The Yenepoya Institute of Arts, Science, Commerce and Management
A Constituent Unit of Yenepoya (Deemed to be University)
Question Bank 2024
III Semester BCA/ BSc
BCA304/BSC304 Introduction to Artificial Intelligence

UNIT 01

Remembering:

1. Which of the following is NOT an application of AI?
a. Natural Language Processing
b. Game Playing
c. Computer Vision
d. Manual Data Entry
Answer: D

2. What does the acronym "IoT" stand for?
a. Internet of Technology
b. Internet of Things
c. Internet of Thinking
d. Internet of Transport
Answer: b) Internet of Things

3. Which programming language is commonly used for AI development?
a. Java b. Python c. C++ d. Ruby
Answer: b) Python

4. Which of the following is an example of an AI application in games?
a. Chess-playing computer program
b. Typing tutor software
c. Spreadsheet software
d. Web browser
Answer: A

5. Which of the following is an AI application in robotics?
a. Email client
b. Self-driving cars
c. Music player
d. Calendar app
Answer: B

6. What is the purpose of Fuzzy Logic in AI?
a. To handle uncertainty and approximate reasoning
b. To perform complex mathematical calculations
c. To create human-like conversations in chatbots
d. To process images and videos
Answer: A

7. In constraint satisfaction problems, what does 'backtracking' refer to?
a. Trying all possible solutions
b. Undoing variable assignments when a constraint is violated
c. Using heuristics to guide the search
d. Randomly assigning values to variables
Answer: B

8. What is the purpose of depth-first search in AI?
a. To explore all nodes at the present depth before moving to the next level
b. To explore as far as possible along a branch before backtracking
c. To use heuristics to guide the search
d. To find the shortest path
Answer: B

9. What does the term 'search space control' refer to in AI?
a. Controlling the environment of the AI agent
b. Managing the number of states explored during the search
c. Defining the initial state and goal state
d. Using machine learning to optimize search
Answer: B

10. Which of the following AI techniques is used in speech recognition?
a. Fuzzy Logic
b. Genetic Algorithms
c. Neural Networks
d. Expert Systems
Answer: C

11. What type of problem is best suited for using the means-end analysis technique?
a. Problems with clearly defined initial and goal states
b. Problems that require random exploration
c. Problems that cannot be broken down into subproblems
d. Problems that do not involve any search process
Answer: A

12. What is an example of an AI technique used in robotics?
a. Natural Language Processing
b. Genetic Algorithms
c. Computer Vision
d. Fuzzy Logic
Answer: C

Understanding:

13. How does AI differ from human intelligence?
a. AI can perform tasks faster than humans
b. AI relies on algorithms, while human intelligence is more abstract
c. AI can only perform tasks it is programmed for, while humans can adapt to new situations
d. AI is not capable of learning, unlike humans
Answer: C

14. What is artificial intelligence?
a A type of robot
b. A human-like computer program
c. The simulation of human intelligence in machines
d. Advanced automation
Answer: c) The simulation of human intelligence in machines

15. Explain the concept of State Space Search in AI.
a. It is a process of searching for a sequence of actions that reaches a goal state
b. It is a technique used to reduce the complexity of a problem by breaking it down into smaller parts
c. It is a method for representing knowledge in AI systems
d. It is a way to control the search space in AI algorithms
Answer: A

16. Which AI application allows computers to interpret and understand human speech?

a. Optical Character Recognition (OCR) b. Speech Recognition
c. Machine Translation d. Image Classification
Answer: b) Speech Recognition

17. What is the primary focus of computer vision in AI?
a. Language understanding b. Speech recognition
c. Image and video analysis d. Decision making
Answer: c) Image and video analysis

18. What is the role of Problem Reduction in AI?
a. To break down a complex problem into simpler subproblems
b. To eliminate unnecessary constraints in a problem
c. To find the optimal solution to a problem
d. To control the search space in AI algorithms
Answer: A

19. How does A* algorithm differ from other search algorithms like DFS and BFS?
a. A* is more efficient in finding the optimal solution
b. A* does not guarantee finding the optimal solution
c. A* is only applicable to certain types of problems
d. A* is slower than DFS and BFS
Answer: A

20. Which search algorithm explores all the nodes at the present depth level before moving on to the nodes at the next depth level?
a. Depth First Search b. Breadth First Search
c. Heuristic Search d. A* Algorithm
Answer: B

21. What is the main purpose of heuristic search in AI?
a. To explore all possible paths
b. To find the optimal solution by exploring the most promising paths first
c. To use randomness in the search process
d. To search without using any prior knowledge
Answer: B

22. In the context of AI, what does the term 'state space' refer to?
a. The set of all possible states that can be reached
b. The initial state of the problem
c. The goal state
d. The path from the initial state to the goal state
Answer: A

23. Which of the following is an application of computer vision in AI?
a. Speech Recognition b. Image Classification
c. Natural Language Processing d. Game Playing
Answer: B

Applying:

24. To apply the concept of State Space Search to solve a problem where a robot needs to navigate through a maze.
a. Identify the initial state and goal state
b. Generate possible actions for the robot

c. Use a search algorithm to find the path to the goal state
d. All of the above
Answer: D

25. Which of the following is not a subfield of AI?
a. Machine Learning b. Natural Language Processing
c. Robotics d. Quantum Computing
Answer: d) Quantum Computing

26. Which AI technique is focused on making decisions under uncertainty?
a. Expert Systems b. Reinforcement Learning
c. Neural Networks d. Genetic Algorithms
Answer: b) Reinforcement Learning

27. What AI technique is used for teaching computers to play chess at a grandmaster level?
a. Machine learning b. Natural language processing
c. Reinforcement learning d. Expert systems
Answer: c) Reinforcement learning

28. In which field does AI play a significant role in image and video recognition?
a. Astrophysics b. Environmental science
c. Computer vision d. Geology
Answer: c) Computer vision

29. Use an example to illustrate the application of Means-End Analysis in problem solving.
a. Solving a maze by comparing the current state to the goal state
b. Finding the shortest path between two points on a map
c. Breaking down a complex problem into smaller subproblems
d. All of the above
Answer: A

30. Which of the following algorithms is used for finding the shortest path in a weighted graph?
a. Hill Climbing b. A* Algorithm
c. Breadth First Search d. Depth First Search
Answer: B

31. What is an example of a real-life application of AI in healthcare?
a. Automated customer service b. Fraud detection
c. Medical diagnosis systems d. Autonomous driving
Answer: C

32. What type of search algorithm is AO*?
a. Uninformed Search b. Informed Search
c. Heuristic Search d. Local Search
Answer: C

33. What is the role of an AI agent in a search problem?
a. To define the initial state
b. To explore the search space and find a solution
c. To simulate human behavior
d. To apply machine learning techniques
Answer: B

