# ASSIGNMENT – 39
## MACHINE LEARNING

Answers of all multiple-choice questions:

1. Which of the following methods do we use to find the best fit line for data in Linear Regression?
A) Least Square Error

2. Which of the following statement is true about outliers in linear regression?
A) Linear regression is sensitive to outliers

3. A line falls from left to right if a slope is _____?
B) Negative

4. Which of the following will have symmetric relation between dependent variable and independent variable?
B) Correlation

5. Which of the following is the reason for over fitting condition?
C) Low bias and high variance

6. If output involves label then that model is called as:
B) Predictive modal

7. Lasso and Ridge regression techniques belong to _____?
D) Regularization

8. To overcome with imbalance dataset which technique can be used?
A) Cross validation

9. The AUC Receiver Operator Characteristic (AUCROC) curve is an evaluation metric for binary classification problems. It uses _____ to make graph?
C) Sensitivity and Specificity

10. In AUC Receiver Operator Characteristic (AUCROC) curve for the better model area under the curve should be less.
B) False

11. Pick the feature extraction from below:
B) Apply PCA to project high dimensional data

12. Which of the following is true about Normal Equation used to compute the coefficient of the Linear Regression?
A) We don't have to choose the learning rate.
B) It becomes slow when number of features is very large.

Subjective Answers:

**13. Explain the term regularization?**

Answer: Regularization means to make things regular or acceptable. In the context of machine learning, regularization is the process, which regularizes or shrinks the coefficients towards zero. Regularization is a technique used to reduce the errors by fitting the function appropriately on the given training set and avoid overfitting.

The commonly used regularization techniques are:
a) L1 regularization
b) L2 regularization
c) Dropout regularization

L1 regularization: A regression model which uses L1 Regularization technique is called LASSO (Least Absolute Shrinkage and Selection Operator) regression.
L2 regularization: A regression model that uses L2 regularization technique is called Ridge regression. Lasso Regression adds "absolute value of magnitude" of coefficient as penalty term to the loss function(L).

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

Answer: The different Regularization algorithms are as follows?

- L1 regularization (LASSO Regression))
- L2 regularization (Ridge Regression)
- Elastic-Net Regression

L1 regularization: A regression model which uses L1 Regularization technique is called LASSO (Least Absolute Shrinkage and Selection Operator) regression. LASSO is a regression analysis method that performs both feature selection and regularization in order to enhance the prediction accuracy of the model. LASSO regression converts coefficients of less important features to zero, which indeed helps in feature selection, and it shrinks the coefficients of remaining features to reduce the model complexity, hence avoiding overfitting.

L2 regularization: A regression model that uses L2 regularization technique is called Ridge regression. Ridge regression is a method for analyzing data that suffer from multi-collinearity. Ridge regression shrinks the coefficients as it helps to reduce the model complexity and multi-collinearity.

Elastic-Net Regression: Elastic-Net is a regularized regression method that linearly combines the L1 and L2 penalties of the LASSO and Ridge methods respectively.

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

Answer: It is often said that the error term in a regression equation represents the effect of the variables that were omitted from the equation. The error term represents the combined effect of the omitted variables, assuming that-

a)   the combined effect of the omitted variables is independent of each variable included in the equation,
b)   the combined effect of the omitted variables is independent across subjects,
c)   the combined effect of the omitted variables has expectation 0.