DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 1**

Topic :-DIFFERENTIAL EQUATIONS

1. The order and degree of the differential equation $\sqrt{y+\frac{d^2y}{dx^2}} = x + \left(\frac{dy}{dx}\right)^{3/2}$ are
   a) 2,2 b) 2,1 c) 1,2 d) 2,3

2. The solution of $\frac{dy}{dx} + y = e^x$ is
   a) $2y = e^{2x} + c$ b) $2ye^x = e^2 + c$ c) $2ye^x = e^{2x} + c$ d) $2ye^{2x} = 2e^x + c$

3. If $\phi(x) = \phi'(x)$and $\phi(1) = 2$, then $\phi(3)$ equals
   a) e^2 b) $2\,e^2$ c) $3\,e^2$ d) $2\,e^3$

4. The general solution of the differential equation $\frac{dy}{dx} + \sin\left(\frac{x+y}{2}\right) = \sin\left(\frac{x-y}{2}\right)$ is
   a) $\log\tan\left(\frac{y}{2}\right) = c - 2\sin x$ b) $\log\tan\left(\frac{y}{4}\right) = c - 2\sin\left(\frac{x}{2}\right)$
   c) $\log\tan\left(\frac{y}{2}+\frac{\pi}{4}\right) = c - 2\sin x$ d) $\log\tan\left(\frac{y}{4}+\frac{\pi}{4}\right) = c - 2\sin\left(\frac{x}{2}\right)$

5. The differential equation of family of curves $x^2 + y^2 - 2ax = 0$, is
   a) $x^2 - y^2 - 2xy\,y' = 0$ b) $y^2 - x^2 = 2xy\,y'$ c) $x^2 + y^2 + 2y'' = 0$ d) None of these

6. The order of the differential equation whose general solution is given by $y = (c_1 + c_2)\cos(x + c_3) - c_4 e^{x+c_5}$ where c_1, c_2, c_3, c_4, c_5 are arbitrary constants, is
   a) 4 b) 3 c) 2 d) 5

7. The degree of the equation $e^x + \sin\left(\frac{dy}{dx}\right) = 3$ is
   a) 2 b) 0
   c) Degree is not defined d) 1

8. If $x = \sin t\,, y = \cos pt$, then
   a) $(1-x^2)y_2 + xy_1 + p^2y = 0$ b) $(1-x^2)y_2 + xy_1 - p^2y = 0$
   c) $(1+x^2)y_2 - xy_1 + p^2y = 0$ d) $(1-x^2)y_2 - xy_1 + p^2y = 0$

9. The differential equation representing the family of curves $y = xe^{cx}$ (c is a constant) is
   a) $\frac{dy}{dx} = \frac{y}{x}\left(1 - \log\frac{y}{x}\right)$ b) $\frac{dy}{dx} = \frac{y}{x}\log\left(\frac{y}{x}\right) + 1$ c) $\frac{dy}{dx} = \frac{y}{x}\left(1 + \log\frac{y}{x}\right)$ d) $\frac{dy}{dx} + 1 = \frac{y}{x}\log\left(\frac{y}{x}\right)$

10. The degree and order of the differential equation $y = px + \sqrt[3]{a^2p^2 + b^2}$, where $p = \frac{dy}{dx}$, are respectively
    a) 3,1 b) 1,3 c) 1,1 d) 3,3

11. The degree of the differential equation $y_3^{2/3} + 2 + 3y_2 + y_1 = 0$, is
a) 1 b) 2 c) 3 d) None of these

12. If $x^2 + y^2 = 1$, then $\left(y' = \frac{dy}{dx}, y'' = \frac{d^2y}{dx^2}\right)$
a) $yy'' - (2y')^2 + 1 = 0$ b) $yy'' + (y')^2 + 1 = 0$ c) $y'' - (y')^2 - 1 = 0$ d) $y'' + 2(y')^2 + 1 = 0$

13. The solution of the differential equation $\frac{dy}{dx} = \frac{x \log x^2 + x}{\sin y + y \cos y}$, is
a) $y \sin y = x^2 \log x + C$
b) $y \sin y = x^2 + C$
c) $y \sin y = x^2 + \log x + C$
d) $y \sin y = x \log x + C$

14. To reduce the differential equation $\frac{dy}{dx} + P(x).y = Q(x).y^n$ to the linear form, the substitution is
a) $v = \frac{1}{y^n}$ b) $v = \frac{1}{y^{n-1}}$ c) $v = y^n$ d) $v = y^{n-1}$

15. The equation of the curve whose subnormal is equal to a constant a is
a) $y = ax + b$ b) $y^2 = 2ax + 2b$ c) $ay^2 - x^3 = a$ d) None of these

16. A particle starts at the origin and moves along the x-axis in such a way that its velocity at the point $(x, 0)$ is given by the formula $\frac{dx}{dt} = \cos^2 \pi x$. Then, the particle never reaches the point on
a) $x = \frac{1}{4}$ b) $x = \frac{3}{4}$ c) $x = \frac{1}{2}$ d) $x = 1$

17. The solution of the equation $\frac{dy}{dx} = \frac{x+y}{x-y}$ is
a) $c(x^2 + y^2)^{1/2} + e^{\tan^{-1}(y/x)} = 0$ b) $c(x^2 + y^2)^{1/2} = e^{\tan^{-1}(y/x)}$
c) $c(x^2 - y^2) = e^{\tan^{-1}(y/x)}$ d) None of the above

18. The solution of the equation $\frac{d^2y}{dx^2} = e^{-2x}$ is
a) $\frac{e^{-2x}}{4}$ b) $\frac{e^{-2x}}{4} + cx + d$ c) $\frac{1}{4}e^{-2x} + cx^2 + d$ d) $\frac{1}{4}e^{-2x} + c + d$

19. If $x^2 + y^2 = 1$, then
a) $yy'' - (2y')^2 + 1 = 0$ b) $yy'' + (y')^2 + 1 = 0$
c) $yy'' - (y')^2 - 1 = 0$ d) $yy'' + 2(y')^2 + 1 = 0$

20. The equation of the curve whose slope is $\frac{y-1}{x^2+x}$ and which passes through the point $(1, 0)$ is
a) $xy + x + y - 1 = 0$ b) $xy - x - y - 1 = 0$ c) $(y - 1)(x + 1) = 2x$ d) $y(x + 1) - x + 1 = 0$