MATHEMATICS (ASSIGNMENT-9)
TOPIC- DIFFERENTIAL EQUATIONS

1. Solution of the differential equation $\frac{dy}{dx}+\frac{y}{x}=x^2$ is

a) $y=\frac{x^2}{4}+cx^{-2}$ b) $y=x^{-1}+cx^{-3}$ c) $y=\frac{x^3}{4}+cx^{-1}$ d) $xy=x^2+c$

2. The differential equation $\cot y\, dx = x\, dy$ has a solution of the form

a) $y=\cos x$ b) $x=c\sec y$ c) $x=\sin y$ d) $y=\sin x$

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

a) 1 and 1/2 b) 2 and 1 c) 1 and 1 d) 1 and 2

4. 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) $e^{-x}+\frac{2}{3}e^{2x}+c$

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

a) $\frac{2x-1}{2y+3}=C$ b) $\frac{2x+3}{2y-1}=C$ c) $\frac{2x-1}{2y-1}=C$ d) $\frac{2y+1}{2x-3}=C$

6. If $\frac{dy}{dx}=1+x+y+xy$ and $y(-1)=0$, then the function y is

a) $e^{(1-x)^2/2}$ b) $e^{(1+x)^2/2}-1$ c) $\log_e(1+x)-1$ d) $(1+x)$

7. If $y'=\frac{x-y}{x+y}$, then its solution is

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

8. The solution of the equation $y-x\frac{dy}{dx}=a\left(y^2+\frac{dy}{dx}\right)$ is

a) $y=c(x+a)(1-ay)$ b) $y=c(x+a)(1+ay)$

c) $y=c(x-a)(1+ay)$ d) None of these

9. Integral curve satisfying $y'=\frac{x^2+y^2}{x^2-y^2}$, $y(1)=2$ has the slope at the point $(1,0)$ of the curve is equal to

a) $-5/3$ b) -1 c) 1 d) $5/3$

10. 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) $x\sec x=\tan y+c$

11. The differential equation of the family of curve $y^2=4a(x+1)$, is

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

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

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

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

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

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

13. The equation of the curve passing through the origin and satisfying the differential equation $(1 + x^2)\frac{dy}{dx} + 2xy = 4x^2$ is

a) $(1 + x^2)y = x^3$ b) $2(1 + x^2)y = 3\,x^3$ c) $3(1 + x^2)y = 4\,x^3$ d) None of these

14. $y = Ae^x + Be^{2x} + Ce^{3x}$ satisfies the differential equation

a) $y''' - 6y' + 11y' - 6y = 0$
b) $y''' + 6y'' + 11y' + 6y = 0$
c) $y''' + 6y'' - 11y' + 6y = 0$
d) $y''' - 6y'' - 11y' + 6y = 0$

15. The family of curves $y = e^{a \sin x}$, where a is an arbitrary constant, is represented by the differential equation

a) $\log y = \tan x \frac{dy}{dx}$ b) $y \log y = \tan x \frac{dy}{dx}$ c) $y \log y = \sin x \frac{dy}{dx}$ d) $\log y = \cos x \frac{dy}{dx}$

16. 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) $v = y^{n-1}$

17. The solution of $\frac{dy}{dx} = \cos(x + y) + \sin(x + y)$ is

a) $\log\left[1 + \tan\left(\frac{x+y}{2}\right)\right] + c = 0$
b) $\log\left[1 + \tan\left(\frac{x+y}{2}\right)\right] = x + c$
c) $\log\left[1 - \tan\left(\frac{x+y}{2}\right)\right] = x + c$
d) None of these

18. The differential equation of the family of parabola with focus as the origin and the axis as x-axis, is

a) $y\left(\frac{dy}{dx}\right)^2 + 4x\,\frac{dy}{dx} = 4y$
b) $-y\left(\frac{dy}{dx}\right)^2 = 2x\,\frac{dy}{dx} - y$
c) $y\left(\frac{dy}{dx}\right)^2 + y = 2xy\,\frac{dy}{dx}$
d) $y\left(\frac{dy}{dx}\right)^2 + 2xy\,\frac{dy}{dx} + y = 0$

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

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

a) Variable radii and a fixed centre t (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

ANSWER- KEY

1.	C	2.	B	3.	D	4.	C	5.	B	6.	B	7.	A
8.	C	9.	C	10.	A	11.	C	12.	C	13.	C	14.	B
15.	D	16.	B	17.	B	18.	B	19.	B	20.	C		