

Practice Quiz

Q1: Which institution is the text from?

- A) JNTUH, Hyderabad
- B) Malla Reddy College of Engineering & Technology
- C) UGC, Govt. of India
- D) AICTE

Answer: B) Malla Reddy College of Engineering & Technology

Explanation: The text is from Malla Reddy College of Engineering & Technology, as mentioned in the header.

Q2: Who is the Associate Professor mentioned in the text?

- A) Ms.K.Bhavana
- B) Dr.B.Jyothi
- C) Ms.Anitha Patibandla
- D) None of the above

Answer: C) Ms.Anitha Patibandla

Explanation: Ms.Anitha Patibandla is the Associate Professor mentioned in the text.

Q3: Which grade has the institution been accredited by NAAC?

- A) B
- B) A
- C) C
- D) D

Answer: B) A

Explanation: The institution has been accredited with NAAC grade 'A', as mentioned in the text.

Q1: What is the main focus of Artificial Intelligence?

- A) Designing intelligence in artificial devices
- B) Understanding human behavior
- C) Creating robots with human-like abilities
- D) Developing advanced computer systems

Answer: A) Designing intelligence in artificial devices

Explanation: Artificial Intelligence is concerned with designing intelligence in artificial devices to perform tasks that typically require human intelligence.

Q2: What are the sub-areas of AI mentioned in the text?

- A) Game Playing, Speech Recognition, and Expert Systems
- B) Mathematical Theorem Proving, Natural Language Understanding, and Scheduling
- C) Business, Engineering, and Fraud Detection
- D) Object Identification, Information Retrieval, and Space Shuttle Scheduling

Answer: A) Game Playing, Speech Recognition, and Expert Systems

Explanation: The sub-areas of AI mentioned in the text include Game Playing, Speech Recognition, and Expert Systems.

Q3: What is an Agent in the context of AI?

- A) A human with advanced sensory abilities
- B) A robot with advanced motor skills
- C) Anything that perceives its environment and acts upon it
- D) A software program that performs tasks autonomously

Answer: C) Anything that perceives its environment and acts upon it

Explanation: An Agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through actuators.

Q4: What is the main goal of Cognitive Science in AI?

- A) To create machines that think rationally
- B) To produce human-like behavior in machines
- C) To simulate the reasoning process of humans
- D) To develop logical rules for inference mechanisms

Answer: C) To simulate the reasoning process of humans

Explanation: The main goal of Cognitive Science in AI is to produce a sequence of steps of the reasoning process similar to those followed by humans in solving tasks.

Q1: What is the term used to refer to the agent's perceptual inputs at any given instant?

- A) Percept Sequence
- B) Agent Function
- C) Percept
- D) Agent Program

Answer: C) Percept

Explanation: The term "percept" is used to refer to the agent's perceptual inputs at any given instant.

Q2: In the vacuum-cleaner world example, what action does the agent take if the current square is dirty?

- A) Move Left
- B) Move Right
- C) Suck

D) Do Nothing

Answer: C) Suck

Explanation: The agent will perform the action of "Suck" if the current square is dirty in the vacuum-cleaner world example.

Q3: What distinguishes a rational agent from an omniscient agent?

A) Omniscient agents rely on prior knowledge, while rational agents rely on percepts.

B) Rational agents learn from what they perceive, while omniscient agents do not.

C) Rational agents act based on their own experience, while omniscient agents know the actual outcome of their actions.

D) Omniscient agents are autonomous, while rational agents lack autonomy.

Answer: C) Rational agents act based on their own experience, while omniscient agents know the actual outcome of their actions.

Explanation: Rational agents not only gather information but also learn from what they perceive, while omniscient agents know the actual outcome of their actions.

Q4: What types of environments are distinguished based on observability?

A) Deterministic vs. Stochastic

B) Episodic vs. nonepisodic

C) Accessible vs. inaccessible

D) Static vs. dynamic

Answer: C) Accessible vs. inaccessible

Explanation: An environment is classified as fully observable if an agent sensor can sense or access the complete state of the environment at each point of time, otherwise it is partially observable.

Q1: What is the main drawback of Iterative Deepening Depth First Search (IDDFS)?

A) It combines the benefits of BFS and DFS search algorithms

B) It repeats all the work of the previous phase

C) It is not complete

D) It is slower than BFS and DFS

Answer: B) It repeats all the work of the previous phase

Explanation: IDDFS repeats all the work of the previous phase, which can be inefficient in terms of time and resources.

Q2: Which algorithm continuously moves in the direction of increasing elevation to find the peak of the mountain or best solution?

A) Breadth First Search

B) Depth First Search

C) Hill Climbing Algorithm

D) Simulated Annealing Search

Answer: C) Hill Climbing Algorithm

Explanation: Hill Climbing Algorithm continuously moves in the direction of increasing elevation to find the peak of the mountain or best solution.

Q3: What is the key characteristic of Informed Search algorithms?

A) They use no information about the problem

B) They are not complete

C) They are also called blind searches

D) They use information about the problem to guide the search

Answer: D) They use information about the problem to guide the search

Explanation: Informed Search algorithms use information about the problem to guide the search, which can lead to more efficient solutions.

Q1: What is the main problem with a hill climbing algorithm that never makes "downhill" moves?

- A) It is incomplete
- B) It is inefficient
- C) It is not suitable for large-scale optimization tasks
- D) It is not admissible

Answer: A) It is incomplete

Explanation: A hill climbing algorithm that never makes "downhill" moves can get stuck on a local maximum and may not reach the global optimum.

Q2: What is the purpose of the simulated annealing algorithm?

- A) To always pick the best move
- B) To combine hill climbing with a random walk
- C) To guarantee completeness
- D) To have a constant probability for accepting moves

Answer: B) To combine hill climbing with a random walk

Explanation: Simulated annealing combines the benefits of hill climbing with a random walk to achieve efficiency and completeness in finding the global optimum.

Q3: What is the main advantage of the Best First Search algorithm?

- A) It combines depth first and breadth first searches
- B) It guarantees optimality
- C) It allows switching between paths
- D) It has a low time complexity

Answer: C) It allows switching between paths

Explanation: Best First Search allows switching between paths, gaining the benefits of both depth-first and breadth-first searches.

Q4: What is the heuristic estimate used in the A* search algorithm?

A) $f = g + h$

B) $f = g * h$

C) $f = g - h$

D) $f = g / h$

Answer: A) $f = g + h$

Explanation: In the A* search algorithm, the heuristic estimate is calculated as $f = g + h$, where g is the cost to reach the current node and h is the estimated cost to reach the goal node.

Q1: What is the time complexity of the minimax algorithm?

A) $O(bm)$

B) $O(n^2)$

C) $O(\log n)$

D) $O(2^n)$

Answer: A) $O(bm)$

Explanation: The time complexity of the minimax algorithm is $O(bm)$, where b is the branching factor and m is the maximum depth of the tree.

Q2: What is the space complexity of the minimax algorithm using depth-first exploration?

A) $O(n)$

B) $O(\log n)$

C) $O(bm)$

D) $O(2^n)$

Answer: C) $O(bm)$

Explanation: The space complexity of the minimax algorithm using depth-first exploration is $O(bm)$, where b is the branching factor and m is the maximum depth of the tree.

Q3: When does Alpha-Beta pruning occur in the minimax search algorithm?

- A) When $\alpha < \beta$
- B) When $\alpha \geq \beta$
- C) When $\alpha = \beta$
- D) When $\alpha \leq \beta$

Answer: B) When $\alpha \geq \beta$

Explanation: Alpha-Beta pruning occurs in the minimax search algorithm when α is greater than or equal to β , leading to the pruning of unnecessary paths in the search tree.

Q4: What is the advantage of the AO* algorithm?

- A) It is an optimal algorithm
- B) It is fast and efficient
- C) It always finds the optimal path
- D) It has low complexity

Answer: A) It is an optimal algorithm

Explanation: The AO* algorithm is an optimal algorithm, meaning it finds the best possible solution.

Q5: What is the main difference between AND-OR graphs and OR graphs in the AO* algorithm?

