DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 6**

Topic :-DIFFERENTIAL EQUATIONS

1. The general solution $e^x \cos y\, dx - e^x \sin y\, dy = 0$, is
   a) $e^x(\sin y + \cos y) = C$ b) $e^x \sin y = C$ c) $e^x = C\cos y$ d) $e^x \cos y = C$

2. $y = ae^{mx} + be^{-mx}$ satisfies which of the following differential equation?
   a) $\frac{dy}{dx} - my = 0$ b) $\frac{dy}{dx} + my = 0$ c) $\frac{d^2y}{dx^2} + m^2y = 0$ d) $\frac{d^2y}{dx^2} - m^2y = 0$

3. The solution of $\frac{dy}{dx} + y = e^{-x}$, $y(0) = 0$, is
   a) $y = e^{-x}(x - 1)$ b) $y = xe^{-x}$ c) $y = xe^{-x} + 10$ d) $y = (x + 1)e^{-x}$

4. The general solution of the differential equation $(1 + y^2)dx + (1 + x^2)dy = 0$ is
   a) $x - y = c(1 - xy)$ b) $x - y = c(1 + xy)$ c) $x + y = c(1 - xy)$ d) $x + y = c(1 + xy)$

5. If the integrating factor of the differential equation $\frac{dy}{dx} + P(x)y = Q(x)$ is x, then $P(x)$ is
   a) x b) $x^2/2$ c) $1/x$ d) $1/x^2$

6. The order of the differential equation $\frac{d^2y}{dx^2} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$ is
   a) 3 b) 2 c) 1 d) 4

7. The solution of $\frac{dy}{dx} + \sqrt{\left(\frac{1 - y^2}{1 - x^2}\right)} = 0$ is
   a) $\tan^{-1} x + \cot^{-1} x = c$ b) $\sin^{-1} x + \sin^{-1} y = c$
   c) $\sec^{-1} x + \operatorname{cosec}^{-1} x = c$ d) None of these

8. Solution of the differential equation $x\, dy - y\, dx = 0$ represents
   a) A parabola whose vertex is at the origin
   b) A circle whose centre is at the origin
   c) A rectangular hyperbola
   d) Straight lines passing through the origin

9. The differential equation of the family of circles passing through the fixed points $(a,0)$ and $(-a,0)$ is

a) $y_1(y^2 - x^2) + 2xy + a^2 = 0$ b) $y_1y^2 + xy + a^2x^2 = 0$

c) $y_1(y^2 - x^2 + a^2) + 2xy = 0$ d) $y_1(y^2 + x^2) - 2xy + a^2 = 0$

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

a) $x - y = ke^{x-y}$ b) $x + y = ke^{x+y}$ c) $x + y = ke^{x-y}$ d) $(x - y) = ke^{x+y}$

11. The general solution of $y^2dx + (x^2 - xy + y^2)dy = 0$ is

a) $\tan^{-1}\left(\frac{x}{y}\right) + \log y + c = 0$ b) $2\tan^{-1}\left(\frac{x}{y}\right) + \log x + c = 0$

c) $\log\left(y + \sqrt{x^2 + y^2}\right) + \log y + c = 0$ d) $\sin h^{-1}\left(\frac{x}{y}\right) + \log y + c = 0$

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

a) 3,2 b) 3,10 c) 2,3 d) 3,5

13. The solution of $x\,dy - y\,dx + x^2e^x dx = 0$ is

a) $\frac{y}{x} + e^x = c$ b) $\frac{x}{y} + e^x = c$ c) $x + e^y = c$ d) $y + e^x = c$

14. The solution of the differential equation $\frac{dy}{dx} = \frac{x - y + 3}{2(x - y) + 5}$ is

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

c) $2(x - y) + \log(x - y + 2) = x + c$ d) None of the above

15. The differential equation whose solution is $Ax^2 + By^2 = 1$, where A and B are arbitrary constants, is of

a) First order and second degree b) First order and first degree

c) Second order and first degree d) Second order and second degree

16. If $y = f(x)$ is the equation of the curve an its differential equation is given by $\frac{dy}{dx} = \frac{x + 2}{y + 3}$, then the equation of the curve, if it passes through (2, 2), is

a) $x^2 - y^2 + 4x - 6y + 4 = 0$ b) $x^2 - y^2 + 4x + 6y = 0$

c) $x^2 - y^2 - 4x - 6y = 0$ d) $x^2 - y^2 - 4x - 6y - 4 = 0$

17. The differential equation of the family of curves $y^2 = 4\,a\,(x + a)$, is

a) $y^2 = 4\frac{dy}{dx}\left(x + \frac{dy}{dx}\right)$

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

c) $2y\frac{dy}{dx} = 4a$

d) $y^2\frac{dy}{d} + 4y = 0$

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

a) e^x b) $\log x$ c) $\log(\log x)$ d) x

19. The differential equation which represents the family of plane curves $y=\exp(cx)$ is

a) $y'=cy$ b) $xy'-\log y=0$ c) $x\log y=yy'$ d) $y\log y=xy'$

20. The solution of $\frac{dy}{dx}+y\tan x=\sec x$ is

a) $y\sec x=\tan x+c$ b) $y\tan x=\sec x+c$ c) $\tan x=y\tan x+c$ d) $x\sec x=y\tan y+c$