Section B – Data Science

$\boldsymbol{Q1)}$ $\boldsymbol{Given\ a\ function\ f(x,y) = xy^2sin(x) + 2x^3cos(y)\ where\ x\ and\ y\ are\ in\ radians.}$

a) Write a python function to compute the value of the f(x,y) for given inputs x and y. Assume that x and y will be given in radians. Using the python function compute the value of f(x,y) at (1,1).

b) Write a python function to compute the Gradient of f(x,y) and return it as a tuple $(\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y})$.

Compute the gradient of the f(x,y) using the python function at (0,1).

Q2) If you were trying to build a new test to find Covid 19 Infections in patients, which metric would you choose among Accuracy, Precision, Recall or F1 score to optimize and choose among the best solution.

Q3) A teacher records the weights and heights of children in her class of 10 as follows:

Name of the Student	Weight in Kgs	Height in (cms)
George	50	171
Harry	65	165
Joe	89	195
Jinn	55	154
Rony	77	161
Pearl	49	151
Liren	66	163
Harsh	72	178
Harsh	79	183
Harsh	67	185

a) Based on the above data can you conclude that taller students tend to weigh more?
b) The teacher decides to share this data with other teachers in the school. She wants to show how the weights and heights vary in her class without disclosing the names of the students. As a data scientist what are some of the techniques or data transformations you would suggest to the teacher so that there is no breach of Privacy and yet the shared data adequately represents the distribution of heights and weights.