SHIKSHA CLASSES

BOARD QUESTION PAPER

Subject : Maths- II **Topic: 6. Differential Equations** **Total Marks : 20**

Class : XII **Time : 1 Hr.**

Section A

Q.1 : Choose the correct option : 4

i) The solution of cosx.cosy dy – sinx.siny dx = 0 is

a) siny cosx = c b) cosxcosy = c

c) cotxcoty = c d) tanxtany = c

ii) The differential equation obtained on eliminating A and B from $y = A\cos\omega t + B\sin\omega t$ is

a) $y'' + y' = 0$ b) $y'' = -\omega^2 y$ c) $y'' - \omega^2 y = 0$ d) $y'' + y = 0$

Q.2 :`Solve the following questions: **2**

i) Determine the order and degree of he following differential equations:

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

ii) Obtain the differntial equation by eliminating the arbitrary constants from the following

$y^2=4ax$

Section B

: Solve the following : (ANY2) 4

Q.3 :`Verify that y = logx + c is a solution of $x\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$

Q.4 :` Solve the differential equation: $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$.

Q.5 :` Obtain the differential equation by eliminating the arbitary constants y = A cos(logx) +B sin (logx)

Section C

:` Answer the following : (ANY 2) 6

Q.6 : Solve $\frac{dy}{dx} = (9x + y + 2)^2$

Q.7 : Form the differential equation by eliminating arbitary constant. $y = c_1 e^{3x} + c_2 e^{-3x}$

Q.8 : Find the particular solution $\frac{dy}{dx} = 3^{x+y}$ when $x = 0, y = 0$

Section D

: **Answer the following : (ANY 1)** 4

Q.9 : Solve $\frac{y}{x}\cos\left(\frac{y}{x}\right)\left(\frac{dy}{dx} - \frac{y}{x}\right) + \sin\left(\frac{y}{x}\right)\left(\frac{dy}{dx} + \frac{y}{x}\right) = 0$ when $x = 1$ and $y = \frac{\pi}{2}$

Q.10 : The rate of growth of the population of a city at any time t is proportional to the size of the population. For a certain city it is found that the constant of proportionality is 0.04. Find the population of the city after 25 years if the initial population is 10,000.
[Take e = 2.7182]

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