34. What is an example of AI use in autonomous vehicles?

a. Predictive maintenance
b. Speech synthesis
c. Object detection and avoidance
d. Data entry automation
Answer: C

35. Which of the following is a technique for solving optimization problems by simulating the process of natural evolution?
a. Neural Networks
b. Genetic Algorithms
c. Fuzzy Logic
d. Expert Systems
Answer: B

36. What is the goal of the hill climbing algorithm in AI?
a. To find the highest peak in the search space
b. To explore all possible paths
c. To simulate natural evolution
d. To make decisions based on rules
Answer: A

37. What is the primary purpose of using genetic algorithms in AI?
a. To simulate human decision making
b. To find optimal or near-optimal solutions by simulating the process of natural evolution
c. To process and analyze natural language
d. To classify images and objects
Answer: B

38. What is the main advantage of using the A* algorithm over other search algorithms?
a. It is the fastest algorithm for all search problems
b. It guarantees finding the optimal solution if one exists
c. It requires the least amount of memory
d. It explores all possible paths
Answer: B

39. How would you apply Means-End Analysis to solve a problem where a robot needs to assemble parts in a specific order?
a. Identify the current state of the assembly process and the goal state
b. Define the actions the robot can take to move closer to the goal state
c. Develop a strategy to minimize the difference between the current state and the goal state
d. All of the above
Answer: D

40. What is the goal of the Hill climbing algorithm in AI?
a. To find the highest peak in the search space
b. To explore all possible paths
c. To simulate natural evolution
d. To make decisions based on rules
Answer: A

Analyzing:

41. Which of the following is a correct definition of AI?
a. The study of human intelligence and how it can be replicated in machines

b. The creation of intelligent machines that can perform tasks without human intervention
c. The use of computers to simulate human thought processes
d. All of the above
Answer: D

42. What is the role of AI in the automotive industry and its impact on vehicle technology.
a. AI enables autonomous driving features in vehicles
b. AI improves safety through advanced driver-assistance systems (ADAS)
c. AI enhances the overall driving experience with features like voice recognition and personalized settings
d. All of the above
Answer: D

43. Which industry uses AI for fraud detection and prevention?
a. Entertainment b. Finance c. Agriculture d. Retail
Answer: b) Finance

44. Which AI application is used to recommend products to online shoppers based on their past behavior?
a. Natural language processing b. Computer vision
c. Recommendation systems d. Robotics
Answer: c) Recommendation systems

45. How does AI contribute to improving healthcare through medical imaging analysis?
a. AI can analyze medical images faster and more accurately than humans
b. AI is limited in its ability to analyze complex medical images
c. AI can only be used for basic image analysis tasks
d. AI is not suitable for medical imaging analysis
Answer: A

46. What is the role of Computer Vision and Speech Processing in AI applications?
a. Computer Vision is used to analyze and interpret visual information
b. Speech Processing is used to recognize and understand spoken language
c. Computer Vision and Speech Processing are used in robotics for interaction with the environment
d. All of the above
Answer: D

47. How does AI contribute to enhancing cybersecurity?
a. By developing new programming languages
b. By analyzing large datasets for threat detection
c. By creating more secure physical hardware
d. By designing user-friendly interfaces
Answer: B

48. Analyze the role of AI in improving healthcare with real-life examples.
a. AI-powered medical diagnosis systems
b. Robotics-assisted surgeries
c. Personalized treatment plans based on AI algorithms
d. All of the above
Answer: D

49. Which among the following is correct with respect to bfs and dfs?
a. DFS explores deeper into the search space, while BFS explores broader
b. DFS guarantees finding the optimal solution, while BFS does not
c. DFS is more memory-efficient than BFS
d. BFS is more suitable for infinite search spaces
Answer: A

50. Which of the following is an example of a heuristic search technique?
a. Breadth First Search b. Depth First Search
c. Hill Climbing d. Uniform Cost Search
Answer: C

51. Which AI technique is based on the principles of natural selection and genetics?
a. Machine Learning b. Fuzzy Logic
c. Genetic Algorithm d. Expert Systems
Answer: C

Evaluating:

52. Evaluate the impact of AI in the field of education and its potential benefits.
a. AI has improved personalized learning experiences for students
b. AI has increased access to education for remote learners
c. AI has improved student outcomes through adaptive learning platforms
d. All of the above
Answer: D

53. What is the main challenge in developing artificial intelligence systems that can emulate the human cognitive process?
a. Creating algorithms that can learn and adapt to new situations
b. Designing hardware that can support the processing power required
c. Collecting and processing large amounts of data
d. Overcoming ethical and societal concerns about AI
Answer: A

54. Assess the effectiveness of AI in predicting customer behavior in e-commerce.
a. AI can accurately predict customer preferences and purchasing behavior
b. AI is not effective in predicting customer behavior
c. AI is only useful for analyzing historical data, not predicting future behavior
d. AI is limited to certain types of e-commerce platforms
Answer: A

55. Evaluate the impact of AI in the field of finance and banking.
a. AI has improved fraud detection and risk management
b. AI has reduced the need for human financial advisors
c. AI has made banking services more accessible
d. All of the above
Answer: D

56. Assess the effectiveness of AI techniques like Neural Networks in image recognition tasks.
a. Neural Networks are less accurate than traditional image recognition algorithms

b. Neural Networks are more efficient in processing images
c. Neural Networks are limited to specific types of images
d. Neural Networks are not suitable for image recognition tasks
Answer: B

57. Evaluate the effectiveness of Production Systems in modeling human problem-solving behavior.
a. Production Systems are not effective for modeling human behavior
b. Production Systems are limited to specific problem domains
c. Production Systems can model complex decision-making processes
d. Production Systems are only useful for simple problems
Answer: C

58. Which of the following is NOT a common application of AI in healthcare?
a. Disease diagnosis
b. Drug discovery
c. Self-driving cars
d. Personalized medicine
Answer: c) Self-driving cars

59. Assess the impact of AI applications in the field of education.
a. AI has improved student learning outcomes
b. AI has replaced human teachers in many schools
c. AI has no impact on education
d. AI has made education less accessible
Answer: A

60. Evaluate the effectiveness of Genetic Algorithms in solving optimization problems compared to traditional algorithms.
a. Genetic Algorithm is always more effective than traditional algorithms
b. Genetic Algorithm is less effective than traditional algorithms for some problems
c. Genetic Algorithm is more suitable for continuous optimization problems
d. Genetic Algorithm is less efficient than traditional algorithms
Answer: B

61. Assess the impact of AI techniques like Machine Learning on job automation in various industries.
a. AI has led to widespread job loss in many industries
b. AI has created new job opportunities in AI-related fields
c. AI has no impact on job automation
d. AI has only impacted manual labor jobs
Answer: B

62. Assess the effectiveness of AI techniques like Neural Networks in image recognition tasks.
a. Neural Networks are less accurate than traditional image recognition algorithms
b. Neural Networks are more efficient in processing images
c. Neural Networks are limited to specific types of images
d. Neural Networks are not suitable for image recognition tasks
Answer: B

