Assignment for Academic Year 2024-2025 (Beginning January 2025)

CLASS: BA-1st Year **Course Name: Differential Calculus**

Course Code: MATH101TH

ASSIGNMENT-1

Attempt any **TWO** of the following questions:

Ques 1. Evaluate $\log_{x\to 1}\frac{x^6-5x+4}{x^3-2x+1}$.

Ques 2. Find the nth derivative of $x^n e^x$.

Ques 3. Examine the continuity of the function $f(x)=\begin{cases}\frac{x-|x|}{x}, x\neq 0\\ 2, x=0,\end{cases}$, at $x=0$.

Ques 4. Find the approximate values of $\sqrt{66}$.

ASSIGNMENT-2

Attempt any **TWO** of the following questions:

Ques 1. Verify Lagrange's mean value theorem for the function $f(x)=x+\frac{1}{x}$ in $\left[\frac{1}{2},3\right]$.

Ques 2. Find the points of inflexion on the curve $x=a\tan\theta, y=a\sin\theta\cos\theta$.

Ques 3. Find all asymptoted of the curve $x^3-2y^3+xy(2x-y)+y(x-y)+1=0$.

Ques 4. Trace the curve $y=x^3$.

ASSIGNMENT-3

Attempt any **TWO** of the following questions:

Ques 1. Trace the curve $r=a\cos 3\theta$.

Ques 2. Prove thatcurvature of a straight line is zero.

Ques 3. If $x=u(1+v), y=v(1+u)$ find the Jacobian of x, y with respect to u, v.

Ques 4. Examine the continuity at the incicated point for the function

$$f(x,y)=\begin{cases}\frac{x^2y}{x^3+y^3}, (x,y)\neq(0,0)\\ 0, (x,y)=(0,0)\end{cases}$$ at (0,0).