

1. A) Least Square Error.
2. A) Linear regression is sensitive to outliers.
3. B) Negative.
4. B) Correlation.
5. C) Low bias and high variance.
6. B) Predictive model.
7. D) Regularization.
8. D) SMOTE.
9. A) TPR and FPR.
10. B) False.
11. B) Apply PCA to project high dimensional data.
12. A) We don't have to choose the learning rate.  
B) It becomes slow when number of features is very large.
13. Explain the term regularization?

When we use regression model to train some data there is a good chance that the model will overfit the given training data set. Regularization helps to sort this over fitting problem by restricting the degrees of freedom of a given equation.

In a linear equation we do not want huge weights coefficient as a small change in weights can make a large difference for the dependent variables, So regularization constraints the weight of such features to avoid overfitting.

To Regularize the model, A Shrinkage penalty is added to the cost function as below

LASSO as L1 → Least Absolute Shrinkage and Selection Operator

Sum of magnitude of the coefficients

RIDGE as L2 →

Sum of squares of magnitude of coefficients

ELASTICNET → Combines L1 and L2 regularization to balance between the two types of penalties.

#### 14. Which particular algorithms are used for regularization?

Lasso Regression (L1 Regularization) → Feature selection and regularization.

Ridge Regression (L2 Regularization) → Handling multicollinearity and regularization.

Elastic Net Regression → When you need a combination of feature selection and coefficient shrinkage.

LassoCV and RidgeCV → Model tuning and selection

Support Vector Machines (SVM) with Regularization → Classification and regression tasks.

Logistic Regression with Regularization → Helps in feature selection and improving model generalization.

#### 15. Explain the term error present in linear regression equation?

Error refers to the difference between the actual value of the dependent variable and the value predicted by the model. It quantifies how well the model fits the data.

The error for a given observation is the difference between the observed value  $Y$  and the predicted value  $\hat{Y}$ .

It comes with two type, are as follows

Residual – it is the difference between the observed value and the predicted value from the model. But there is a problem while using residual, it will come with negative. So, to avoid that negativity

Sum of Square of Residual - The sum of the squared differences between observed and predicted values, used to measure the overall fit of the model.