Question Paper Code	13095

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Sixth Semester

Computer Science and Engineering

(Common to Information Technology & Seventh Semester - Electronics and Communication Engineering)

20CSPC601 - ARTIFICIAL INTELLIGENCE

Regulations - 2020

Duration: 3 Hours   Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)
Answer ALL Questions

		Marks	K-Level	CO

1. What is the primary objective of problem formulation in AI? — 1 K1 CO1
   (a) Finding the best algorithm
   (b) Generating random solutions
   (c) Defining the problem clearly and precisely
   (d) Implementing complex neural networks

2. Which search strategy explores nodes at the deepest level of the search tree first before backtracking? — 1 K1 CO1
   (a) Depth-first search (b) Breadth-first search (c) Uniform-cost search (d) Greedy search

3. A _____ environment is one in which actions are characterized by their possible outcomes, but no probabilities are attached to them. — 1 K2 CO1
   (a) Deterministic   (b) Nondeterministic   (c) Episodic   (d) Sequential

4. Infer the role of the energy function in Simulated Annealing. — 1 K2 CO2
   (a) To define the probability distribution of the search space
   (b) To evaluate the quality of the proposed solution
   (c) To determine the rate at which the temperature decreases
   (d) To define the acceptance probability for each iteration of the algorithm

5. The requirements to solve a constraint satisfaction problem are _____ and _____. — 1 K2 CO2
   (a) Start State, Goal State   (b) Start State, State Space
   (c) State Space, Notion of Solution   (d) None of the Mentioned

6. A CSP is _____ if it is k-consistent and is also $(k-1)$-consistent, $(k-2)$-consistent, all the way down to 1-consistent. — 1 K2 CO2
   (a) Strongly k-consistent   (b) Weakly k-consistent
   (c) Strongly 1-consistent   (d) Weakly 1-consistent

7. Which is the best way to go for Game playing problem? — 1 K1 CO3
   (a) Linear approach   (b) Heuristic approach
   (c) Random approach   (d) An Optimal approach

8. Interpret the time complexity of the minimax algorithm when the maximum depth of the tree is "m" and there are "b" legal moves available at each node? — 1 K2 CO3
   (a) $O(mb)$ (b) $O(bm)$ (c) $O(b^m)$ (d) $O(m)$

9. Which of the following technique allows the correct Mini-Max decision to be computed without examining every node of the game tree? — 1 K1 CO3
   (a) Cutting   (b) Pruning   (c) Hatching   (d) Removing

10. Which of the following is an example of a first-order logic representation? — 1 K1 CO4
    (a) Predicate Calculus (b) Fuzzy Logic (c) Propositional Logic (d) Modal Logic

11. Illustrate the logical representation of the sentence "All dogs have tails"? — 1 K2 CO4
    (a) $\forall$ dog(tails)   (b) $\forall$ tails(dog)   (c) $\forall x$ (dog(x) $\rightarrow$ hasTail(x))   (d) hasTail(dog)

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **13095**

12. A good solution in "intelligent" machines depends on   *1   K1   CO4*
    (a) A neural network's design challenge
    (b) A neural network's representation of knowledge
    (c) The availability of labeled examples
    (d) The elimination of sensor noise

13. Consider a scenario: A simple planning agent is tasked with preparing breakfast,   *1   K1   CO5*
    consisting of making toast and brewing coffee. What stage of the agent's planning process
    involves identifying the initial state and defining the goal state?
    (a) Execution stage   (b) Learning stage
    (c) Goal-setting stage   (d) Problem formulation stage

14. Relate the rule applied in Simple Planning Agent.   *1   K2   CO5*
    (a) Action   (b) Condition-Action Rule   (c) Goal Plan Rule   (d) None of the Mentioned

15. The process by which the brain incrementally orders actions needed to complete a   *1   K2   CO5*
    specific task is referred as
    (a) Planning problem   (b) Partial order Planning
    (c) Total order planning   (d) Both planning problem and partial order planning

16. In _____ once a statement is proven to be true in first-order logic, it remains   *1   K1   CO5*
    true always
    (a) Logical Inference Problem   (b) Situation Calculus
    (c) Frame Problem   (d) All of the Mentioned

17. Identify the purpose of intent recognition in Chatbot development.   *1   K3   CO6*
    (a) Identifying the emotions of the user   (b) Recognizing the intentions behind user inputs
    (c) Converting speech to text   (d) Generating random responses

18. Select the NLP task that involves converting spoken language into written text   *1   K3   CO6*
    (a) Named Entity Recognition (NER)   (b) Sentiment Analysis
    (c) Speech Recognition   (d) Machine Translation

19. Application of unigram is   *1   K1   CO6*
    (a) Sentiment analysis   (b) Speech recognition   (c) Tokenizing   (d) Information retrieval

20. How the sentences are converted to unigrams?   *1   K1   CO6*
    (a) By splitting the sentences into letters
    (b) By splitting the sentences into words
    (c) By splitting the sentences into tokens
    (d) By splitting the sentences into groups of words

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PART - B (10 × 2 = 20 Marks)
Answer ALL Questions

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21. Illustrate the properties of task Environments in AI.   *2   K2   CO1*

22. What are the criteria to measure the performance of search strategies?   *2   K1   CO1*

23. List the criteria for the evaluation of search strategy.   *2   K1   CO2*

24. What is constraint satisfaction problem?   *2   K1   CO2*

25. Define Stochastic games with examples.   *2   K1   CO3*

26. Outline Mini –Max Strategy.   *2   K2   CO3*

27. State about declarative and procedural knowledge.   *2   K1   CO4*

28. What are the 3 types of symbol which is used to indicate objects, relations and functions?   *2   K1   CO4*

29. What do you mean by ensemble learning?   *2   K1   CO5*

30. Define Information Extraction.   *2   K1   CO6*

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PART - C (6 × 10 = 60 Marks)
Answer ALL Questions

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31. a) Explain in detail, the structure of different intelligent agents.   *10   K2   CO1*

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OR

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    b) What is PEAS? Explain different agent types with their PEAS descriptions.   *10   K2   CO1*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **13095**

32.	a)	Discuss the concepts of the following with an example (i) Best First Search. (ii) A* Algorithms.	10	K2	CO2

OR

	b)	Explain and solve the logic in crypt arithmetic problem for the below Problem:	10	K2	CO2

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CROSS

+ ROADS

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DANGER

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No two letters have the same value. The sums of the digits must be shown in the problem.

33.	a)	Summarize alpha-beta pruning algorithm and the Min-max game playing algorithm with an example.	10	K2	CO3

OR

	b)	Demonstrate the AO* algorithm with a suitable example.	10	K2	CO3

34.	a)	Develop an algorithm for propositional resolution and Unification algorithm.	10	K3	CO4

OR

	b)	Organize the rules of inference in Artificial Intelligence.	10	K3	CO4

35.	a)	Identify the five components of a planning system.	10	K3	CO5

OR

	b)	Construct a Planning Graph for the problem-"HAVE CAKE AND EAT CAKE TOO".	10	K3	CO5

36.	a)	Build and discuss the various levels of Natural Language Processing.	10	K3	CO6

OR

	b)	Develop a simple NLP model to implement machine translation.	10	K3	CO6