63. Assess the impact of AI techniques like Machine Learning on job automation in various industries.
a. AI has led to widespread job loss in many industries
b. AI has created new job opportunities in AI-related fields

c. AI has no impact on job automation
d. AI has only impacted manual labor jobs
Answer: B

64. Which AI technique is used for decision making under uncertainty?
a. Neural Networks
b. Fuzzy Logic
c. Genetic Algorithms
d. Machine Learning
Answer: B

65. Which of the following algorithms is used for search space control in AI?
a. A* Algorithm
b. Hill Climbing
c. Breadth First Search
d. Depth First Search
Answer: A

66. What is the primary purpose of using the branch and bound algorithm in AI?
a. To find all possible solutions
b. To find the best solution by systematically exploring and pruning branches of the search tree
c. To simulate human decision making
d. To use genetic algorithms for optimization
Answer: B

67. In which search algorithm does the search continue by expanding the most promising node chosen according to a specified rule?
a. Breadth First Search
b. Depth First Search
c. Hill Climbing
d. A* Algorithm
Answer: D

Creating:

68. To design an AI application for optimizing energy consumption in a smart home.
a. Use sensors to monitor energy usage
b. Analyze data to identify patterns and optimize energy usage
c. Control appliances to minimize energy consumption
d. All of the above
Answer: D

69. In a scenario where AI techniques like Machine Learning can be applied to improve healthcare outcomes.
a. Predicting patient outcomes based on medical history
b. Personalizing treatment plans based on genetic data
c. Automating medical image analysis for faster diagnosis
d. All of the above
Answer: D

70. For designing an AI application for improving customer service in a retail store.
a. Use NLP for analyzing customer feedback
b. Use Computer Vision for monitoring in-store traffic
c. Use Robotics for automated inventory management
d. All of the above
Answer: D

71. Which scenario demonstrates the application of Heuristic Search to solve a real-life problem?

a. Planning a route for a delivery truck to minimize fuel consumption
b. Sorting a list of numbers in ascending order
c. Calculating the shortest path between two points on a map
d. All of the above

Answer: A

72. To design an AI solution to reduce energy consumption in smart homes.

a. Use sensors to monitor energy usage
b. Use AI to analyze data and optimize energy consumption
c. Use Robotics to control appliances
d. All of the above

Answer: D

5 Marks Questions

1. Define artificial intelligence and give two real-life examples of its application.
2. List and briefly describe any 4 games that use AI techniques.
3. Define machine learning and deep learning with examples for each.
4. What is state space search? Provide an example.
5. Define hill climbing in the context of heuristic search. What are its types?
6. What is the A* algorithm used for?How is it different from AO*?
7. Write a note on NLP and computer vision.
8. Write a note on Computer vision and Speech recognition.
9. What are the properties and terms associated with an AI agent?

10 Marks Questions

10. Define artificial intelligence. Explain its applications.
11. Compare and contrast Artificial intelligence, Machine Learning and Deep Learning.
12. Explain how artificial intelligence can be applied in healthcare and transportation. Provide specific examples for each.
13. Describe how AI is used in chess and real-time strategy games. What are the key AI techniques involved?
14. Explain the difference between natural language processing and computer vision. Provide examples of their applications.
15. What is Problem Solving in AI? Explain the steps involved in it.
16. Explain the search algorithms in Artificial intelligence.
17. Explain the properties of search algorithm. Explain informed and uninformed search.
18. Differentiate between Informed and Uninformed search in AI.
19. Explain any informed search algorithm with example.
20. Explain any uninformed search algorithm with example.
21. Define and explain the Breadth first search algorithm, and provide a graphical example to illustrate how it works.
22. Define and explain the Depth first search algorithm, and provide a graphical example to illustrate how it works.

23. Explain three types of Hill Climbing Algorithm.

24. Explain the difference between depth-first search and breadth-first search. Provide an example of each.

25. Describe the branch and bound problem-solving method. Provide an example of where it might be used.

26. Explain AI techniques and write its advantages and disadvantages.

27. Describe the working of the AO* algorithm. How does it differ from the A* algorithm?

15 Marks Questions

28. Analyze the differences between human intelligence and artificial intelligence. Write the potential impacts of AI on various industries with real-life examples.

29. Evaluate the impact of AI in video game development and player experience. Explain with examples how AI has transformed gaming over the years.

30. Describe the working of expert systems and their use in the medical field. Compare this with the application of robotics in manufacturing.

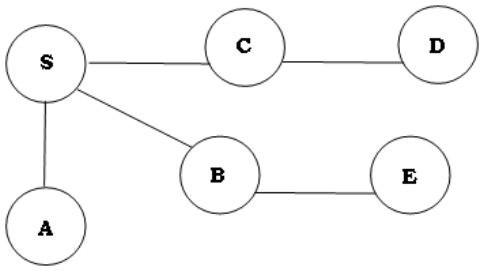
31. Analyze the role of AI agents in problem-solving. Compare and contrast different types of AI agents with examples.

32. Differentiate between informed and uninformed search and explain any one search algorithm with an example.

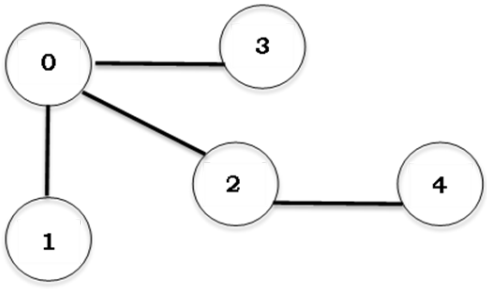
33. What is informed and uninformed search algorithm. Explain one informed and one uninformed algorithm.

34. What is an AI agent? Explain Types of Agents based on their degree and capacity with relevant diagrams.

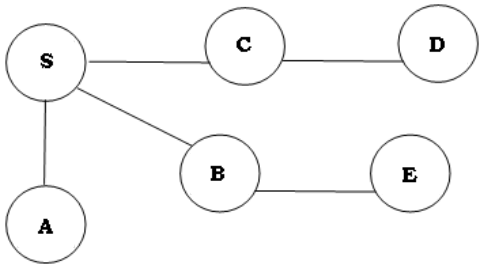
35. Write Python code, apply and explain the steps of Breadth First Search algorithm for the following graph,



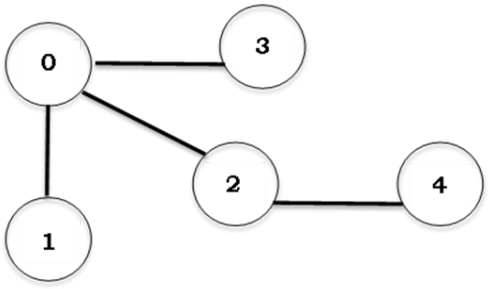
36. Write Python code, apply and explain the steps of Breadth First Search algorithm for the following graph,



37. Write Python code, apply and explain the steps of Depth First Search algorithm for the following graph,



38. Write Python code, apply and explain the steps of Depth First Search algorithm for the following graph,



39. Evaluate the effectiveness of heuristic search techniques such as hill climbing and branch and bound in solving complex problems. Use examples to support your answer.

40. Apply the A* algorithm to solve a problem. Describe each step and explain why A* is suitable for that problem.

UNIT 02

Remembering:

1. What are the types of knowledge?
a. Declarative, Procedural, Meta
b. Logical, Analytical, Critical
c. Semantic, Syntactic, Pragmatic
d. Explicit, Implicit, Tacit
Answer: A

2. What is an issue in Knowledge Representation?
a. Data Encryption
b. Data Compression
c. Knowledge Acquisition
d. Data Normalization
Answer: C

3. What is the primary objective of a production system in AI?
a. To create a model of human cognitive behavior
b. To generate new data from existing data
c. To represent and execute knowledge in the form of rules
d. To use neural networks for decision making
Answer: C

4. Which of the following is a type of knowledge representation
a. Data mining
b. Semantic Networks

c. Sorting algorithms
d. Neural networks
Answer: b

5. What is the full form of FOL in AI?
a. First Order Logic
b. Final Object Logic
c. Fixed Order Logic
d. Functional Object Logic
Answer: a

Understanding:

6. What is the syntax for Horn Clauses?
a. If p then q
b. p and q
c. p or q
d. p implies q
Answer: D

7. What is the difference between Declarative and Procedural knowledge?
a. Knowing "that" vs Knowing "how"
b. Knowing "how" vs Knowing "that"
c. Explicit vs Implicit knowledge
d. Based on experience vs Based on theory
Answer: A

8. Which of the following is an example of Declarative knowledge?
a. Riding a bicycle
b. Knowing how to cook
c. Knowing that Paris is the capital of France
d. Solving a math problem
Answer: C

9. What is the primary function of frames in AI knowledge representation?
a. To store images
b. To represent facts in structured form
c. To model time-based events
d. To perform logical reasoning
Answer: b

10. How do production rules work in AI?
a. By executing a sequence of functions
b. By matching conditions to actions
c. By creating new data
d. By running neural networks
Answer: b

Applying:

11. Convert $\forall x\ (Cat(x) \rightarrow Animal(x))$ to Horn Clause form.
a. $Cat(x) \wedge Animal(x)$
b. $\neg Cat(x) \vee Animal(x)$
c. $Cat(x) \vee \neg Animal(x)$
d. $\neg Cat(x) \wedge \neg Animal(x)$
Answer: B

12. Which algorithm resolves conflicts in Horn Clauses?
a. Depth-First Search
b. Breadth-First Search
c. Resolution
d. Backtracking
Answer: C

13. Convert $\forall x\ (Bird(x) \rightarrow Fly(x))$ to a logical implication:
a. $Bird(x) \wedge Fly(x)$
b. $\neg Bird(x) \vee Fly(x)$

c. Bird(x) ∨ ¬Fly(x) d. Fly(x) → Bird(x)
Answer: b

14. What is the correct Horn Clause for "If it is sunny, then it is warm"
a. sunny → warm b. ¬sunny ∨ warm
c. warm → sunny d. ¬warm ∨ sunny
Answer: b

Analyzing:

15. How do Horn Clauses differ from Predicate Calculus?
a. Use symbols instead of words
b. Focus on logical implications
c. Represent statements as rules
d. Use quantifiers to specify conditions
Answer: C

16. Compare Forward and Backward reasoning.
a. Start with facts vs Start with goals
b. Start with goals vs Start with facts
c. Start with known information vs Start with unknown information
d. Start with unknown information vs Start with known information
Answer: A

17. How does the use of Semantic Nets differ from Frames in representing knowledge?
a. Semantic Nets focus on hierarchical relationships, while Frames focus on categorization.
b. Semantic Nets use nodes and arcs, while Frames use slots and fillers.
c. Semantic Nets are more suitable for complex relationships, while Frames are more suitable for structured information.
d. Semantic Nets are more memory-efficient, while Frames are more computationally efficient.
Answer: B

18. In Order to break down the process of resolving conflicts in Horn Clauses.
a. Identify conflicting rules, Apply resolution algorithm
b. Apply resolution algorithm, Identify conflicting rules
c. Remove conflicting rules, Apply resolution algorithm
d. Apply resolution algorithm, Remove conflicting rules
Answer: A

19. How does the use of Semantic Nets differ from Frames in representing knowledge?
a. Semantic Nets focus on hierarchical relationships, while Frames focus on categorization.
b. Semantic Nets use nodes and arcs, while Frames use slots and fillers.
c. Semantic Nets are more suitable for complex relationships, while Frames are more suitable for structured information.
d. Semantic Nets are more memory-efficient, while Frames are more computationally efficient.
Answer: B

20. Which algorithm would be the most appropriate for resolving a conflict in a production system?

a. Forward Chaining
b. Backward Chaining
c. Resolution Algorithm
d. Decision Tree

Answer: c

21. What distinguishes semantic networks from conceptual dependency models?

a. Semantic networks use rules, while conceptual dependency uses frames.
b. Semantic networks use relations between objects, while conceptual dependency focuses on events.
c. Semantic networks use first-order logic, while conceptual dependency uses propositional logic.
d. Both are identical in their knowledge representation methods.

Answer: b

Evaluating:

22. How effective are semantic nets in representing knowledge?

a. More efficient than other methods
b. Less efficient than other methods
c. Equally effective as other methods
d. Suitable for certain types of knowledge

Answer: C

23. What is a likely outcome of using partitioned nets in neural network design?

a. Enhanced performance in specific applications
b. Minimal practical application
c. Complexity in implementation
d. Inadequacy for solving complex problems

Answer: A

24. Which statement best describes the effectiveness of Frames in representing knowledge structures?

a. Frames provide a clear, structured representation.
b. Frames are limited in representing complex relationships.
c. Frames require extensive memory usage.
d. Frames are not suitable for representing hierarchies.

