}{dx^r}\right)^q$

$m=4,p=3$

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

Integration

$\log x-\frac{1}{2}\log|1+y^2|=C$

$(1,0)\Rightarrow\boxed{c=0}$

$\log x-\frac{1}{2}\log|1+y^2|=0$

$\Rightarrow\frac{x^2}{1+y^2}=1$

$\Rightarrow x^2-y^2=1$

67. $(cy+d)dy=(ax+b)$

Integration

$\frac{cy^2}{2}+dy=\frac{ax^2}{2}+bx+k$

$ax^2-cy^2+2bx-2dy-2dy+k=0$

respresent striaghtline

$a=c=0\ \&\ b^2+d^2\neq 0$

68. IPE

69 conceptual

70. $ax+by=z$

71. $y_1 = 2ax + b$

$y_2 = 2a$

$y_3 = 0$

72. $(x-h)^2 + y^2 = h^2$

diff

$(x-h) + yy_1 = 0$

$\Rightarrow h = x + yy_1$

$\Rightarrow (-yy_1)^2 + y^2 = (x + yy_1)^2$

$\Rightarrow 2xy\dfrac{dy}{dx} + x^2 - y^2 = 0$

73 cubing on both side

$\left(y^2\left(y''\right)^2 + x^2y^2 - sinx\right)^3 = -27x^3y'$

Order=3 ,Degree =6

74. $\dfrac{dy}{dx} + \dfrac{x}{1+x^2}.y = \dfrac{x^3}{1+x^2}$

$I.\text{F} = e^{\frac{1}{2}\int\frac{2x}{1+x^2}dx} = \sqrt{1+x^2}$

75. $y = vx$

$v + x\dfrac{dy}{dx} = \dfrac{v^2}{v - v^2 - 1}$

$\dfrac{v - v^2 - 1}{v^3 + v}dv = \dfrac{dx}{x}$

$\Rightarrow \int \dfrac{v}{v(v^2+1)} - \dfrac{1+v^2}{v(1+v^2)}dv = \int \dfrac{dx}{d}$

