***Math Assingment***

***Math-1201***

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**Session: 2023-24**

**Course Code : MATH1201**

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**Course: Math-1201**— Integral calculas, Differential Equation and

Series Solution.

**Basic Concepts**

**Constant:** Constant is a quantity which has a fixed value is called a constant.

here e≅2.828

**Variable:** A variable is a quantity which can take any value assigned to each.

Variable =

Variables have two types

They are, (i)Dependent variable (ii) Independent Variable

1. **Dependent Variable:** A **dependent variable** is the variable that **depends** on the value of the independent variable.
2. **Independent Variable:** An Independent variable is the variable that we change or control in an experiment or equation. It doesn’t depend on the other variable.

**Equation:** An equation is a mathematical statement that shows two expressions are equal. It always has an equal sign (=).

Example:

Differential Equation 2 Types:

* ODE – Ordinary Differential Equation (
* PDE – Partial Differential Equation

**1.Ordinary Differential Equation:** A differential equation involving ordinary derivatives of one or more dependent variables with respect to a single independent variable is called an Ordinary Differential Equation.

**EXAMPLE:** =0

**The variable x is the single independent variable, and y is a dependent variable.**

**2.Partial Differential Equation:** A differential equation involving partial derivatives of one or more dependent variables with respect to more than one independent variable is called a Partial Differential Equation.

**EXAMPLE:**=0

**There are three independent variables: x, y, and z; in this equation u is dependent.**

**THE ORDER OF THE DIFFERENTIAL EQUATION*:*** The order of the highest ordered derivative involved in a differential equation is called the order of the differential equation.

**DEGREE:** The power of the highest order derivatives is called degree.

**Example:**

This is a 3rd order, 2nd degree ordinary differential equation

**LINEAR ORDINARY DIFFERENTIAL EQUATION:** An ordinary differential equation involving no product of dependent variable and or its derivatives or transcendental function of the dependent variable is called a linear ODE.

Where is not identically zero.

**EXAMPLE:**

**NON-LINEAR ORDINARY DIFFERENTIAL EQUATION:** A nonlinear ordinary differential equation is an ordinary differential equation that is not linear.

**EXAMPLE:**

**Homogeneous Equation:** A **homogeneous equation** is an equation in which **all terms have the same degree** (in algebra) or an equation that is equal to **zero** (in linear algebra or differential equations).

Assingment Topics:

* Solution

1. General Solution
2. Particular Solution
3. Singular Solution

* Problem

1. General Problem
2. Initial Value Problem
3. Boundary Value Problem

* Math exercise

**Solution**

Solution: A quantity which satisfies an equation is called a solution.

Solution

General Soln Particular Soln  Singular Soln

(G.S) (P.S) (S.S)

General solution:

If the solution of the nth order D.E involves ‘n’ arbitrary Constants, then it is called a General Solution (G.S).

Ex:

Particular solution:

If the arbitrary Constant of the General solution of a differential equation are obtained from given Conditions, then the solution is Called a P.S.

Ex:

Singular Solution:

The solution of the D.E which Cannot be obtain from its General Solution is called a Singular Solution

**Problem**

Problem

General Problem Initial Value Problem Boundary Value Problem

(G.P) (I.V.P) (B.V.P)

Initial Condition**:**

The condition involving the value of the dependent variable for the same value of the independent variable.

Boundary Condition**:**

The condition involving the value of the dependent variable for the difference value of the independent variable.

Initial Value Problem (I.V.P):

A problem involving one or more differential equations with one or more Initial Conditions is called an I.V.P.

Example:

Boundary Value Problem:

A problem involving one or more differential equations with one or more Boundary Conditions is called a B.V.P.

Example: