Question Bank - Linear Regression

1. The values of x and their corresponding values of y are shown in the table below

x	0	1	2	3	4
y	2	3	5	4	6

a) Find the least square regression line y = a x + b.

b) Estimate the value of y when x = 10.

2. For a year, five randomly selected students took a math aptitude test before they began their statistics course. The Statistics Department has three questions.

a)What linear regression equation best predicts statistics performance, based on math aptitude scores?

b)If a student made an 80 on the aptitude test, what grade would we expect her to make in statistics?

c)How well does the regression equation fit the data?

Student	x_i	y_i
1	95	85
2	85	95
3	80	70
4	70	65
5	60	70

3. Consider the following set of points: {(-2 , -1) , (1 ,1) , (3 , 2)} **a)**Find the **least square regression line** for the given data points. **b)**Plot the given points and the regression line in the same rectangular system of axes. **c)**Predict the value for a new data point, 2.

4. Explain the following terms w.r.t **Linear Regression**

(i) Least Square Error(LSE) function

(ii) Sum of Squared Residuals (SSE) function

(iii) Mean Squared Error (MSE) Function

5. Explain the difference between **Simple** and **Multiple Linear Regression** with an example.

6. What is **Multiple Linear Regression**? When is it used?

7. What is **Linear Regression**? List the critical assumptions of Linear Regression. Mention a few applications of Linear Regression.