$\Rightarrow Tan^{-1}v - \log v = \log x + c$

$\Rightarrow Tan^{-1}\left(\dfrac{y}{x}\right) = \text{logy+c}$

$\therefore \text{f}\left(y\right) = \log y$

$\text{f}(\text{e}^3) = 3$

76. $ym = k$

$y\dfrac{dy}{dx} = k$

$\dfrac{y^2}{2} = kx + c$

$\Rightarrow y^2 - 2c = 2kx$

77. IPE

78. $y = ax + b$

$y_1 = a$

$y_2 = 0$

79 $\int \dfrac{e^{1/y^2}}{y_3}dy = \dfrac{\cos\sqrt{x}}{\sqrt{x}}dx$

$\dfrac{1}{y^2} = t \quad ; \quad x = s^2$

$\therefore -\dfrac{1}{2}\int e^t dt = 2\int \cos s \; ds$

$e^t = -4\sin s + c$

$e^{1/y^2} = -4\sin\sqrt{x} + c$

$(0,1) \rightarrow \boxed{C = e}$

$\therefore e^{1/y^2} = -4\sin\sqrt{x} + e$

$\dfrac{1}{y^2} = \log(e - 4\sin\sqrt{x})$

80. conceptual

81 $\dfrac{xdy - ydx}{y^2} = \dfrac{1}{y}dy$

$\Rightarrow -d\left(\dfrac{x}{y}\right) = \dfrac{1}{y}dy$

$\Rightarrow \dfrac{-x}{y} = \log cy$

$\Rightarrow y = A.e^{-x/y}$

82 $(x-h)^2 + (y-3)^2 = r^2 ....(1)$

$(x-h) + (y-3)y_1 = 0$

$from (1)$

$(y-3)^2[1 + y_1^2] = r^2$

83 $xy_2^{1/3} + 2x^2(y_2)^{5/3} = -(7y_1 + y)$

cubing on both side

$x^3y_2 + 8x^6y_2^5 - 32x^3y_2^2(7y_1 + y)$

$= -(7y_1 + y)^3$

84. $\dfrac{y}{1+y^2}dy - \dfrac{1}{x}dx = 0$

$\log\left|1 + y^2\right| - 2\log x = c$

$(1,0) \Rightarrow \boxed{C = 0}$

$\therefore \log\left|1 + y^2\right| - 2\log x = 0$

85. $ax^2 + by^2 = 1$

$ax + byy_1 = 0....(1)$

$a + b(yy_2 + y_1^2) = 0$

from B

$-bx[yy_2 + y_1^2] + byy_1 = 0$

86. $\left(\frac{d^2y}{dx^2}\right)^3 = y\frac{dy}{dx} + x\sin\left(\frac{dy}{dx}\right)^4$

Order =2 , degree not defined

87. $\frac{dy}{dx} = \frac{x(y+1)-2(y+1)}{x(y+2)+1(y-2)}$

$= \frac{(y+1)(x-2)}{(y-2)(x+1)}$

$\therefore \int \frac{y-2}{y+1}dy = \int \frac{x-2}{x+1}dx$

$\Rightarrow \int\left[\frac{y+1}{y+1} - \frac{3}{y+1}\right]dy = \int\left[\frac{x+1}{x+1} - \frac{3}{x+1}\right]dx$

$\Rightarrow c + y - 3\log|y+1| = x - 3\log(x+1)$

88. $\frac{x}{a^2} + \frac{yy_1}{b_2} = 0 \quad ...(1)$

$\frac{1}{a^2} + \frac{yy_2 + y_1^2}{b^2} = 0$

$from(1) - x\left(\frac{yy_2 + y_1^2}{b^2}\right) + \frac{yy_1}{b^2} = 0$

89 Not defined

90. $2x - 3y = t$

$2 - \frac{dt}{dx} = \frac{3t+15}{3t+7}$

$\frac{dt}{dx} = \frac{3t-1}{3t+7}$

$\Rightarrow \int\left(\frac{3t-1}{3t-1} + \frac{8}{3t-1}\right)dt = \int dx$

$\Rightarrow t + \frac{8}{3}\log|3t-1| = x + c$

$\Rightarrow 2x - 3y + \frac{8}{3}\log|6x - 9y - 1| = 2x + c$

91. *Statement* : 1

$x^2 + (y-h)^2 = k^2$

$2x + 2(y-h)y_1 = 0$

$x^2 + \left(\frac{-x}{y_1}\right)^2 = k^2$

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

Statement2 :

