1)What is Ridge Regression, and how does it differ from ordinary least squares regression?

Ans- Ridge regression is a term used to refer to a linear regression model whose coefficients are estimated not by ordinary least squares (OLS), but by an estimator, called ridge estimator, that, albeit biased, has lower variance than the OLS estimator.

Linear Regression establishes a relationship between dependent variable (Y) and one or more independent variables (X) using a best fit straight line (also known as regression line). Ridge Regression is a technique used when the data suffers from multicollinearity ( independent variables are highly correlated).

2) What are the assumptions of Ridge Regression?

Ans- The assumptions of ridge regression are the same as that of linear regression: linearity, constant variance, and independence. However, as ridge regression does not provide confidence limits, the distribution of errors to be normal need not be assumed.

3) How do you select the value of the tuning parameter (lambda) in Ridge Regression?

Ans- The value of lambda will be chosen by cross-validation. The plot shows cross-validated mean squared error. As lambda decreases, the mean squared error decreases. Ridge includes all the variables in the model and the value of lambda selected is indicated by the vertical lines.

4) Can Ridge Regression be used for feature selection? If yes, how?

Ans- We can use ridge regression for feature selection while fitting the model. In this article, we are going to use logistic regression for model fitting and push the parameter penalty as L2 which basically means the penalty we use in ridge regression.

5) How does the Ridge Regression model perform in the presence of multicollinearity?

Ans- Multicollinearity happens when predictor variables exhibit a correlation among themselves. Ridge regression aims at reducing the standard error by adding some bias in the estimates of the regression. The reduction of the standard error in regression estimates significantly increases the reliability of the estimates.

6) Can Ridge Regression handle both categorical and continuous independent variables?

Ans- The short answer is Yes. Categorical variables require special attention in regression analysis because, unlike dichotomous or continuous variables, **they cannot by entered into the regression equation just as they are**. Instead, they need to be recoded into a series of variables which can then be entered into the regression model.

7) How do you interpret the coefficients of Ridge Regression?

Ans- The ridge coefficients are a reduced factor of the simple linear regression coefficients and thus never attain zero values but very small values. The lasso coefficients become zero in a certain range and are reduced by a constant factor, which explains their low magnitude in comparison to the ridge.

8) Can Ridge Regression be used for time-series data analysis? If yes, how?

Ans- **The ridge regression technique can be used to predict time-series. Time series regression can help you understand and predict the behavior of dynamic systems from experimental or observational data**. Common uses of time series regression include modeling and forecasting of economic, financial, biological, and engineering systems.