Reg. No. : | | | | | | | | | | | | |

Question Paper Code: 1045258

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

Fifth Semester

Computer Science and Engineering

U20CS501 – ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

(Regulation 2020)

Time: Three Hours Maximum: 100 Marks

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. Define artificial intelligence.

2. Write the ways to formulate a problem.

3. Define informed search strategy with an example.

4. State how knowledge is represented using structured format.

5. Infer Unification theorem.

6. Write about ontological engineering.

7. Define fuzzy systems.

8. Write the properties of fuzzy sets.

9. Artificial intelligence will change the world. Justify this statement.

10. Mention the typical components of an expert system support environment.

PART – B (5 x 16 = 80 Marks)

11.(a) (i) Formulate the problem for the 8-puzzle states that are divided into two disjoint sets, such that any state is reachable from any other state in the same set, while no state is reachable from any state in the other set. (10)

(ii) Elucidate the four kinds of agent programs that embody the principles underlying all intelligent systems. (6)

(OR)

(b) (i) Describe the types of environment in Artificial intelligence. (8)

(ii) Discuss the structure of agents with neat diagram. (8)

12. (a) Discuss the problem-solving approach to search problems in artificial intelligence. Using examples, illustrate how different search algorithms such as depth-first search, breadth-first search, and A* search can be applied to solve various real-world problems. Compare and contrast the strengths and weaknesses of each search algorithm, considering factors such as time complexity, space complexity, optimality and completeness. Additionally, discuss how heuristic functions can enhance the efficiency and effectiveness of search algorithms in navigating complex search spaces. (16)

(OR)

(b) (i) Explain the nature of heuristics with example. What is the effect of heuristics accuracy? (8)
(ii) Explain the working of Alpha-Beta pruning algorithm with an example. (8)

13. (a) (i) Write down all the possible syntax of the predicate logic and explain how these predicates are used to represent various objects and their relations. (8)
(ii) Represent the following statements into predicate logic with the specified number of predicates: (8)
A) Not all students like both Mathematics and Science
B) There exists a lawyer all of whose customers are doctors
C) Every person like ice-cream
D) Some humans are intelligent

(OR)

(b) (i) "As per the law, it is a crime for an American to sell weapons to hostile nations. Country A, an enemy of America, has some missiles, and all the missiles were sold to it by Robert, who is an American citizen". Prove that "Robert is criminal". Solve the above problem using a forward-chaining algorithm to reach the goal. (8)
(ii) Discuss in detail the knowledge representation in AI systems. (8)

14. (a) (i) Draw the architecture of fuzzy logic system and explain in detail. (8)
(ii) Explain briefly about Supervised learning. (8)

(OR)

(b) (i) Compare fuzzy logic with crisp logic and list any three Specific problems which can be solved using fuzzy logic. (8)
(ii) Discuss any one fuzzy logic application in Biomedical engineering. (8)

15. (a) (i) List the basic characteristics of an expert system. Also, discuss various stages of knowledge acquisition. (8)
(ii) Compare the Neural network with Rule based network and Expert systems. (8)

(OR)

(b) (i) Explain the role of AI in medicine and Industry. (8)
(ii) Write short notes on expert systems. (8)

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