Answer: A

25. Assess the impact of Declarative knowledge in problem-solving.

a. Provides specific steps to solve a problem
b. Allows for flexible problem-solving approaches
c. Limits problem-solving to predefined procedures
d. Requires constant updating of procedural knowledge

Answer: C

26. Evaluate the effectiveness of using First Order Logic (FOL) for knowledge representation in complex systems.

a. FOL is highly effective due to its expressiveness.
b. FOL is inefficient because of its complexity.
c. FOL is only useful for small, simple systems.

d. FOL is always preferred over other methods like semantic networks.
Answer: a

27. What could be a major drawback of using frames for knowledge representation in AI?
a. Frames are not flexible enough for large datasets.
b. Frames do not allow for hierarchical data.
c. Frames require high computational resources.
d. Frames cannot store structured knowledge.
Answer: c

Creating:

28. How would you use Partitioned Nets to represent a complex system?
a. Divide the system into smaller, manageable parts
b. Combine all components into a single unit
c. Use a hierarchical structure
d. Separate the system into unrelated parts
Answer: A

29. Develop a set of Horn Clauses for representing "If it is raining, then the grass is wet."
a. raining → wet(grass)
b. ¬raining ∨ wet(grass)
c. wet(grass) → raining
d. ¬wet(grass) ∨ raining
Answer: A

30. How would you use Partitioned Nets to represent a complex system?
a. Divide the system into smaller, manageable parts
b. Combine all components into a single unit
c. Use a hierarchical structure
d. Separate the system into unrelated parts
Answer: A

31. Create a semantic net for "Cat is a type of Animal."
a. Cat → Animal
b. Animal → Cat
c. Cat ∧ Animal
d. Animal ∧ Cat
Answer: A

32. Design a frame for representing a car.
a. Name: Car, Properties: Make, Model, Year
b. Name: Car, Attributes: Make, Model, Year
c. Name: Car, Components: Make, Model, Year
d. Name: Car, Details: Make, Model, Year
Answer: A

33. Design a set of production rules for a simple traffic light system:
a. If light is red, stop the vehicle.
b. If light is yellow, prepare to stop.
c. If light is green, proceed.
Answer: Create all the three rules, they work together.

34. Develop a frame structure for a student object in an academic system.
a. Name: Student, Attributes: ID, Name, Age, Grade
b. Name: Student, Properties: Courses, Year, Advisor
c. Name: Student, Components: Marks, Assignments, Attendance

Answer: b

5 Marks questions

1. What is Knowledge representation? Explain its types.
2. Explain AI knowledge cycle.
3. Describe the approaches to knowledge representation in AI.
4. Differentiate between declarative and procedural knowledge.
5. Explain any two techniques of KR.
6. What are the main issues in Knowledge Representation?
7. Explain First Order Logic. What are the basic elements of FOL syntax.
8. What is FOL? Explain quantifiers.
9. Explain the components of a first-order logic statement.Convert the following sentence into a first-order logic expression: "All humans are mortal."

10 Marks Questions

10. Compare and contrast forward and backward reasoning with examples.
11. Explain the structure of semantic nets and how they represent knowledge. Provide an example.
12. Describe the role of quantifiers in predicate logic with suitable examples.
13. Explain the components and implementation of frames in knowledge representation.
14. What is Knowledge Representation in AI? Explain its types with examples.
15. Explain the AI Knowledge Cycle in detail.
16. Explain the issues in AI knowledge representation.
17. Describe the techniques of Knowledge Representation with example.
18. Explain Logic Representation and Semantic Network Representation. Give its advantages and disadvantages.
19. Explain Frame Representation and Production Rule Representation. Give its advantages and disadvantages.
20. Explain Propositional Logic in detail.
21. What is Propositional Logic? Explain the logical connectives.
22. What is Propositional Logic? Explain atomic and compound propositions. Also give the limitations of Propositional Logic.
23. Explain Propositional logic. Construct a truth table for the following compound proposition:
    a. $(p \land q) \lor \neg r$
    b. $(p \lor q) \land \neg p$
    c. $\neg (p \land q) \lor (p \rightarrow r)$
    d. $(p \rightarrow q) \lor (\neg q \land r)$
    e. $(p \land \neg q) \rightarrow r$
    f. $(\neg p \lor q) \land r$
    g. $\neg (p \land q) \lor (r \land \neg q)$
    h. $(p \land \neg (q \lor r)) \lor q$

24. Explain the components of a first-order logic statement.Convert the following sentence into a first-order logic expression: "All humans are mortal."

25. What is First Order Logic? Describe the notion of universal and existential quantification. How do these quantifiers affect the meaning of a statement?

26. Convert the following sentence into a first-order logic expression:

a. “All students in the class passed the exam.”
b. “Some students study in the library.”
c. "There exists a student who has never missed a class."
d. "Not all students stay in hostel.“
e. "There is a student who is both an athlete and a top scholar."

27. Convert the following sentence into a first-order logic expression:

a. “Every program that has a syntax error fails to compile.”
b. “There exists a machine learning model that performs better on unseen data than on training data.”
c. "Not all sorting algorithms are stable."
d. "Some operating systems are open-source.“
e. "All AI models require training data to learn."

28. Represent using Propositional Logic:

P: The light switch is on.
Q:The room is bright.
R: The bulb is working.

a. If the light switch is on, then the room is bright.
b. If the bulb is not working, then the room is not bright.
c. If the room is bright, then the bulb is working.
d. If the light switch is on and the bulb is working, then the room is bright

29. Represent using Propositional Logic:

P: The code is error-free.
Q: The program runs successfully.
R: The compiler is functioning.

a. If the code is error-free, then the program runs successfully.
b. If the compiler is not functioning, then the program does not run successfully.
c. If the program runs successfully, then the code is error-free.
d. If the code is error-free and the compiler is functioning, then the program runs successfully.

30. Represent using Propositional Logic:

P: The system is online.
Q: The server is responsive.
R: The network is stable.

a. If the system is online, then the server is responsive.
b. If the network is unstable, then the system is not online.
c. If the server is responsive, then the system is online.
d. If the network is stable and the system is online, then the server is responsive.

31. Explain Procedural knowledge with example.

32. Explain Declarative knowledge with example.
33. Differentiate between Procedural and Declarative knowledge.
34. Explain AI forward and backward reasoning in detail.
35. Compare and contrast Forward and backward reasoning.

15 Marks Questions

36. Create a detailed semantic net for a given domain (e.g., healthcare, education). Explain each part of your net and how it contributes to knowledge representation.
37. Write the advantages and disadvantages of procedural versus declarative knowledge in AI systems. Provide examples to support your arguments.
38. Develop an application that uses forward and backward reasoning. Describe the algorithms used and the problem-solving approach.
39. Give a detailed explanation of Knowledge representation in AI with the approaches and techniques.
40. Explain the concept of knowledge representation in artificial intelligence. Describe various techniques and issues related to knowledge representation.
41. Explain knowledge representation and its approaches. Also give its advantages and disadvantages.
42. What is first-order logic, and how does it differ from propositional logic? What are the basic elements of a first order logic statement?
43. Consider the following first-order logic statements and predicates:
F(x): "x is a fruit."
E(x): "x is an apple."
T(x, y): "x tastes better than y."
Explain the following,
a) Define a first-order logic statement using the predicates F(x), E(x), and T(x, y) that represents the assertion "All apples are fruits."
b)Use a first-order logic statement to express "Some fruits taste better than apples."
c)Provide a first-order logic statement that asserts "There exists an apple that tastes better than all other fruits."

