

Differential and Integral Calculus (MATH-205)

QZ-II/Semester II (2022-23)

KSU ID: _____

Date: Thursday, February 2, 2023 **Maximum Points:** 10

Question I: (2°) Evaluate the following limit.

$$\lim_{(x,y) \rightarrow (0,0)} \frac{x^4 + x^2 - y^4 + y^2}{2(x^2 + y^2)}$$

Question II: (2°) Find the distance between the following planes.

$$p_1 : 2x - 4y + 8z - 3 = 0, \quad p_2 : 3x - 6x + 12z + 7 = 0$$

Question III: (3°) Identify and describe the surface $16x^2 - 4y^2 + z^2 = 0$. Find and sketch its traces in xy - and xz -planes.

Question IV: (3°) Consider the space curve C defined by

$$C : x = 4\sqrt{t}, \quad y = t^2 - 10, \quad z = \frac{4}{t}, \quad t > 0$$

Find parametric equations for the tangent line to C at the point $P(8, 6, 1)$.

— Good Luck —

Start your solutions from here