

## QUIZ: 3

(Objective Part)

Name: \_\_\_\_\_  
 Registration No. \_\_\_\_\_  
 Semester: 3<sup>rd</sup>  
 Section: C & D  
 Total Marks: 12

Course Title: Differential Equations  
 Course Code: MT-1006  
 Program: BCS  
 Date: 16-10-2023  
 Time Allowed: 20 – minutes

i	What is the order and degree of the linear differential equation $e^x \frac{d^4 y}{dx^4} + 3y^3 = x^2 \left( \frac{d^3 y}{dx^3} \right)^2$			
a) 4 <sup>th</sup> order, 1 <sup>st</sup> degree	b) 3 <sup>rd</sup> order, 2 <sup>nd</sup> degree	c) 1 <sup>st</sup> order, 4 <sup>th</sup> degree	d) None	

ii	Which of the following differential equation is Exact?			
a) $(x^2 + 1)dx - xydy = 0$	b) $xdy + (3x - 2y)dx = 0$	c) $2xydx + (2 + x^2)dy = 0$	d) $x^2 ydy - ydx = 0$	

iii	The equation $y^2 = Cx$ is the general solution of which differential equation.			
a) $y' = \frac{2y}{x}$	b) $y' = \frac{2x}{y}$	c) $y' = \frac{y}{2x}$	d) $y' = \frac{x}{2y}$	

iv	What is the solution of the 1 <sup>st</sup> order differential equation $y(k+1) = y(k) + 5$			
a) $y(k) = 4 - \frac{5}{k}$	b) $y(k) = 20 + 5k$	c) $y(k) = C - k$	d) None	

v	Classify the differential equation $e^x \frac{dy}{dx} + 3y = x^2 y$ is			
a) Separable and not linear	b) Linear and not separable	c) Both separable and linear	d) Neither separable nor linear	

vi	Let $\frac{ds}{dt} + p(t)s = f(t)$ is the 1 <sup>st</sup> order linear differential equation. If $f(t) \neq 0$ . This equation is called a ..... differential equation.			
a) Homogeneous	b) Underdamped	c) Damped	d) Non-homogeneous	

vii	The term of the general solution which made little contribution in the solution is known as ..... part.			
a) Error Term	b) Complimentary term	c) Transient Term	d) None	

viii	The point/points where the value of the function does not exist is called----- point.			
a) Auxiliary	b) stationary	c) Singular	d) None	

Q 2. Find the value of K so that the given differential equation is exact  
 $(6xy^3 + \cos y)dx + (2Kx^2y^2 - x \sin y)dy = 0$

Marks (4)

$$M = 6xy^3 + \cos y \quad ; \quad N = 2Kx^2y^2 - x \sin y$$

$$M_y = 18xy^2 - \sin y \quad ; \quad N_x = 4Kxy^2 - \sin y$$

$\therefore$  eq is Exact

$$\therefore M_y = N_x$$

$$18xy^2 - \cancel{\sin y} = 4xKy^2 - \cancel{\sin y}$$

$$K = \frac{18xy^2}{4xy^2}$$

$$\boxed{K = \frac{9}{2}}$$