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Select the most appropriate answer as given in the options.

Part- I

1. Which of the following is a supervised learning technique?
   A) K-means clustering
   B) Decision tree classification
   C) Principal Component Analysis (PCA)
   D) Apriori algorithm

2. What does overfitting mean in the context of machine learning?
   A) The model performs well on unseen data.
   B) The model memorizes the training data and performs poorly on new data.
   C) The model is too simple to capture the underlying patterns in the data.
   D) The model converges slowly during training.

3. Which evaluation metric is commonly used for classification tasks when dealing with imbalanced datasets?
   A) Accuracy
   B) Precision
   C) F1-score
   D) Mean squared error

4. What is the purpose of regularization techniques in machine learning?
   A) To increase model complexity
   B) To reduce bias in the model
   C) To prevent overfitting
   D) To speed up training time

5. Which machine learning algorithm is used for anomaly detection?
   A) Support Vector Machines (SVM)
   B) K-means clustering
   C) Random Forest
   D) Gradient Descent

6. What is the primary purpose of pooling layers in a CNN?
   A) To flatten the input data
   B) To reduce the spatial dimensions of the feature map
   C) To add non-linearity to the network
   D) To apply element-wise activation functions

7. Which activation function is commonly used at the output layer of a binary classification CNN?
   A) ReLU (Rectified Linear Unit)
   B) Sigmoid
   C) Tanh (Hyperbolic tangent)
   D) Softmax

8. What is the purpose of dropout regularization in deep learning?
   A) To add noise to the input data
   B) To randomly drop neurons during training to prevent overfitting
   C) To increase the learning rate of the model
   D) To remove outliers from the training dataset

9. What is backpropagation in the context of neural networks?
   A) The process of updating model parameters to minimize prediction errors
   B) The process of randomly initializing model weights
   C) The process of generating synthetic data for model training
   D) The process of forward pass through the network

10. Which deep learning architecture is commonly used for sequence modeling tasks?
   A) Autoencoders
   B) Long Short-Term Memory (LSTM) networks
   C) Generative Adversarial Networks (GANs)
   D) Reinforcement Learning (RL)

11. Which NLP technique is used to extract important words or phrases from a text?
   A) Stemming
   B) Lemmatization
   C) Named Entity Recognition (NER)
   D) Term Frequency-Inverse Document Frequency (TF-IDF)

12. What does POS tagging stand for in NLP?
   A) Part-of-Speech tagging
   B) Phrase-Optimization Syntax
   C) Primary Objective of Syntax
   D) Probability of Semantic

13. Which NLP task involves predicting the next word in a sequence based on context?
   A) Named Entity Recognition (NER)
   B) Part-of-Speech Tagging (POS)
   C) Language Modeling
   D) Sentiment Analysis

14. What is the purpose of word embeddings in NLP?
   A) To transform words into fixed-length vectors
   B) To remove stop words from text
   C) To tokenize sentences into words
   D) To perform sentiment analysis

15. Which algorithm is commonly used for text classification tasks in NLP?
   A) K-means clustering
   B) Support Vector Machines (SVM)
   C) Apriori algorithm
   D) Hierarchical clustering

16. What does the `__init__` method do in a Python class?
   A) Initializes the class object
   B) Defines class attributes and methods
   C) Executes when an object is created
   D) Cleans up resources when an object is destroyed

17. What is the output of `print(len([1, 2, 3, 4]))` in Python?
   A) 4
   B) 3
   C) [1, 2, 3, 4]
   D) None

18. Which keyword is used to define a function in Python?
   A) def
   B) function
   C) define
   D) func

19. What will `x = "hello"` and `y = "world"` result in when `print(x + " " + y)` is executed?
   A) helloworld
   B) hello world
   C) SyntaxError
   D) None of the above

20. What does the `super()` function do in Python?
   A) Calls the superclass constructor
   B) Returns the current instance of the class
   C) Defines a subclass of a superclass
   D) Initializes a child class

Part-II

1. Which of the following is NOT a type of machine learning?
   A) Supervised Learning
   B) Unsupervised Learning
   C) Reinforcement Learning
   D) Static Learning