- A) AND nodes must have all goals realized, while OR nodes only need one goal
- B) AND nodes only need one goal realized, while OR nodes must have all goals
- C) AND nodes and OR nodes have the same goals

D) There is no difference between AND-OR graphs and OR graphs

Answer: A) AND nodes must have all goals realized, while OR nodes only need one goal

Explanation: In AND-OR graphs, all goals following an AND node must be realized, while in OR graphs, only one goal following an OR node needs to be realized.

Q1: What is the correct symbol for conjunction in propositional logic?

A) \wedge

B) \vee

C) \Rightarrow

D) \Leftrightarrow

Answer: A) \wedge

Explanation: The symbol \wedge represents conjunction in propositional logic, meaning "and".

Q2: Which logical connective is used for implication in propositional logic?

A) \wedge

B) \vee

C) \Rightarrow

D) \Leftrightarrow

Answer: C) \Rightarrow

Explanation: The symbol \Rightarrow represents implication in propositional logic, meaning "if-then".

Q3: Which of the following is a limitation of propositional logic?

A) Can represent complex sentences

B) Represents facts as either true or false

C) Has limited expressive power

D) Can represent natural language statements easily

Answer: C) Has limited expressive power

Explanation: Propositional logic cannot represent complex sentences or natural language statements effectively.

Q4: In first-order logic, what do constant symbols stand for?

A) Objects

B) Relations

C) Functions

D) Connectives

Answer: A) Objects

Explanation: Constant symbols in first-order logic stand for objects.

Q5: What does the symbol \forall represent in first-order logic?

A) Existential quantification

B) Disjunction

C) Universal quantification

D) Conjunction

Answer: C) Universal quantification

Explanation: The symbol \forall represents universal quantification in first-order logic, meaning "for all".

Q1: What are sentences added to a knowledge base called in first-order logic?

A) Queries

B) Assertions

C) Goals

D) Axioms

Answer: B) Assertions

Explanation: Sentences added to a knowledge base in first-order logic are called assertions.

Q2: What is the process of asking questions of the knowledge base in first-order logic called?

A) Assertion

B) Query

C) Goal

D) Axiom

Answer: B) Query

Explanation: The process of asking questions of the knowledge base in first-order logic is called a query.

Q3: Which type of chaining in artificial intelligence starts with the goal and works backward?

A) Forward chaining

B) Backward chaining

C) Horn chaining

D) Definite chaining

Answer: B) Backward chaining

Explanation: Backward chaining in artificial intelligence starts with the goal and works backward through rules to find known facts that support the goal.

Q4: What are facts that form the descriptions of specific problem instances in AI known as?

- A) Axioms
- B) Theorems
- C) Assertions
- D) Instances

Answer: D) Instances

Explanation: Facts that form the descriptions of specific problem instances in AI are known as instances.

Q5: Which form of sentence in AI is known as a definite clause or strict horn clause?

- A) Disjunction of literals with at most one positive literal
- B) Disjunction of literals with exactly one positive literal
- C) Conjunction of literals with at least one positive literal
- D) Conjunction of literals with no positive literal

Answer: B) Disjunction of literals with exactly one positive literal

Explanation: A definite clause or strict horn clause in AI is a disjunction of literals with exactly one positive literal.

Q1: What is the definition of Machine Learning according to Arthur Samuel?

- A) Field of study that gives computers the capability to learn with human assistance
- B) Field of study that requires explicit programming for computers to learn
- C) Field of study that automates and improves the learning process of computers without explicit programming
- D) Field of study that focuses on human learning processes

Answer: C) Field of study that automates and improves the learning process of computers without explicit programming

Explanation: Machine Learning allows computers to learn based on experiences without being explicitly programmed.

Q2: What is the basic difference between Traditional Programming and Machine Learning?

- A) Traditional Programming uses data and output, while Machine Learning uses data and program logic
- B) Traditional Programming requires human assistance, while Machine Learning does not
- C) Traditional Programming is faster than Machine Learning
- D) Machine Learning requires explicit programming, while Traditional Programming does not

Answer: A) Traditional Programming uses data and output, while Machine Learning uses data and program logic

Explanation: In Traditional Programming, the program logic is provided by humans, while in Machine Learning, the program logic is created by the machine.

