

CUET Mathematics Test

Chapter: Differential Equations (Advanced Set)

General Instructions

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

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1. Find the order and degree of the differential equation: $\sqrt{\frac{d^2y}{dx^2}} = \sqrt[3]{\frac{dy}{dx}} + 3$.
2. Find the order and degree of the differential equation: $\sin^{-1}\left(\frac{d^2y}{dx^2}\right) = x + y$.
3. Form the differential equation of the family of parabolas having vertex at origin and axis along the positive x-axis.
4. Find the order and degree of: $e^{\frac{d^3y}{dx^3}} - x\frac{d^2y}{dx^2} + y = 0$.
5. Solve the differential equation: $\frac{dy}{dx} = \frac{1-\cos x}{1+\cos x}$.
6. Solve: $(e^x + e^{-x})dy - (e^x - e^{-x})dx = 0$.
7. Find the particular solution of $\frac{dy}{dx} = y \tan x$, given that $y = 1$ when $x = 0$.
8. Solve the differential equation: $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$.
9. Find the general solution of: $\frac{dy}{dx} = \sin^{-1} x$.
10. Find the order and degree of the differential equation of all non-vertical lines in a plane.
11. Solve: $x\sqrt{1+y^2}dx + y\sqrt{1+x^2}dy = 0$.
12. Solve the differential equation: $y \log y dx - x dy = 0$.
13. Find the particular solution of $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$, given that $y = \sqrt{3}$ when $x = 1$.
14. Find the order and degree of: $\frac{d^2y}{dx^2} = \left[y + \left(\frac{dy}{dx}\right)^2 \right]^{1/4}$.
15. Solve: $\frac{dy}{dx} = e^{x+y} + xe^y$.
16. Find the equation of a curve passing through the point $(0, -2)$ given that at any point (x, y) on the curve, the product of the slope of its tangent and y-coordinate of the point is equal to the x-coordinate of the point.
17. Solve: $\frac{dy}{dx} = \frac{xy+y}{xy+x}$.
18. Find the order and degree of the differential equation: $\left(\frac{d^2y}{dx^2}\right)^2 + \cos\left(\frac{d^2y}{dx^2}\right) = 0$.
19. Solve: $\frac{dy}{dx} = \cos(x+y) + \sin(x+y)$. (Hint: Use substitution $u = x+y$).
20. Find the general solution of the differential equation: $\frac{dy}{dx} = \frac{y^2-y-2}{x^2+2x}$.

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