DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 10**

Topic :-DIFFERENTIAL EQUATIONS

1. The solution of differential equation $(1+y^2)+(x-e^{\tan^{-1}y})\frac{dy}{dx}=0$ is
   a) $2xe^{\tan^{-1}y}=e^{2\tan^{-1}y}+k$ b) $2xe^{\tan^{-1}y}=e^{\tan^{-1}y}+k$
   c) $xe^{\tan^{-1}y}=e^{\tan^{-1}y}+k$ d) $xe^{\tan^{-1}y}=e^{\tan^{-1}y}+k$

2. The solution of $e^{dy/dx}=(x+1)$, $y(0)=3$ is
   a) $y=x\log x-x+2$ b) $y=(x+1)\log|x+1|-x+3$
   c) $y=(x+1)\log|x+1|+x+3$ d) $y=x\log x+x+3$

3. The solution of the equation $x^2\frac{d^2y}{dx^2}=\log x$ when $x=1$, $y=0$ and $\frac{dy}{dx}=-1$ is
   a) $y=\frac{1}{2}(\log x)^2+\log x$ b) $y=\frac{1}{2}(\log x)^2-\log x$
   c) $y=-\frac{1}{2}(\log x)^2+\log x$ d) $y=-\frac{1}{2}(\log x)^2-\log x$

4. The order of the differential equation whose solution is $y=a\cos x+b\sin x+ce^{-x}$, is
   a) 3 b) 1 c) 2 d) 4

5. The differential equation for which $\sin^{-1}x+\sin^{-1}y=c$, is given by
   a) $\sqrt{1-x^2}dx+\sqrt{1-y^2}dy=0$ b) $\sqrt{1-x^2}dy+\sqrt{1-y^2}dx=0$
   c) $\sqrt{1-x^2}dy-\sqrt{1-y^2}dx=0$ d) $\sqrt{1-x^2}dx-\sqrt{1-y^2}dy=0$

6. A continuously differential function $\phi(x)$ in $(0,\pi)$satisfying $y'=1+y^2$, $y(0)=0=y(\pi)$, is
   a) $\tan x$ b) $x(x-\pi)$ c) $(x-\pi)(1-e^x)$ d) Not possible

7. A solution of the differential equation $\left(\frac{dy}{dx}\right)^2-x\frac{dy}{dx}+y=0$ is
   a) $y=2$ b) $y=2x$ c) $y=2x-4$ d) $y=2x^2-4$

8. If $y=a\sin(5x+c)$, then
   a) $\frac{dy}{dx}=5y$ b) $\frac{dy}{dx}=-5y$ c) $\frac{d^2y}{dx^2}=-25y$ d) $\frac{d^2y}{dx^2}=25y$

9. An integrating factor of the differential equation $(1-x^2)\frac{dy}{dx} - xy = 1$ is

a) $-x$ b) $-\frac{x}{(1-x^2)}$ c) $\sqrt{(1-x^2)}$ d) $\frac{1}{2}\log(1-x^2)$

10. The slope of a curve at any point is the reciprocal of twice the ordinate at the point and it passes through the point (4, 3). The equation of the curve is

a) $x^2 = y + 5$ b) $y^2 = x - 5$ c) $y^2 = x + 5$ d) $x^2 = y - 5$

11. The integrating factor of the differential equation $\cos x\left(\frac{dy}{dx}\right) + y\sin x = 1$ is

a) $\sec x$ b) $\tan x$ c) $\sin x$ d) $\cot x$

12. The solution of the differential equation $\frac{dy}{dx} + \frac{2x}{1+x^2}.y = \frac{1}{(1+x^2)^2}$ is

a) $y(1-x^2) = \tan^{-1}x + c$ b) $y(1+x^2) = \tan^{-1}x + c$

c) $y(1+x^2)^2 = \tan^{-1}x + c$ d) $y(1-x^2)^2 = \tan^{-1}x + c$

13. The second order differential equation is

a) $y'^2 + x = y^2$ b) $y'y'' + y = \sin x$ c) $y''' + y'' + y = 0$ d) $y' = y$

14. The differential equation $\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{y}$ determines a family of circles with

a) Variable radii and a fixed centret (0,1)

b) Variable radii and a fixed centre at (0,-1)

c) Fixed radius 1 and variable centres along the x-axis

d) Fixed radius 1 and variable centres along the y-axis

15. If $\frac{dy}{dx} + y = 2e^{2x}$, then y is equal to

a) $ce^{x} + \frac{2}{3}e^{2x}$ b) $(1-x)e^{-x} + \frac{2}{3}e^{2x} + c$

c) $ce^{-x} + \frac{2}{3}e^{2x}$ d) $e^{-x} + \frac{2}{3}e^{2x} + c$

16. If the function $y = \sin^{-1}x$, then $(1-x^2)\frac{d^2y}{dx^2}$ is equal to

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

17. The solution of $dy = \cos x(2 - y\,\text{cosec}\,x)dx$, where $y = \sqrt{2}$, when $x = \pi/4$ is

a) $y = \sin x + \frac{1}{2}\text{cosec}\,x$ b) $y = \tan(x/2) + \cot(x/2)$

c) $y = (1/\sqrt{2})\sec(x/2) + \sqrt{2}\cos(x/2)$ d) None of the above

18. The solution of the differential equation $(1+y^2)\tan^{-1}x\,dx + y(1+x^2)dy = 0$ is

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

c) $\log(1+x^2)+\log(\tan^{-1}y)+c$ d) $(\tan^{-1}x)(1+y^2)+c=0$

19. The solution of the differential equation $\frac{dy}{dx}=y\tan x-2\sin x$, is

a) $y\sin x=c+\sin 2x$ b) $y\cos x=c+\frac{1}{2}\sin 2x$

c) $y\cos x=c-\sin 2x$ d) $y\cos x=c+\frac{1}{2}\cos 2x$

20. If $y(t)$ is a solution of $(1+t)\frac{dy}{dt}-ty=1$ and $y(0)=-1$ then $y(1)$ is equal to

a) $-\frac{1}{2}$ b) $e+\frac{1}{2}$ c) $e-\frac{1}{2}$ d) $\frac{1}{2}$

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