INDIAN SCHOOL NIZWA - WORKSHEET

APPLIED MATHEMATICS

3C.DIFFERENTIAL EQUATIONS

Name: _____ Date:_____ Class: XII Sec: ___

1.	Generalsolutionof differentialequation: $dy = (x^2+1)dx$ is: (a) $y = x^3/3 + \log\|x\| + C$ (b) $y = x^3 + \log\|x\| + C$ (c) $y = x^3/3 + x + C$ (d) $\log y = x^3 + x + C$
2.	The degree of the differential equation, $\left(\frac{d^2y}{dx^2}\right)^3 + \left(\frac{dy}{dx}\right)^2 + \frac{dy}{dx} = 0$ (a) 1 (b) 2 (c) 3 (d) 4
3.	The sum of the order and the degree of the differential equation $(2 + 3\frac{dy}{dx})^{\frac{2}{3}} = 5\frac{d^2y}{d^2x}$ is : (A) 3 (B) 2 (C) 5 (D) 0.
4.	The solution of the differential equation $\frac{dx}{x} + \frac{dy}{y} = 0$ is : (a) $\frac{1}{x} + \frac{1}{y} = C$ (b) $xy = C$ (c) $\log x \log y = C$ (d) $x + y = C$
5.	The order of the differential equation corresponding to family of curves $y = Ae^{3x} + Be^{-3x}$ is : (a) 1 (b) 2 (c) 3 (d) 4
6.	The order and degree of a differential equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^4 + x^{\frac{1}{5}} = 0$; respectively, are (A) 2 and 4 (B) 2 and 1 (C) 2 and 3 (D) 3 and 3
7.	Solve the differential equation: $(1 + x^2)dy - (1 + y^2)dx = 0.$

8. Find the general solution of $\frac{dy}{dx} = e^{x+y}$.

9. Radium decomposes at a rate proportional to the quantity of radium present. Suppose that it is found that in 25 years approximately 1.1 % of a certain quantity of radium has decomposed.

Based on the above information answer the following questions:

(i)Formulate the differential equation for the amount of radium decomposed in time t.

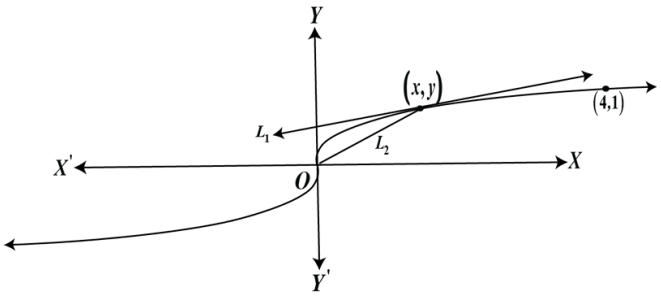
(ii)If p and q denotes the order and degree of the differential equation in (1) respectively. find $2p + 3q$.**Courtesy: google**

(iii)Write the expression for the amount of radium decomposed in time t and the amount of radium present at t=0

OR

(iii)Compute the value of proportionality constant appearing in the differential equation of part (i).

10. Shown below is a curve.



L_1 is the tangent to any point (x, y) on the curve.

L_2 is the line that connects the point (x, y) to the origin.

The slope of L_1 is one third of the slope of L_2.

Then the differential equation, using the given conditions is:

(A) $\frac{dy}{dx} = \frac{y}{3x}$ (B) $\frac{dy}{dx} = \frac{y}{x}$ (C) $\frac{dy}{dx} = \frac{x}{3y}$ (D) $\frac{dy}{dx} = \frac{3y}{x}$