**Section – A ( 20 questions)**

**1. Which of the following is NOT a supervised learning algorithm?**

a) K-Means Clustering b) Linear Regression c) Decision Trees d) Support Vector Machines

**2. What does the term "bias" refer to in the context of machine learning models?**

a) The difference between predicted and actual values.

b) The degree of flexibility of the model.

c) The error introduced by approximating a real problem.

d) The sensitivity of the model to changes in the input data.

**3. Which of the following evaluation metrics measures the model's ability to recall all positive instances correctly?**

a) Precision b) Recall c) F1-score d) Specificity

**4. In logistic regression, what does the odds ratio represent?**

a) The ratio of the probability of the event occurring to the probability of it not occurring.

b) The difference between the predicted and actual values.

c) The slope of the regression line. d) The probability of the event occurring.

**5. Which of the following techniques is used to handle missing values in a dataset?**

a) Removing the rows with missing values.

b) Replacing missing values with the mean or median of the feature.

c) Ignoring the missing values during model training. d) All of the above.

**6. What is the primary goal of using feature scaling in machine learning?**

a) To increase the dimensionality of the dataset.

b) To reduce the computational cost of model training.

c) To ensure that all features contribute equally to the learning process.

d) To introduce non-linearity into the model.

**7. Which of the following algorithms is NOT a type of supervised learning?**

a) Decision Trees b) K-Means Clustering c) SVM d) Linear Regression

**8. What is the primary purpose of using the test set in machine learning?**

a) To evaluate the performance of the model. b) To fine-tune the hyperparameters of the model.

c) To train the model parameters on labeled data. d) To test the generalization ability of the model.

**9. What does the term "overfitting" refer to in machine learning?**

a) The model performs well on training data but poorly on unseen data.

b) The model fails to capture the underlying patterns in the data.

c) The model has too few parameters to represent the complexity of the data.

d) The model is too simple to capture the relationships in the data.

**10. Which of the following evaluation metrics is used to assess the performance of a regression model?**

a) Accuracy b) Precision c) R-squared d) F1-score

**11. What is the primary objective of dimensionality reduction techniques in machine learning?**

a) To increase the computational cost of model training.

b) To decrease the interpretability of the model.

c) To remove irrelevant features and reduce the complexity of the dataset.

d) To introduce non-linearity into the model.

**12. Which of the following statements about ensemble learning is true?**

a) Ensemble learning combines multiple models to increase bias and variance.

b) Ensemble learning reduces the risk of overfitting compared to individual models.

c) Ensemble learning is only applicable to regression problems.

d) Ensemble learning is less robust to noisy data.

**13. What is the main drawback of using decision trees for classification tasks?**

a) Tendency to underfit the data. b) Prone to multicollinearity.

c) Susceptible to overfitting. d) Limited to linear decision boundaries.

**14. What is the primary goal of cross-validation in machine learning?**

a) To maximize the training accuracy of the model.

b) To minimize the computational cost of model training.

c) To assess the generalization performance of the model.

d) To optimize the hyperparameters of the model.

**15. What does the term "confusion matrix" represent in the context of classification models?**

a) A matrix that summarizes the performance of a classification model.

b) A matrix that measures the correlation between predictors and the target variable.

c) A matrix that represents the distribution of data points in feature space.

d) A matrix that measures the degree of multicollinearity among independent variables.

**16. Which of the following is NOT a common kernel function used in Support Vector Machines?**

a) Gaussian kernel b) Polynomial kernel c) Exponential kernel d) Sine kernel

**17. What is the primary disadvantage of using the mean squared error (MSE) as an evaluation metric for regression models?**

a) It is not sensitive to outliers. b) It cannot handle non-linear relationships.

c) It may be heavily influenced by extreme values.

d) It does not provide a clear interpretation of model performance.

