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1 **In Q1 to Q7, only one option is correct, Choose the correct option:**

1. The value of correlation coefficient will always be:
   A) between 0 and 1 B) greater than -1
   C) between -1 and 1 D) between 0 and -1
   ANS- C) between -1 and 1

2. Which of the following cannot be used for dimensionality reduction?
   A) Lasso Regularisation B) PCA
   C) Recursive feature elimination D) Ridge Regularisation
   ANS- B) PCA

3. Which of the following is not a kernel in Support Vector Machines?
   A) linear B) Radial Basis Function
   C) hyperplane D) polynomial
   ANS – C) hyperplane
   B)) Radial Basis Function

4. Amongst the following, which one is least suitable for a dataset having non-linear decision boundaries?
   A) Logistic Regression B) Naïve Bayes Classifier
   C) Decision Tree Classifier D) Support Vector Classifier
   ANS- A) Logistic Regression

5. In a Linear Regression problem, 'X' is independent variable and 'Y' is dependent variable, where 'X' represents weight in pounds. If you convert the unit of 'X' to kilograms, then new coefficient of 'X' will be?
   (1 kilogram = 2.205 pounds)
   A) 2.205 × old coefficient of 'X' B) same as old coefficient of 'X'
   C) old coefficient of 'X' ÷ 2.205 D) Cannot be determined
   ANS- A) 2.205 × old coefficient of 'X'

6. As we increase the number of estimators in ADABOOST Classifier, what happens to the accuracy of the model?
   A) remains same B) increases
   C) decreases D) none of the above
   ANS- B) increases

7. Which of the following is not an advantage of using random forest instead of decision trees?
   A) Random Forests reduce overfitting
   B) Random Forests explains more variance in data then decision trees
   C) Random Forests are easy to interpret
   D) Random Forests provide a reliable feature importance estimate
   ANS- C) Random Forests are easy to interpret

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In Q8 to Q10, more than one options are correct, Choose all the correct options:

8. Which of the following are correct about Principal Components?
   A) Principal Components are calculated using supervised learning techniques
   B) Principal Components are calculated using unsupervised learning techniques
   C) Principal Components are linear combinations of Linear Variables.
   D) All of the above
   E) ANS- B) Principal Components are calculated using unsupervised learning techniques

9. Which of the following are applications of clustering?
   A) Identifying developed, developing and under-developed countries on the basis of factors like GDP, poverty index, employment rate, population and living index
   B) Identifying loan defaulters in a bank on the basis of previous years' data of loan accounts.
   C) Identifying spam or ham emails
   D) Identifying different segments of disease based on BMI, blood pressure, cholesterol, blood sugar levels.
   E) ANS- D) Identifying different segments of disease based on BMI, blood pressure, cholesterol, blood sugar levels.

10. Which of the following is(are) hyper parameters of a decision tree?
    A) max_depth B) max_features
    C) n_estimators D) min_samples_leaf
    ANS- D) min_samples_leaf

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Q10 to Q15 are subjective answer type questions, Answer them briefly.

11. What are outliers? Explain the Inter Quartile Range (IQR) method for outlier detection.

ANS- An outlier is an observation in which in a random sample of a population lies an abnormal distance from other values.

The IQR describes the middle 50% of values when ordered from lowest to highest. To find the interquartile range (IQR), first find the median (middle value) of the lower and upper half of the data. These values are quartile 1 (Q1) and quartile 3 (Q3). The IQR is the difference between Q3 and Q1.

12. What is the primary difference between bagging and boosting algorithms?

ANS- Bagging is the simplest way of combining predictions that belong to the same type while Boosting is a way of combining predictions that belong to the different types. Bagging aims to decrease variance, not bias while Boosting aims to decrease bias, not variance.

13. What is adjusted R^2 in linear regression. How is it calculated?

ANS-

Adjusted R-squared value can be calculated based on value of r-squared, number of independent variables (predictors), total sample size. Every time you add a independent variable to a model, the R-squared increases, even if the independent variable is insignificant. It never declines.

14. What is the difference between standardisation and normalisation?

ANS-

Normalisation	Standardisation
Scaling is done by the highest and the lowest values.	Scaling is done by mean and standard deviation.
It is applied when the features are of separate scales.	It is applied when we verify zero mean and unit standard deviation.
Scales range from 0 to 1	Not bounded
Affected by outliers	Less affected by outliers
It is applied when we are not sure about the data distribution	It is used when the data is Gaussian or normally distributed
It is also known as Scaling Normalization	It is also known as Z-Score

15. What is cross-validation? Describe one advantage and one disadvantage of using cross-validation.

ANS-

Cross validation is a technique for assessing how the statistical analysis generalises to an independent data set.

Advantage –

Reduces Overfitting: In Cross Validation, we split the dataset into multiple folds and train the algorithm on different folds. This prevents our model from overfitting the training dataset. So, in this way, the model attains the generalization capabilities which is a good sign of a robust algorithm.

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Disadvantage –

Needs Expensive Computation: Cross Validation is computationally very expensive in terms of processing power required.