$(x-h)^2 + y^2 = h^2$

$x - h + yy_1 = 0$

$h = x + yy_1$

$\therefore (-yy_1)^2 + y^2 = (x + yy_1)^2$

92. $2yy_1 - 5a = 0$

$\Rightarrow 5a = 2yy_1$

$\therefore y^2 - x(2yy_1) - 5\left(\frac{2yy_1}{5}\right)^{\frac{3}{2}} = 0$

$= (y^2 - 2yy_1) = \frac{8}{5}(yy_1)^3$

Order m=1, degree n=3

93. $\left[\sin x - \frac{2x}{1+x^2}\right]dx = \int \frac{\log y}{y}dy$

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

94. No. of obituary Constant are 4

95. A: Net defined

R: True

96. $\frac{\cos\sqrt{x}}{\sqrt{x}}dx - \frac{2e^{1/v}}{y^2}dy = 0$

$x = t^2 \qquad \frac{1}{y} = s$

$2\int \cos t dt + 2\int e^s ds = 0$

$2\sin\sqrt{x} + 2e^{1/y} = c$

$(\pi^2, 1) = 1\ \boxed{c = 2e}$

$\sin\sqrt{x} + e^{1/y} = e$

97 Conceptual

98. Conceptual

99. Conceptual

100. $y = \frac{\log x}{x} \Rightarrow xy = \log x$

$xy_1 + y(1) = \frac{1}{x} \Rightarrow x^2y_1 + xy = 1$

$x^2y_1 + xy - 1 = 0 \Rightarrow x^2y_2 + 2xy_1 + xy_1 + y = 0$

$\therefore x^2y_2 + 3xy_1 + y = 0$

101. $f(x) = x^2 + ax + b \quad G.T\ f(0) = 2 \therefore b = 2$

$\therefore f(x) = x^2 + ax + 2 \quad G.T\ f'(4) = \frac{-3}{4}$

POINTS ARE $A(0,2), B(8,\beta)$

$m =$ slope of $\overline{AB}$

$\Rightarrow \frac{\beta - 2}{8 - 0} = \frac{-3}{4} \Rightarrow \beta - 2 = -6 \Rightarrow \beta = -4$

102. Conceptual

103. Conceptual

104 Conceptual

105. $Take\,\alpha = \beta = 1\,and\,\delta = 1,\ \gamma = -1$

Then the given Equation Reduces to

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

$$\Rightarrow \frac{dy}{dx} = \frac{y}{x}\left[\ln\left(\frac{y}{x}\right)+1\right]$$

Which is a homogeneous equation

106. Tan x.Tan y dx+ cos2x csc2ydy=0

$$\Rightarrow \int Tan\,x.\sec^2 x\,dx + \int \cot y \csc^2 y\,dy = c_1$$

$$\frac{(Tanx)^2}{2} - \frac{(-\cot y)^2}{2} = c_1$$

$$Tan^2 x - \cot^2 y = c,\ Where\ c = 2c_1$$

107. IPE

108. Given

$$x^3 \sin y\frac{dy}{dx} = 2$$

$$\sin y dy = \frac{2}{x^3}dx$$

$$\int \sin y dy = 2\int \frac{dx}{x^3}$$

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

$$\lim_{x\to\infty} y(x) = \frac{\pi}{2}$$

109. IPE

110. IPE

111. Given

$$\frac{dy}{dx} = 1 - \frac{1}{x^2}$$

$$\int 1\,dx - \int \frac{1}{x^2}dx = x + \frac{1}{x} + c$$

$$\therefore\ y = x + \frac{1}{x} + c\ \rightarrow (1)$$

$$at\,(1,2) \Rightarrow 2 = 1 + \frac{1}{1} + c\ \Rightarrow c = 0$$

$$from\ (1)\quad y = x + \frac{1}{x}$$

112. $y = Ae^{Bx} \Rightarrow y^1 = ABe^{Bx} \Rightarrow y^1 = yB$

$$\Rightarrow B = \frac{y^1}{y}\ \Rightarrow \frac{y.y^{11} - (y^1)^2}{y^2} = 0 \Rightarrow y y^{11} - (y^1)^2 = 0$$

113. $\frac{dy}{dx} = 4x + 3y$

$$\frac{dy}{dx} - 3y = 4x$$

$$I.F = e^{-3\int 1 dx}$$

$$= e^{-3x}$$

114. $(1+y^2)dx = xy\,dy$

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

$$\int \frac{1}{x}dx = \int \frac{y}{1+y^2}dy$$

$$\log x = \frac{1}{2}\log(1+y^2) + \log C$$

$$x = (1+y^2)^{1/2} C.......(1)$$

$$Put\ x = 1, y = 0\ in\ (1)$$

$$\boxed{C = 1}$$

$$(1) \Rightarrow x = (1+y^2)^{1/2}(1)$$

$$x = (1+y^2)^{1/2}\quad \Rightarrow x^2 = 1 + y^2$$

$$\Rightarrow x^2 -- y^2 = 1$$

Which is a part of hyperbola

115. $y = e^{2x}\left(c\cosh\sqrt{2}x + d\sin h\sqrt{2}x\right).....(1)$

$$y^1 = e^{2x}\left(c\sinh\sqrt{2}x(\sqrt{2}) + d\cosh\sqrt{2}x(\sqrt{2})\right) + \left(c\cos h\sqrt{2}x + d\sin h\sqrt{2}x\right)(2e^{2x})$$

