Ans1:- R-squared is generally a better measure of the goodness of fit for a regression model than the residual sum of squares (RSS). , is a statistical measure that represents the proportion of the variance for the dependent variable that's explained by the independent variables in the model.

Ans2:- TSS = ESS + RSS, where TSS is Total Sum of Squares, ESS is Explained Sum of Squares and RSS is Residual Sum of Suqares. The aim of Regression Analysis is explain the variation of dependent variable Y.

Ans3:- Regularization is a critical technique in machine learning to reduce overfitting, enhance model generalization, and manage model complexity. Several regularization techniques are used across different types of models.

Ans4:- Gini Impurity tells us what is the probability of misclassifying an observation. Note that the lower the Gini the better the split. In other words the lower the likelihood of misclassification.

Ans5:- It is easy to go too deep in the tree, and to fit the parameters that are specific for that training set, rather than to generalize to the whole dataset. This is overfitting. In other words, the more complex the model, the higher the chance that it will overfit. The overfitted model has too many features.

Ans6:- Ensemble learning refers to a machine learning approach where several models are trained to address a common problem, and their predictions are combined to enhance the overall performance.

Ans7:- Bagging is a learning approach that aids in enhancing the performance, execution, and precision of machine learning algorithms. Boosting is an approach that iteratively modifies the weight of observation based on the last classification. 2. It is the easiest method of merging predictions that belong to the same type.

Ans8:- Out-of-bag (OOB) error, also called out-of-bag estimate, is a method of measuring the prediction error of random forests, boosted decision trees, and other machine learning models utilizing bootstrap aggregating (bagging).

Ans9:- In K-fold cross-validation, the data set is divided into a number of K-folds and used to assess the model's ability as new data become available. K represents the number of groups into which the data sample is divided. For example, if you find the k value to be 5, you can call it 5-fold cross-validation.

Ans10:- Hyperparameters directly control model structure, function, and performance. Hyperparameter tuning allows data scientists to tweak model performance for optimal results. This process is an essential part of machine learning, and choosing appropriate hyperparameter values is crucial for success.

Ans11:- If the learning rate is too high, the algorithm may overshoot the minimum, and if it is too low, the algorithm may take too long to converge. Overfitting: Gradient descent can overfit the training data if the model is too complex or the learning rate is too high.

Ans12:- Logistic regression is a popular method for binary classification, but it has some limitations when dealing with non-linear data.

Ans13:- Overall gradient boosting is more robust to outliers and noise since it equally considers all training instances when optimizing the loss function. AdaBoost is faster but more impacted by dirty data since it fixates on hard examples.

Ans14:- The bias-variance tradeoff is about finding the right balance between simplicity and complexity in a machine learning model. High bias means the model is too simple and consistently misses the target, while high variance means the model is too complex and shoots all over the place.

Ans15:- LENEAR KERNEL USE IN SVM –

Linear Kernel: Decision Boundary: Form: The linear kernel produces a decision boundary that is a hyperplane in the feature space. This hyperplane separates data points from different classes in a linear fashion. Assumption: It assumes that the relationship between the features and the target variable is linear.

RBF KERNAL USE IN SVM –

In machine learning, the radial basis function kernel, or RBF kernel, is a popular kernel function used in various kernelized learning algorithms. In particular, it is commonly used in support vector machine classification.

POLYNOMIAL KERNAL USE IN SVM –

In machine learning, the polynomial kernel is a kernel function commonly used with support vector machines (SVMs) and other kernelized models, that represents the similarity of vectors (training samples) in a feature space over polynomials of the original variables, allowing learning of non-linear models.