UNIT 03

Remembering:

1. What is the focus of Natural Language Processing (NLP)?
a. Understanding human psychology
b. Understanding and processing human language
c. Analyzing animal communication

d. Creating new languages
Answer: B

2. Which is a key application of NLP?
a. Weather prediction
b. Voice recognition
c. Stock market analysis
d. Traffic control
Answer: B

3. What is the basic unit of syntactic processing in NLP?
a. Words
b. Sentences
c. Paragraphs
d. Documents
Answer: A

4. Which of the following is an example of semantic analysis?
a. Identifying parts of speech
b. Understanding the meaning of a sentence
c. Parsing a sentence
d. Creating a syntax tree
Answer: B

5. What is the role of context-free grammars in NLP?
a. To analyze the context of a sentence
b. To define the structure of a language
c. To identify the meaning of words
d. To generate random sentences
Answer: B

6. Which AI application is most likely to use NLP?
a. Predictive maintenance
b. Fraud detection
c. Chatbots
d. Image classification
Answer: C

7. What is the primary purpose of tokenization in NLP?
a. To analyze sentence structures
b. To split text into smaller units
c. To identify the meaning of a sentence
d. To remove stop words
Answer: b

8. Which of the following is used to remove unnecessary words in NLP?
a. Lemmatization
b. Tokenization
c. Stemming
d. Stop word removal
Answer: d

9. What does the term 'corpus' refer to in NLP?
a. A collection of grammar rules
b. A dictionary of terms
c. A large collection of text data
d. A syntax tree
Answer: c

Understanding:

10. How does syntax differ from semantics in NLP?
a. Syntax deals with word meanings, while semantics deals with sentence structure
b. Syntax deals with sentence structure, while semantics deals with word meanings
c. Syntax and semantics are the same in NLP
d. Syntax and semantics are not relevant in NLP

Answer: B

11. What is the role of parsing techniques in NLP?

a. To identify parts of speech
b. To create syntax trees
c. To analyze sentence structure
d. All of the above

Answer: D

12. How do top-down and bottom-up parsing differ?

a. Top-down starts with the smallest unit, while bottom-up starts with the largest unit
b. Top-down starts with the largest unit, while bottom-up starts with the smallest unit
c. Top-down and bottom-up parsing are the same
d. Top-down and bottom-up parsing are not relevant in NLP

Answer: A

13. What are grammar-free analysers used for in NLP?

a. To analyze grammar rules
b. To process sentences without predefined grammars
c. To generate sentences
d. To identify parts of speech

Answer: B

Applying:

14. How would you apply parsing techniques to analyze a sentence?

a. Identify the parts of speech
b. Create a syntax tree
c. Determine the sentence structure
d. All of the above

Answer: D

15. Using context-free grammars, how would you create a framework for a simple language?

a. Define the set of words used in the language
b. Specify the rules for constructing valid sentences
c. Evaluate the meaning of each sentence
d. Create sentences without following specific rules

Answer: A

16. How does lemmatization differ from stemming?

a. Lemmatization converts words to their root form, while stemming removes word endings
b. Stemming converts words to their root form, while lemmatization removes word endings
c. Lemmatization and stemming are the same
d. Stemming is more accurate than lemmatization

Answer: a

17. What is the role of Named Entity Recognition (NER) in NLP?

a. To detect relationships between entities
b. To classify text into categories
c. To identify and classify entities like names, places, and organizations
d. To analyze grammatical structure

Answer: c

18. How does syntactic parsing help in NLP?

a. By identifying parts of speech
b. By creating a syntactic structure from a sentence

c. By determining the meaning of words
d. By translating text into another language
Answer: b

19. Apply tokenization to the following sentence: "Natural language processing is fascinating."
a. Break the sentence into clauses
b. Convert the sentence into lowercase
c. Split the sentence into words: "Natural", "language", "processing", "is", "fascinating."
d. Remove punctuation marks
Answer: c

20. How would you apply a sentiment analysis algorithm to classify customer reviews?
a. By analyzing the grammatical structure of each review
b. By identifying parts of speech
c. By determining the overall sentiment as positive, negative, or neutral
d. By converting words to their root forms
Answer: c

21. How would you apply lemmatization to the word "running"?
a. Convert it to "run"
b. Remove the suffix "-ing"
c. Identify it as a verb
d. Convert it to "runs"
Answer: a

Analyzing:

22. How does the use of grammar-free analysers impact NLP?
a. It simplifies the analysis process
b. It allows for more flexibility in language processing
c. It limits the types of languages that can be processed
d. It increases the accuracy of language analysis
Answer: B

23. Analyze the role of context-free grammars in defining language structures.
a. They provide a framework for analyzing language
b. They limit the types of languages that can be defined
c. They simplify the language analysis process
d. They are not relevant in NLP
Answer: A

24. How do parsing techniques contribute to the understanding of sentence structures?
a. They identify parts of speech
b. They create syntax trees
c. They analyze the context of sentences
d. All of the above
Answer: D

25. How does sentiment analysis differ from text classification?
a. Sentiment analysis deals with emotions, while text classification assigns categories

b. Sentiment analysis is for specific words, while text classification is for sentences
c. Text classification uses grammar, while sentiment analysis ignores it
d. Sentiment analysis uses a predefined set of emotions, while text classification does not
Answer: a

26. Analyze the impact of part-of-speech tagging on parsing a sentence.
a. It allows the parser to ignore irrelevant words
b. It improves the accuracy of identifying grammatical structures
c. It speeds up the overall NLP process
d. It helps detect entities like names and locations
Answer: b

27. How does machine translation analyze and convert text from one language to another?
a. By using rule-based translations
b. By identifying sentence structures and their equivalents in the target language
c. By analyzing sentiment before translation
d. By using word embeddings to find matching translations
Answer: b

Evaluating:

28. Evaluate the effectiveness of top-down parsing in NLP.
a. It is more efficient than bottom-up parsing
b. It is less efficient than bottom-up parsing
c. It is equally efficient as bottom-up parsing
d. It is not relevant in NLP
Answer: A

29. Evaluate the effectiveness of grammar-free analysers in processing complex languages.
a. They are more effective than traditional methods
b. They are less effective than traditional methods
c. They are equally effective as traditional methods
d. They are not suitable for processing complex languages
Answer: B

30. Assess the impact of parsing techniques on NLP applications.
a. They improve the accuracy of language processing
b. They have no impact on language processing
c. They make language processing slower
d. They limit the types of languages that can be processed
Answer: A

31. Evaluate the effectiveness of top-down parsing in NLP.
a. It is more efficient than bottom-up parsing
b. It is less efficient than bottom-up parsing
c. It is equally efficient as bottom-up parsing
d. It is not relevant in NLP
Answer: A