Q3: What are the two broad classifications of machine learning problems?

- A) Supervised learning and Reinforcement learning
- B) Unsupervised learning and Reinforcement learning
- C) Supervised learning and Unsupervised learning
- D) Unsupervised learning and Semi-supervised learning

Answer: C) Supervised learning and Unsupervised learning

Explanation: Machine learning problems can be broadly classified into Supervised learning and Unsupervised learning categories.

Q1: What type of learning algorithm is used to draw inferences from datasets without labeled responses?

- A) Supervised learning
- B) Unsupervised learning
- C) Reinforcement learning

D) Semi-supervised learning

Answer: B) Unsupervised learning

Explanation: Unsupervised learning is used to group unsorted information according to similarities, patterns, and differences without any prior training of data.

Q2: Which type of learning algorithm involves a teacher providing labeled data to train the machine?

A) Supervised learning

B) Unsupervised learning

C) Reinforcement learning

D) Semi-supervised learning

Answer: A) Supervised learning

Explanation: Supervised learning involves training the machine using labeled data provided by a teacher or supervisor.

Q3: What is the process of providing input data as well as correct output data to a machine learning model called?

A) Supervised learning

B) Unsupervised learning

C) Reinforcement learning

D) Semi-supervised learning

Answer: A) Supervised learning

Explanation: Supervised learning involves providing input data and correct output data to the machine learning model for training and prediction.

Q4: Which type of problem does regression algorithms address in supervised learning?

A) Categorical

B) Continuous

C) Binary

D) Discrete

Answer: B) Continuous

Explanation: Regression algorithms are used for the prediction of continuous variables in supervised learning.

Q1: What is the main goal of unsupervised learning?

A) To predict discrete values belonging to a particular class

B) To train models using labeled data

C) To find hidden patterns and insights from data

D) To group data based on similarities

Answer: C) To find hidden patterns and insights from data

Explanation: Unsupervised learning focuses on discovering inherent groupings in data without the use of labeled data.

Q2: Which type of learning is more complex, supervised or unsupervised?

A) Supervised learning

B) Unsupervised learning

C) Both are equally complex

D) Neither is complex

Answer: B) Unsupervised learning

Explanation: Unsupervised learning is more complex as it does not have corresponding output labels to guide the model.

Q3: What is the main purpose of clustering in unsupervised learning?

A) To predict discrete values

- B) To group data based on similarities
- C) To find relationships between variables
- D) To analyze structured data

Answer: B) To group data based on similarities

Explanation: Clustering in unsupervised learning involves grouping data objects based on similarities or differences.

Q4: Which algorithm is commonly used for Association rule learning in unsupervised learning?

- A) Linear Regression
- B) K-means clustering
- C) Apriori algorithm
- D) Principle Component Analysis

Answer: C) Apriori algorithm

Explanation: The Apriori algorithm is used for finding relationships between variables in a large dataset in unsupervised learning.

Q1: What is the main goal of supervised learning?

- A) To find hidden patterns in data
- B) To train the model using labeled data
- C) To infer patterns from unlabeled input data
- D) To predict continuous/real values

Answer: B) To train the model using labeled data

Explanation: In supervised learning, the main goal is to train the model using labeled data so it can predict the output when given new data.

Q2: Which type of machine learning method does not require any supervision?

- A) Supervised Learning
- B) Reinforcement Learning
- C) Unsupervised Learning
- D) Semi-supervised Learning

Answer: C) Unsupervised Learning

Explanation: Unsupervised learning does not require any supervision and finds patterns in data without labeled input.

Q3: What is the difference between underfitting and overfitting in machine learning?

A) Overfitting occurs when the algorithm works well with training data but not with test data, while underfitting occurs when the algorithm does not perform well with either dataset.

B) Underfitting occurs when the algorithm works well with training data but not with test data, while overfitting occurs when the algorithm does not perform well with either dataset.

C) Overfitting occurs when the algorithm works well with both training and test data, while underfitting occurs when the algorithm works well only with test data.

