Department of Computer Science and Engineering
University of Liberal Arts Bangladesh
Final Examination

Semester – Fall 2019
Course Title: Differential and Integral Calculus
Course Code : MAT 101 Section: 4
Duration : 2 Hours

PLEASE ANSWER ALL QUESTIONS **Total 50 Marks**

Question 1

Determine the open intervals on which the function, $f(x) = 3x^4 + 4x^3 - 12x^2 + 2$ is increasing or decreasing. (5 marks)

Question 2

Locate all the inflection points of the function $f(x) = x^3 - 3x^2 + 1$. (6 marks)

Question 3

Calculate the following integrals: (8 marks)

i) $\int_{ln2}^{3} 5e^x dx$

ii) $\int_{1}^{0} \sqrt{1-x^2}\,dx$

Question 4

Compute the following Integrals: (8 marks)

i) $\int e^x cosx dx$

ii) $\int \frac{x^2+x-2}{3x^3-x^2+3x-1} dx$

Question 5

a) Find the Taylor series for 1/x about x = 1. (6 marks)

b) Find the Maclaurin series for e^x. (5 marks)

Question 6

Use a double integral to find the volumes:

a) The volume under the plane $z = 2x + y$ and over the rectangle $R = \{(x, y) : 3 \leq x \leq 5, 1 \leq y \leq 2\}$. (6 marks)

b) The volume under the plane $z = 40 - 2xy$ and over the rectangle $R = \{(x, y) : 1 \leq x \leq 3, 2 \leq y \leq 4\}$. (6 marks)

****END OF QUESTIONS****