$$y^1 = e^{2x}\left(\sqrt{2}c\sin h\sqrt{2}x + \sqrt{2}d\cos h\sqrt{2}x\right) + 2y\ (from\ 1)$$

$$y^1 - 2y = e^{2x}\left(\sqrt{2}c\sin h\sqrt{2}x + 2\sqrt{d}\cos h\sqrt{2}x\right).....(2)$$

$$y^{11} - 2y^1 = e^{2x}\left(\sqrt{2}c\cos h\sqrt{2}x(\sqrt{2}) + \sqrt{2}d\sin h\sqrt{2}x(\sqrt{2})\right)$$

$$+\left(\sqrt{2}c\sin h\sqrt{2}x + \sqrt{2}d\cos h\sqrt{2}x\right)(2e^{2x})$$

$$y^{11} - 2y^1 = e^{2x}\left(2c\cos h\sqrt{2}x + 2d\sin h\sqrt{2}x\right) + 2(y^1 - 2y)\ (from\ 2)$$

$$y^{11} - 2y^1 = 2e^{2x}\left(c\cos h\sqrt{2}x + d\sin h\sqrt{2}x\right) + 2y^1 - 4y$$

$$y^{11} - 2y^1 = 2y + 2y^1 - 4y$$

$$\therefore y^{11} - 4y^1 + 2y = 0$$

116. IPE

117. $y = c_1e^x + c_2e^{\log_e x} + c_3\sin^2 x - c_4(\cos^2 x - 1)$

$$y = C_1e^x + c_2e^{\log_e x} + c_3\sin^2 x + c_4\sin^2 x$$

$$= C_1e^x + c_2e^{\log_e x} + (c_3 + c_4)\sin^2 x$$

No of arbitrary constants=3

Order=3

118. $$3x^2\frac{d^2y}{dx^2} - \sin\left(\frac{d^3y}{dx^3}\right) + \cos(xy) = 0$$

$$3x^2\frac{d^2y}{dx^2}+\cos(xy)=\sin\left(\frac{d^3y}{dx^3}\right)$$

Order=3

Degree= can't be defined

(since sin x has infinite expansion)

119. *Given* $y(1)=\log e$

$$x\frac{dy}{dx}=y+x\,e^{-\left(\frac{y}{x}\right)}\Rightarrow\frac{dy}{dx}=\frac{y}{x}+e^{\frac{-y}{x}}\rightarrow(1)$$

$$\text{put}\quad y=vx\Rightarrow\frac{dy}{dx}=v+x\frac{dv}{dx}$$

$$v+x\frac{dv}{dx}=v+e^{-v}\Rightarrow x\frac{dv}{dx}=e^{-v}$$

$$\Rightarrow\int e^{v}dv=\int\frac{dx}{x}\Rightarrow e^{v}=\log x+c$$

$$e^{\frac{y}{x}}=\log x+c\qquad AT\quad x=1,\quad y=\log e$$

$$\therefore c=e$$

$$e^{\frac{y}{x}}=\log x+e$$

$$\frac{y}{x}=\log(\log x+e)$$

$$AT\quad x=e$$

$$\frac{y}{e}=\log(\log e+e)$$

$$\Rightarrow y=e\log(1+e)$$

120. Option 4 $\Rightarrow x(x\,dy+y\,dx)=1$

$$d(xy)=\frac{1}{x}$$

121. 2h+3k-7=0

3h+2k-8=0

By solving we get (h, k)=(2, 1)