D) Underfitting occurs when the algorithm works well with both training and test data, while overfitting occurs when the algorithm works well only with training data.

Answer: A) Overfitting occurs when the algorithm works well with training data but not with test data, while underfitting occurs when the algorithm does not perform well with either dataset.

Explanation: Overfitting happens when the model is too complex and fits the training data too closely, while underfitting happens when the model is too simple to capture the underlying patterns in the data.

Q4: Which regression type is used for modeling a non-linear dataset using a linear model?

- A) Linear Regression
- B) Logistic Regression
- C) Polynomial Regression

D) Support Vector Regression

Answer: C) Polynomial Regression

Explanation: Polynomial Regression is used to model non-linear datasets using a linear model by transforming original features into polynomial features of given degree.

Q1: What is Support Vector Regression (SVR)?

A) A clustering algorithm

B) An unsupervised learning algorithm

C) A regression algorithm for continuous variables

D) A classification algorithm

Answer: C) A regression algorithm for continuous variables

Explanation: SVR is a regression algorithm that works for continuous variables.

Q2: What is the main goal of SVR?

A) To predict discrete variables

B) To classify data points

C) To maximize the margin and cover as many datapoints as possible

D) To minimize the margin and focus on outliers

Answer: C) To maximize the margin and cover as many datapoints as possible

Explanation: The main goal of SVR is to consider the maximum datapoints within the boundary lines and the hyperplane.

Q3: Which function is used to map lower-dimensional data into higher-dimensional data in SVR?

A) Hyperplane

B) Kernel

C) Boundary line

D) Support vectors

Answer: B) Kernel

Explanation: Kernel is a function used to map a lower-dimensional data into higher-dimensional data in SVR.

Q4: Which type of linear regression uses more than one independent variable to predict the value of a numerical dependent variable?

A) Simple Linear Regression

B) Multiple Linear Regression

C) Polynomial Regression

D) Logistic Regression

Answer: B) Multiple Linear Regression

Explanation: Multiple Linear Regression uses more than one independent variable to predict the value of a numerical dependent variable.

Q1: Which type of clustering algorithm is Agglomerative Hierarchical clustering?

A) Fuzzy Clustering

B) Density-Based Clustering

C) Partitioning Clustering

D) Hierarchical Clustering

Answer: D

Explanation: Agglomerative Hierarchical clustering is a type of hierarchical clustering algorithm.

Q2: What is the main advantage of Hierarchical clustering over K-Means clustering?

A) Faster computation

- B) Requires predetermined number of clusters
- C) Creates clusters of the same size
- D) No need to predetermine the number of clusters

Answer: D

Explanation: Hierarchical clustering does not require the predetermined number of clusters, unlike K-Means clustering.

Q3: What does a dendrogram represent in Hierarchical clustering?

- A) Number of clusters
- B) Distance between data points
- C) Cluster centroids
- D) Tree-like structure of clusters

Answer: D

Explanation: A dendrogram represents the tree-like structure of clusters in Hierarchical clustering.

Q4: Which linkage method calculates the distance between the centroid of clusters?

- A) Single Linkage
- B) Complete Linkage
- C) Average Linkage
- D) Centroid Linkage

Answer: D

Explanation: Centroid Linkage method calculates the distance between the centroid of clusters in Hierarchical clustering.

Q5: What is the main purpose of clustering in machine learning?

- A) Classification of labeled data
- B) Grouping unlabelled data
- C) Regression analysis
- D) Anomaly detection

Answer: B

Explanation: Clustering is used to group unlabelled data into clusters based on similarities.

Q1: What is the main advantage of the DBSCAN algorithm compared to other clustering algorithms?

- A) It works on updating the candidates for centroid
- B) It separates areas of high density from areas of low density
- C) It requires specifying the number of clusters beforehand
- D) It has $O(N^2T)$ time complexity

Answer: B) It separates areas of high density from areas of low density

Explanation: DBSCAN algorithm separates areas of high density from areas of low density, allowing clusters to be found in any arbitrary shape.

Q2: Which clustering algorithm does not require specifying the number of clusters beforehand?