32. Evaluate the effectiveness of Named Entity Recognition (NER) in extracting relevant information.

a. It is very accurate for all languages
b. It struggles with identifying entities in ambiguous contexts
c. It works best for short texts
d. It can extract relationships between entities as well
Answer: b

33. Assess the limitations of stemming in NLP applications.
a. It may result in non-meaningful words
b. It accurately identifies word roots
c. It is slower than lemmatization
d. It requires more training data
Answer: a

34. Evaluate how effective word embeddings like Word2Vec are in capturing word semantics.
a. They capture the exact meaning of words
b. They fail to capture relationships between words
c. They represent words based on context in a vector space
d. They are not suitable for complex languages
Answer: c

Creating:

35. To design a context-free grammar for a simple language,
a. Define the vocabulary
b. Define the grammar rules
c. Analyze the context of sentences
d. Generate sentences randomly
Answer: B

36. For creating a parsing algorithm for analyzing sentence structures,
a. Start with the smallest unit and build up to the largest unit
b. Start with the largest unit and break it down into smaller units
c. Analyze the context of the sentence
d. Use predefined grammar rules
Answer: B

37. Inorder to develop a semantic analysis technique for identifying the meaning of sentences.
a. Use predefined rules to determine meaning
b. Analyze the context of the sentence
c. Identify the parts of speech
d. All of the above
Answer: B

38. Create a grammar rule using context-free grammar for the sentence "The cat sleeps."
a. S → NP VP, NP → Det N, VP → V
b. S → N VP, VP → V Det
c. S → Det N, VP → N
d. S → N V, VP → N Det
Answer: a

39. Design a simple chatbot that can respond to greetings.
a. Use a set of predefined rules for greetings
b. Create a grammar for sentence parsing

c. Implement machine learning for conversational responses
d. Translate the input into different languages
Answer: a

40. Create a semantic analysis rule for the sentence "She is reading a book."
a. Define the relationships between words based on their roles
b. Identify the grammatical structure of the sentence
c. Translate the sentence into a different language
d. Remove all irrelevant parts of speech
Answer: a

5 Marks Questions:

1. What is Natural Language Processing (NLP) and how is it used in AI?
2. What is NLP? Explain its components.
3. What are the primary goals of NLP? Provide examples of how NLP is used in everyday applications.
4. Describe the basic components involved in syntactic processing in NLP. How are syntax trees constructed and utilized?
5. Explain the concept of parsing in NLP. Briefly explain the differences between top-down and bottom-up parsing strategies.
6. Explain the concept of Grammar in NLP.

10 Marks Questions:

7. Describe NLP. Explain the steps in it.
8. Explain parsing in NLP. Explain its techniques and applications.
9. Explain the concept of grammar and translation in NLP.
10. Define syntax and semantics in the context of natural language processing. Explain the challenges involved in performing semantic analysis.
11. Compare and contrast context-free grammars (CFGs) and regular grammars in NLP. How do CFGs contribute to syntactic parsing?
12. Explain Semantic Analysis and Grammar free Analysers in NLP.
13. Describe the different approaches to sentence generation in NLP, focusing on template-based methods versus probabilistic methods. Provide examples to illustrate each approach.
14. Explain Translation in NLP along with its approaches. Give its significance.

15 Marks Questions:

15. Describe syntactic analysis in NLP and outline the role of parsing. Explain different parsing techniques and assess their importance in NLP applications.
16. Trace the historical development of machine translation techniques, from rule-based systems to statistical and neural approaches. Analyze the limitations of earlier methods and how neural networks have addressed these limitations.
17. Provide a detailed explanation of how context-free grammars (CFGs) are applied in both top-down and bottom-up parsing strategies in NLP. Evaluate the strengths and weaknesses of each approach with examples.

18. Explore the challenges inherent in machine translation. How do rule-based, statistical, and neural approaches address these challenges differently? Provide specific examples to illustrate your points.

Unit 04

Remembering:

1. What is a key characteristic of Expert Systems?
a. They can learn from experience
b. They are designed for specific tasks
c. They mimic human emotions
d. They require constant supervision
Answer: B

2. Which type of learning in AI relies on external feedback for improvement?
a. Supervised learning b. Unsupervised learning
c. Reinforcement learning d. Genetic algorithm
Answer: C

3. What is the main role of knowledge engineers in building Expert Systems?
a. Designing the user interface
b. Acquiring and structuring domain knowledge
c. Implementing machine learning algorithms
d. Testing the system for errors
Answer: B

4. Which of the following is NOT a component of an Expert System?
a. Knowledge Base b. Inference Engine
c. Database d. User Interface
Answer: C

5. What is the primary purpose of the Knowledge Base in an Expert System? a. To store user preferences
b. To store domain-specific knowledge
c. To execute reasoning
d. To present outputs
Answer: b. To store domain-specific knowledge

6. Which of the following best describes an Inference Engine? a. A component used to collect user inputs
b. A system for making decisions using logical rules
c. A part of the database management system
d. A machine learning algorithm
Answer: b. A system for making decisions using logical rules

Understanding:

7. Why is knowledge acquisition important in Expert Systems?
a. To reduce the need for human experts
b. To ensure the system is scalable
c. To capture and represent human expertise

d. To improve system performance
Answer: C

8. How does reinforcement learning differ from supervised learning?
a. Reinforcement learning requires labeled data, while supervised learning does not
b. Reinforcement learning learns from external feedback, while supervised learning learns from labeled examples
c. Reinforcement learning is more efficient than supervised learning
d. Reinforcement learning does not require a training dataset
Answer: B

9. What is the key feature of an expert system?
a. It uses machine learning algorithms to make decisions
b. It simulates the decision-making ability of a human expert
c. It performs tasks randomly
d. It uses genetic algorithms
Answer: B

10. What is the main objective of a genetic algorithm?
a. To simulate the process of natural selection
b. To classify data into different categories
c. To predict future outcomes based on historical data
d. To process large amounts of data quickly
Answer: A

11. Which component of an Expert System is responsible for processing information and providing answers or solutions?
a. Knowledge Base
b. User Interface
c. Inference Engine
d. Database
Answer: c. Inference Engine

12. Which of the following is a characteristic of an Expert System?
a. Ability to perform physical tasks.
b. Ability to learn from experience.
c. Ability to communicate using natural language.
d. Ability to process emotions.
Answer: b. Ability to learn from experience.

