


# National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Calculus and Analytical Geometry	Course Code:	MT 1003
	Degree Program:	BCS, BDS, BSE	Semester:	Fall 2022
	Exam Duration:	60 Minutes	Total Marks:	30
	Paper Date:	11-11-22	Weight	15
	Section:	ALL	Page(s):	
	Exam Type:	Midterm-II		

Student : Name: \_\_\_\_\_ Roll No. \_\_\_\_\_ Section: **BDS-1A**

Instruction/Notes: Attempt all questions. Programmable calculators are not allowed.

**Question 1[CLO-4, 10 points]:** A tank of water in the shape of a cone is leaking water at a constant rate of  $2 \text{ ft}^3/\text{h}$ . The base radius of the tank is  $5 \text{ ft}$  and the height of the tank is  $14 \text{ ft}$ .

- At what rate is the depth of the water in the tank changing when the depth of the water is  $6 \text{ ft}$ ?
- At what rate is the radius of the top of the water in the tank changing when the depth of the water is  $6 \text{ ft}$ ?

**Question 2[CLO- 5, 10 points]:** For the given function

- Find critical points and intercepts.
- Find the interval where function is decreasing or increasing and determine the extreme values.
- Find the point of inflections.
- Find the interval where function is concave up or concave down.
- Plot the graph.

$$y = x^4 - 6x^2$$

**Question 3[CLO-6, 10 points]**

- Evaluate the integral given below

$$\int \sqrt{\frac{s-1}{s^5}} ds$$

- Determine the area of the region bounded by (as shown in figure)

$$x = y^2 + 1, x = 5$$

$$y = 3 \text{ and } y = -3$$