- A) K-Means
- B) Affinity Propagation
- C) Expectation-Maximization Clustering using GMM
- D) Agglomerative Hierarchical algorithm

Answer: B) Affinity Propagation

Explanation: Affinity Propagation clustering algorithm does not require specifying the number of clusters beforehand, as it sends messages between data points until

convergence.

Q3: In which application is clustering technique used to classify different species of plants and animals?

- A) Identification of Cancer Cells
- B) Search Engines
- C) Customer Segmentation
- D) Biology

Answer: D) Biology

Explanation: Clustering technique is used in the biology stream to classify different species of plants and animals using the image recognition technique.

Q1: What are the two main types of reinforcement learning mentioned in the text?

- A) Positive Reinforcement
- B) Negative Reinforcement
- C) Neutral Reinforcement
- D) Random Reinforcement

Answer: A) Positive Reinforcement

Explanation: The text mentions that the two main types of reinforcement learning are Positive Reinforcement and Negative Reinforcement.

Q2: What is the condition for a state to be considered a Markov State?

- A) It should depend on the past actions
- B) It should depend on the future actions
- C) It should follow the Markov property
- D) It should be fully observable

Answer: C) It should follow the Markov property

Explanation: A Markov State is a state that follows the Markov property, which means that the future is independent of the past and can only be defined with the present.

Q3: Which reinforcement learning algorithm is based on the Bellman equation?

- A) Q-Learning
- B) SARSA
- C) Deep Q Neural Network (DQN)
- D) Off policy RL algorithm

Answer: A) Q-Learning

Explanation: Q-Learning is a popular model-free reinforcement learning algorithm based on the Bellman equation.

Q4: What does 'Q' represent in Q-learning?

- A) Quantity
- B) Quality
- C) Question
- D) Quotient

Answer: B) Quality

Explanation: In Q-learning, 'Q' stands for quality, which specifies the quality of an action taken by the agent.

Q5: In which type of learning does the agent interact with the environment and explore it to take actions?

- A) Reinforcement Learning
- B) Supervised Learning
- C) Unsupervised Learning
- D) Semi-supervised Learning

Answer: A) Reinforcement Learning

Explanation: Reinforcement Learning involves the agent interacting with the environment, exploring it, taking actions, and getting rewarded.

Q1: What is one of the main learning algorithms used in Artificial Intelligence?

- A) Deep Learning
- B) Reinforcement Learning
- C) Supervised Learning
- D) Unsupervised Learning

Answer: B) Reinforcement Learning

Explanation: Reinforcement Learning is mentioned as one of the main learning algorithms used in Artificial Intelligence in the text.

Q2: In which cases should Reinforcement Learning not be used according to the text?

- A) When there is limited data
- B) When there is delayed feedback
- C) When the problem can be solved efficiently with other ML algorithms
- D) When human intervention is required

Answer: C) When the problem can be solved efficiently with other ML algorithms

Explanation: The text mentions that if there is enough data to solve the problem efficiently, other ML algorithms can be used instead of Reinforcement Learning.

Q3: What is one of the main issues with the Reinforcement Learning algorithm mentioned in the text?

- A) Lack of exploration
- B) Delayed feedback
- C) Limited data availability

D) Human intervention

Answer: B) Delayed feedback

Explanation: The text states that delayed feedback is one of the parameters that may affect the speed of learning in the Reinforcement Learning algorithm.

Q1: What is the probability of the series: Baby is sleeping, sleeping, eating, playing, playing, sleeping?

A) 0.125

B) 0.25

C) 0.0625

D) 0.03125

Answer: C) 0.0625

Explanation: To find the probability of a series of events, you multiply the individual probabilities together. So, $0.25 * 0.25 * 0.25 * 0.50 * 0.50 * 0.25 = 0.0625$.

Q2: What is the probability of baby playing given baby is eating?

A) 0.25

B) 0.50

C) 0.75

D) 0.125

Answer: B) 0.50

Explanation: The probability of baby playing given baby is eating can be calculated as the probability of baby playing and eating divided by the probability of baby eating. So, $(0.25 * 0.50) / 0.25 = 0.50$.