Applying:

13. How would you apply knowledge acquisition techniques to build an Expert System?
a. By interviewing domain experts and capturing their knowledge
b. By collecting data from various sources and analyzing it
c. By implementing machine learning algorithms
d. By designing the user interface
Answer: A

14. Inorder to apply the concept of Expert Systems to design a system that recommends personalized movie recommendations.
a. Define the rules for recommending movies based on user preferences
b. Use machine learning to analyze user movie ratings
c. Implement a decision-making system based on user input
d. All of the above
Answer: A

15. To apply Expert System techniques to a medical diagnosis system, you would implement _____ to diagnose diseases based on symptoms.
a. statistical methods
b. machine learning
c. rules
d. data mining
Answer**:** c. rules

16. If you were to design an Expert System for legal advice, the critical first step would be to _____ legal experts to gather knowledge.
a. design a user interface
b. interview
c. implement machine learning
d. collect data
Answer**:** b. interview

Analyzing:

17. What role did MYCIN and R1 play in the development of Expert Systems?
a. Pioneering the field of Expert Systems
b. Transforming medical practices
c. Showcasing Expert Systems' capabilities in complex domains
d. Becoming obsolete due to limitations
Answer: C

18. Which statement best describes the design and functionality of MYCIN in the context of medical diagnosis?
a. MYCIN utilized neural networks for diagnosing various infections
b. MYCIN primarily focused on diagnosing viral infections
c. MYCIN was ineffective in diagnosing medical conditions
d. MYCIN employed a rule-based approach to diagnose bacterial infections
Answer: D

19. How do neural nets simulate the structure and function of the human brain?
a. By using nodes and connections to process information
b. By storing information in memory
c. By using complex algorithms to process data
d. By mimicking the process of natural selection
Answer: A

20. How does learning automation contribute to the efficiency of Expert Systems?
a. It reduces the need for human intervention in knowledge acquisition
b. It allows Expert Systems to learn from data without explicit programming
c. It speeds up the process of developing Expert Systems
d. All of the above
Answer: D

21. A limitation that could arise from using a rule-based Expert System in a dynamic environment is _____.
a. inability to handle complex algorithms
b. difficulty in updating rules to match new situations
c. the need for high-level programming skills

d. requiring extensive training datasets
Answer**:** b. difficulty in updating rules to match new situations

22. The development of MYCIN influenced the use of Expert Systems in other fields by _____.
a. demonstrating the value of rule-based systems for expert decision-making
b. showing that Expert Systems could replace human experts completely
c. proving neural networks are better than rule-based systems
d. leading to the decline of Expert Systems
Answer**:** a. demonstrating the value of rule-based systems for expert decision-making

Evaluating:

23. Why is knowledge acquisition important in building effective Expert Systems?
a. Because knowledge can be easily acquired from the internet
b. To ensure the system captures relevant domain knowledge
c. Only in the initial stages of system development
d. Only for complex Expert Systems
Answer: B

24. What is the main feature of an AI expert system?
a. It learns from data
b. It makes decisions based on rules and knowledge
c. It uses genetic algorithms
d. It simulates human behavior
Answer: B

25. Which AI technology is used for making predictions and decisions in complex, uncertain environments?
a. Expert systems
b. Convolutional neural networks (CNN)
c. Genetic algorithms
d. Reinforcement learning
Answer: a. Expert systems

26. An Expert System might be preferred over a machine learning system because _____.
a. it can make decisions without needing large datasets
b. it always gives more accurate results
c. it is more adaptable and flexible
d. it requires constant human supervision
Answer: a. it can make decisions without needing large datasets

27. Factors to consider when evaluating the effectiveness of an Expert System in the financial domain include _____.
a. number of rules, hardware requirements, algorithm complexity
b. compatibility with machine learning algorithms
c. accuracy of decisions, speed of processing, scalability
d. amount of user interaction required
Answer: c. accuracy of decisions, speed of processing, scalability

Creating:

28. In which scenario could neural nets be applied to enhance the performance of an Expert System?
a. Using medical symptoms to diagnose diseases
b. Alphabetically sorting a list of names

c. Predicting trends in the stock market
d. Converting temperature units from Fahrenheit to Celsius
Answer: A

29. To enhance an Expert System for diagnosing car engine issues using neural networks, you could use neural networks to _____.
a. identify patterns in sensor data and predict failures
b. apply rule-based decision-making to predict issues
c. collect user feedback to implement more rules
d. store information about previous repairs
Answer: a. identify patterns in sensor data and predict failures

30. To design an Expert System to assist with tax filing, the first component to develop would be to _____.
a. build the rule base for identifying tax exemptions
b. implement the inference engine for tax processing
c. create the user interface for tax filers
d. design a database to store tax records
Answer: a. build the rule base for identifying tax exemptions

5 Marks Questions:

1. Why are expert systems important in modern applications? Give two examples.
2. What are the main characteristics that distinguish expert systems from regular software?
3. How do knowledge engineers contribute to the knowledge acquisition process in expert systems?

10 Marks Questions:

4. Compare supervised, unsupervised, and reinforcement learning in AI. Provide examples of where each type is used.
5. What are the main components of an expert system, and how do they interact with each other?
6. Write a note on the advantages and disadvantages of using an expert system in AI?
7. What are the basic activities performed by an expert system in AI?
8. Explain the diagnosis activity done by an expert system with an example.
9. Explain the prediction activity done by an expert system with an example.
10. Explain the expert system's prediction activity with an example.
11. Write a note on the applications, advantages and limitations of using neural networks in AI?
12. How do tools and techniques automate learning processes in AI? What benefits do they offer?
13. Analyze the design and impact of MYCIN and R1 expert systems. What limitations did they face?
14. How do genetic algorithms mimic natural evolution? Give examples of their practical applications.

15 Marks Questions:

15. Explain the concept of expert systems in artificial intelligence, highlighting their architecture, components, and applications.

16. Explain Expert systems and knowledge acquisition in the context of prediction systems.
17. Explain the structure and functions of neurons and layers in neural networks. How are they applied in decision-making tasks?
18. Critically assess knowledge acquisition techniques in expert systems. What challenges do knowledge engineers encounter, and how can they be addressed?
19. Elaborate the ethical considerations of using expert systems in decision-making. How can biases in knowledge acquisition affect outcomes?
20. Describe the historical evolution of expert systems. How have technological advancements influenced their development?
21. Compare rule-based and knowledge-based systems. What are their advantages and limitations?
22. Evaluate the impact of reinforcement learning in AI. Provide real-world examples of its applications.
23. Explain the architecture of genetic algorithms. How does crossover and mutation contribute to their effectiveness?
24. Explain the role of neural networks in pattern recognition. Provide examples of their use in real-world applications.
25. Analyze the scalability challenges of neural networks for large-scale applications and methods to overcome them.
26. Compare artificial neural networks with biological neural networks in terms of learning capabilities.
27. Describe the stages of knowledge engineering for expert systems. How does knowledge representation affect their performance?
28. Describe the future trends in expert systems and AI. How might advancements in machine learning impact their development?
29. Evaluate the effectiveness of MYCIN and R1 in clinical decision support. What were their strengths and weaknesses?
30. Explain reinforcement learning in AI. How do agents learn optimal behavior through rewards and punishments?
31. Critically assess the limitations of current neural network architectures and challenges in designing them for specific tasks.

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