**18. In logistic regression, what does the odds ratio represent?**

a) The ratio of the probability of the event occurring to the probability of it not occurring.

b) The difference between the predicted and actual values.

c) The slope of the regression line. d) The probability of the event occurring.

**19. What is the main drawback of using decision trees for classification tasks?**

a) Tendency to underfit the data. b) Prone to multicollinearity.

c) Susceptible to overfitting. d) Limited to linear decision boundaries.

**20. What is the primary purpose of cross-validation in machine learning?**

a) To maximize the training accuracy of the model.

b) To minimize the computational cost of model training.

c) To assess the generalization performance of the model.

d) To optimize the hyperparameters of the model.

**Section – B ( 15 questions)**

**21. Which of the following metrics is calculated as the square of the correlation between the predicted and actual values in regression?**

a) Mean Absolute Error b) Root Mean Squared Error

c) R-squared d) Mean Squared Error

**22. What is the primary goal of using regularization techniques in machine learning models?**

a) To increase the model complexity b) To reduce the risk of overfitting

c) To decrease the computational cost d) To improve model interpretability

**23. Which metric is used to evaluate the performance of a binary classification model when the cost of false negatives is high?**

a) Precision b) Recall c) F1-score d) Specificity

**24. In logistic regression, what does the odds ratio represent?**

a) The ratio of the probability of the event occurring to the probability of it not occurring

b) The difference between the predicted and actual values

c) The slope of the regression line d) The probability of the event occurring

**25. Discuss the significance of feature scaling in machine learning models and provide examples of techniques used for feature scaling.**

a) Feature scaling ensures that all features contribute equally to the model's learning process and improves convergence speed and model performance. Common techniques include Min-Max scaling, Standardization (Z-score scaling), and Robust scaling.

b) Feature scaling reduces the dimensionality of the dataset, making it easier to visualize and interpret the results.

c) Feature scaling helps in reducing the computational complexity of the model, leading to faster training times.

d) Feature scaling is not necessary for machine learning models and can sometimes introduce unnecessary complexity.

**26. Which of the following is NOT a common kernel function used in Support Vector Machines?**

a) Linear kernel b) Polynomial kernel c) Sigmoid kernel d) Exponential kernel

**27. What is the primary purpose of using regularization techniques in machine learning models?**

a) To increase the model complexity b) To reduce the risk of overfitting

c) To decrease the computational cost d) To improve model interpretability

**28. Which metric is used to evaluate the performance of a binary classification model when both false positives and false negatives are equally important?**

a) Precision b) Recall c) F1-score d) Accuracy

**29. What is the primary purpose of using logistic regression in machine learning?**

a) To predict continuous outcomes. b) To perform dimensionality reduction.

c) To classify data into discrete categories. d) To handle missing values in the dataset.

**30. What is the primary purpose of using the activation function in neural networks?**

a) To transform the input features into a higher-dimensional space. b) To calculate the cost function.

c) To introduce non-linearity into the model. d) To regularize the model parameters.

**31. Which of the following is NOT a type of kernel function commonly used in Support Vector Machines?**

a) Gaussian kernel b) Polynomial kernel c) Exponential kernel d) Sigmoid kernel

**32. What does the term "one-vs-all" mean in the context of multiclass classification with logistic regression?**

a) Training multiple models for each class. b) Combining all classes into one category.

c) Using one classifier for all classes simultaneously. d) Handling binary classification problems only.

**33. Which of the following evaluation metrics measures the model's ability to recall all positive instances correctly?**

a) Precision b) Recall c) F1-score d) Specificity

**34. In linear regression, what does the residual represent?**

a) The difference between the predicted and actual values. b) The slope of the regression line.

c) The coefficient of determination. d) The probability of the event occurring.

**35. What is the significance of the intercept term in linear regression models?**

a) It represents the slope of the regression line.

b) It determines the direction of the regression line.

c) It adjusts the magnitude of the coefficients.

d) It accounts for the baseline value of the dependent variable.