2. What is the purpose of feature scaling in machine learning?
   A) To convert categorical features into numerical values
   B) To standardize or normalize the range of features
   C) To add new features to the dataset
   D) To reduce the number of features in the dataset

3. Which algorithm is used for clustering in unsupervised learning?
   A) Linear Regression
   B) K-nearest Neighbors (KNN)
   C) K-means Clustering
   D) Decision Trees

4. What is cross-validation used for in machine learning?
   A) To train the model on multiple datasets simultaneously
   B) To select the best model based on performance metrics
   C) To test the model on unseen data during training
   D) To evaluate the model's performance using different subsets of the data

5. Which evaluation metric is suitable for regression tasks?
   A) Accuracy
   B) Precision
   C) Mean Absolute Error (MAE)
   D) F1-score

6. What is the purpose of an activation function in a neural network?
   A) To initialize the weights of the network
   B) To control the output range of neurons
   C) To add more layers to the network
   D) To define the learning rate of the network

7. Which layer is typically used for reducing the dimensionality of data in a neural network?
   A) Convolutional Layer
   B) Dropout Layer
   C) Pooling Layer
   D) Batch Normalization Layer

8. Which optimizer is commonly used for training deep learning models?
   A) Gradient Descent
   B) AdaBoost
   C) Adam
   D) Random Forest

9. What does the term "vanishing gradient problem" refer to in deep learning?
   A) The gradient of the loss function becomes too large during training
   B) The weights of the neural network become too small to update effectively
   C) The gradient of the loss function becomes too small to propagate back through the network
   D) The neural network fails to converge during training

10. Which deep learning architecture is used for generating new data samples?
    A) Autoencoders
    B) Variational Autoencoders (VAEs)
    C) Long Short-Term Memory (LSTM) networks
    D) Convolutional Neural Networks (CNNs)

11. What is the purpose of tokenization in NLP?
   A) To translate text into multiple languages
   B) To remove stopwords from text data
   C) To split text into individual words or tokens
   D) To identify named entities in text data

12. Which task involves determining the sentiment (positive, negative, neutral) of text data?
   A) Named Entity Recognition (NER)
   B) Part-of-Speech Tagging (POS)
   C) Sentiment Analysis
   D) Word Embedding

13. What is the purpose of stemming in NLP?
   A) To extract important keywords from text
   B) To identify named entities in text data
   C) To reduce words to their base or root form
   D) To tokenize sentences into words

14. Which algorithm is commonly used for text classification in NLP?
   A) K-means Clustering
   B) Support Vector Machines (SVM)
   C) Decision Trees
   D) Linear Regression

15. What does TF-IDF stand for in the context of text analysis?
   A) Text Frequency-Inverse Document Format
   B) Term Frequency-Inverse Document Frequency
   C) Token Frequency-Inverse Document Feature
   D) Text Feature-Inverse Data Frequency

16. What does the `len()` function do in Python?
   A) Returns the length of a string or list
   B) Converts a string to lowercase
   C) Checks if a value exists in a list
   D) Rounds a floating-point number to the nearest integer

17. What is the output of `print("Hello" + "World")` in Python?
   A) Hello World
   B) HelloWorld
   C) Hello + World
   D) SyntaxError

18. What is the correct way to define a Python function named `add` that takes two arguments `a` and `b`?
   A) `def add(a, b):`
   B) `function add(a, b):`
   C) `define add(a, b):`
   D) `func add(a, b):`

19. How do you access the value associated with the key `'name'` in a dictionary named `person`?
   A) `person['name']`
   B) `person(name)`
   C) `person.get('name')`
   D) `person.name`

20. Which keyword is used to inherit properties and methods from a parent class in Python?
   A) `extends`
   B) `inherits`
   C) `superclass`
   D) `class`

Part-III (Practical)

Question 2: Build a CNN Based Classifier for Classifying the Objects using CIFAR10 Dataset.
Requirements:

- Five Number of Convolutional 2D Layers starting with 1024 filters.
- Kernel size 3 x 3
- Two Average Pooling Layers, in the 3rd and Fifth Convolutional Layer.
- Stride 2
- Padding ‘0’
- Optimizer Adam
- Loss function catagorical_crossentropy

The End 😀