RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATION

CBSE PRACTICE PAPER(2024)

(Mathematics)

Grade : XII **Marks: 40 marks**

Chapter: DIFFENTIAL EQUATION Set-1 **Time: 90 minutes**

SECTION A

(This section comprises of Multiple-choice questions (MCQ) of 1 mark each.)

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

(a)1 (b)2 (c)3 (d)6

2. The differential equation representing the family of curves $y^2 = 2c(x + \sqrt{c})$, where c is a positive parameter is of

(a) Order 1 (b) Order 2 (c) Degree 3 (d) Degree 4

3. $\frac{dy}{dx} = \frac{y}{x}\varphi\left(\frac{y}{x}\right)$

(a) $\varphi\left(\frac{y}{x}\right) = kx$ (b) $x\varphi\left(\frac{y}{x}\right) = k$ (c) $\varphi\left(\frac{y}{x}\right) = ky$ (d) $y\varphi\left(\frac{y}{x}\right) = k$

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

(a) (b) (c) (d)

5. $x\sec y\frac{dy}{dx} = 1$

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

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

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

7. The solution of the equation $\frac{dy}{dx} = \frac{y}{x}\left(\log\frac{y}{x} + 1\right)$ is

(a) $\log\left(\frac{y}{x}\right) = cx$ (b)$\frac{y}{x} = \log y + c$ (c)$y = \log y + 1$ (d)$y = xy + c$

8. The solution of the differential equation $xdy - ydx = (\sqrt{x^2 + y^2})dx$ is

(a)$y - \sqrt{x^2 + y^2} = cx^2$ (b)$y + \sqrt{x^2 + y^2} = cx^2$ (c)$y + \sqrt{x^2 + y^2} + cx^2 = 0$ (d)None of these

9. The solution of the equation $\frac{dy}{dx} + y\tan x = x^m\cos x$ is

(a) $(m + 1)y = x^{m+1}\cos$ (b)$my = (x^m + c)\cos x$ (c) $y = (x^{m+1} + c)\cos x$ (d) None of these

10 The solution of the differential equation $x\frac{dy}{dx} + y = x^2 + 3x + 2$ is

(a) (b) $xy = \frac{x^4}{4} + \frac{x^3}{3} + x^2 + c$ (d)

SECTION B

(This section comprises of very short answer type-questions (VSA) of 2 marks each.)

11 Find the differential equation of all non-horizontal lines in a plane

12 Solve the differential equation $\frac{dy}{dx} + 1 = e^{x+y}$

13 Find the general solution of the differential equation $(1+y^2)+(x-e^{\tan^{-1}y})\frac{dy}{dx} = 0$

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

14

15 Solve the differential equation $(1 + y^2) \tan^{-1}x\, dx + 2y(1 + x^2)\, dy = 0$.

16 Solve : $(x + y)(dx – dy) = dx + dy$.

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

17 $\frac{d(xy)}{}$

18 $\frac{dy}{}$

19 Find the equation of a curve passing through the point (1, 1). If the tangent drawn at any point P (x, y) on the curve meets the co-ordinate axes at A and B such that P is the mid-point of AB.