122. $\frac{dx}{dy}+P(y).x=Q(y)$

$$\text{I.F}=e^{\int P\,dy}=\log y$$

Apply log on both sides

$$\int P\,dy.\log e=\log(\log y)$$

Differentiating on both sides

$$P(y)=\frac{1}{y\log y}$$

123. Put x – y – 1 = t

$$1-\frac{dy}{dx}=\frac{dt}{dx}$$

$$1-\frac{dt}{dx}=\cos^2 t$$

$$\sin^2 t=\frac{dt}{dx}$$

Cosec2dt = dx

C – cot t = x

X = c – cos t

X = c – cos (x – y – 1)

124. It can't be expressed as a polynomial degree not defined .

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

$$\text{I.F}=e^{-\int\frac{-2x}{1-x^2}dx}=e^{-\log|1-x^2|}=\frac{1}{1-x^2}$$

$$y\left(\frac{1}{1-x^2}\right)=\int\frac{x}{(1-x^2)^{3/2}}\,dx+c$$

$$y\left(\frac{1}{1-x^2}\right)=\frac{1}{\sqrt{1-x^2}}+c$$

Given y (0) = 1

$$\frac{\cancel{1}}{\cancel{1}-0}=\frac{\cancel{1}}{\cancel{\sqrt{1-0}}}+c\qquad(c=0)$$

$$y=\sqrt{1-x^2}+0$$

$$y\left(\frac{1}{2}\right)=\sqrt{1-\frac{1}{4}}=\frac{\sqrt{3}}{2}$$

126. Given parabola $y^2=4a(x+a)\rightarrow(1)$

Diff w.r.to 'x'

$$2y.\frac{dy}{dn}=4a\ \rightarrow(2)$$

sub 1 & 2, we get

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

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

Here $m = 1$ *order* & $n = 2$ *degree*

$\therefore mn - n + n = 2 - 1 + 2 = \underline{3}$

127. *Given* $\frac{dy}{dx} + f^1(x).y = f(x).f^1(x)$

Here $p(x) = f^1(x)$, $Q(x) = f(x).f^1(x)$

$$I.F = e^{\int p(x)} = e^{\int f^1(x).dx} = e^{f(x)}$$

$G.S$ $y.e^{f(x)} = \int f(x).e^{f(x)}.f^1(x).dx$

$= \int te^t.dt$

$= e^t(t-1) + c$

$= e^{f(x)}[f(x) - 1] + c$

$\therefore y = f(x) - 1 + ce^{-f(x)}$

128 Equation of the parabola $y^2 = 4a(x-h)$

$\cancel{2}yy' = \cancel{4}^2 a$

$y.y'' + y'y' = 0$

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

order $= 2$, *degree* $= 1$

129 $\left(x\sin\frac{y}{x}\right)dy = \left(y\sin\frac{y}{x} - x\right)dx$

$$\frac{dy}{dx} = \frac{y\sin\frac{y}{x} - x}{x\sin\frac{y}{x}} = \frac{\cancel{x}\left(\frac{y}{x}\sin\frac{y}{x} - 1\right)}{\cancel{x}\sin\frac{y}{x}}$$

$y = vx \Rightarrow v = \frac{y}{x}$

$-\int \sin v\, dv = \int \frac{dx}{x}$

$\cos v = \log|x| + c$

$\cos\frac{y}{x} = \log|x| + c$

130 $(2x - 10y^3)dy + y\,dx = 0$

$$\frac{dx}{dy} + \frac{2x}{y} = 10y^2$$

$I.F = e^{\int p\,dy} = y^2$

G.S of given equation is

$x.I.F = \int Q.I.F\,dy$

$xy^2 = 2y^5 + c$

$xy^2 - 2y^5 = c$

131 $y = Ae^x + B\sin 2x$

$$\frac{dy}{dx} = Ae^x + 2B\cos 2x$$

$$\frac{d^2y}{dx^2} = Ae^x - 4B\sin 2x$$

By option verification sub these values

In option (1) we will get zero

132 $\frac{dy}{dx} = \sin(x-y) + \cos(x-y)$

$x - y = t$

$$1 - \frac{dt}{dx} = \frac{dy}{dx}$$

$$1 - \frac{dt}{dx} = \sin t + \cos t$$

$$1 - \sin t - \cos t = \frac{dt}{dx}$$

$$\int 1dx = \int \frac{dt}{1 - \sin t - \cos t}$$

$$\boxed{Tan\frac{x}{2} = t}$$

$$x = \int \frac{1}{1 - \left(\frac{2t}{+t^2}\right) . - \left(\frac{1-t^2}{1+t^2}\right)} \frac{2dt}{1+t^2}$$

