Bahria University
Discovering Knowledge

Multivariable Calculus

BSCS Semester III

Department of Computer Science
Bahria University, Lahore Campus

Assignment:

Deadline: Week 6, 1 April 2023

Evaluation of CLO	Question Number	Marks	Obtained Marks
CLO1: CLO statement Comprehend the basic concepts and techniques of differential and integral calculus of functions of several variables.	1,2,3	10+5+10=25	
CLO3: CLO statement Analyze the given problems and apply integrals to compute physical quantities like area/volume.	4	10	
	Total Marks	**35**	

Question 1. The weekly consumption of chicken, $C = f(I, P)$, (in Kgs) of an average household as a function of the price of chicken in ($\$\backslash kg$) and I, annual household income (in $ 1000s) as shown in the following table

P \ I	3.00	3.50	4.00	4.50
20	2.65	2.59	2.51	2.43
40	4.14	4.05	3.94	3.88
60	5.11	5.00	4.97	4.84
80	5.35	5.29	5.19	5.07
100	5.79	5.77	5.60	5.53

a) Evaluate $f_I(80,4.00)$ and $f_P(40,4.50)$, also interpret it.
b) Write down the table for $f(20, P)$.
c) Write down the table for $f(I, 3.5)$.

Question 2. Let $h(x,t) = 5 + cos(0.5x - t)$ describe a wave. The value of $h(x,t)$ gives the depth of the water in cm at a distance x meters from a fixed point and at time t seconds. Evaluate $h_x(2,5)$ and $h_t(2,5)$ and interpret each in terms of the wave.

Question#3 For the function $u = \frac{1}{\sqrt{x^2+y^2+z^2}}$ verify $u_{xx} + u_{yy} + u_{zz} = 0$.

Question#4

a) Evaluate $\int_0^{\ln 2} \int_0^{\ln 3} e^{x+y} \, dx \, dy$.

b) Find the volume of the solid lying under the surface $f(x,y) = 3x^3 + 3x^2y$ and over the region $R: 1 \leq x \leq 3, 0 \leq y \leq 2$.