$$x = 2\int \frac{1}{2t^2 - 2t}dt$$

$$x = \int \frac{-1}{t}dt + \int \frac{1}{t-1}dt$$

$x = -\log|t| + \log(t-1)$

$$x = \log\left|\frac{t-1}{t}\right|$$

$$=\log\left|\frac{Tan\frac{(x-y)}{2} - 1}{Tan\left(\frac{x-y}{2}\right)}\right| = x + c$$

133 $x^2dy=\left(xy-y^2\right)dx$

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

Let $y=vx \Rightarrow v=\frac{y}{x}$

$$\frac{dy}{dx}=v+x\frac{dv}{dx}$$

$$v+x.\frac{dv}{dx}=\frac{\cancel{x}.v\cancel{x}-v^2\cancel{x}^2}{\cancel{x}^2}$$

$$\cancel{v}+x.\frac{dv}{dx}=\cancel{v}-v^2$$

$$x.dv=-v^2dx$$

$$\int\frac{dv}{-v^2}=\int\frac{dx}{x}$$

$$\frac{1}{v}=\log x-c$$

$$\frac{x}{y}=\log x-c$$

$$x=y\log x-cy$$

$$\boxed{y\log x=x+cy}$$

134 $y^2=4a\left(x+a\right)$

$$2y\frac{dy}{dx}=4a \Rightarrow a=\frac{y\frac{dy}{dx}}{2}$$

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

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

Order = 1, degree =2 =n

= m

m +n2 = 1+4 =5

135 IPE

136 $\left(x^2+2\right)dy+2xy\,dx=e^x\left(x^2+2\right)dx$

$$\left(x^2+2\right)dy=\left(e^x\left(x^2+2\right)-2xy\right)dx$$

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

$$\frac{dy}{dx}+\frac{2x}{x^2+2}y=e^x$$

$$ye^{\int\frac{2x}{x^2+2}dx}=\int e^x\left(\int\frac{2x}{x^2+2}dx\right)dx$$

$$y(x^2+2)=x^2e^x-2xe^x+2e^x+2e^x+c$$

$$y\left(x^2+2\right)=\int\left(e^xx^2+2e^x\right)dx$$

$$y(x^2+2)=x^2e^x-2xe^x+2e^x+2e^x+c$$

$$y\left(x^2+2\right)=e^x\left(x^2-2x+4\right)+c$$

137 (3x-4y)(dx-3dy)+(6dx-4dy)=0

(3x-4y+6)dx=(9x-12y+4) dy

$$\frac{dy}{dx}=\frac{3x-4y+6}{9x-12y+4}$$

$$3x-4y=t$$

$$3-4\frac{dy}{dx}=\frac{dt}{dx}$$

$$3-\frac{dt}{dx}=4.\frac{dy}{dx}\Rightarrow\frac{dy}{dx}=\frac{1}{4}.\left(3-\frac{dt}{dx}\right)$$

$$\frac{1}{4}.\left(3-\frac{dt}{dx}\right)=\frac{t+6}{3t+4}$$

$$\int dx=\int\frac{3t+4}{5t-12}dt$$

$$x=\frac{3}{5}t+\frac{56}{25}\log\left|15x-20y-12\right|+c$$

$$x=\frac{3}{5}(3x-4y)+\frac{56}{25}\log\left|15x-20y+12\right|+c$$

$$5x-15y+14\log\left|15x-20y-12\right|=c$$

138 IPE