Roll No. ..... Total Pages : 03

BT-5/D-23 45278

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

PC-CS-AIML-311A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) What is the difference between uninformed and informed searches ? Write the algorithm of Breadth First Search and discuss its merits and demerits over Depth First Search.

(b) What do you understand by product system ? What are its different components ? Discuss.

2. (a) Write the algorithm of Hill Climbing Search. What are its different variants ? Discuss its limitations also.

(b) Define Artificial Intelligence and give an overview of its application areas.

P.T.O.

Unit II

3. (a) Illustrate the use of alpha-beta pruning to cut down the search area.

   (b) What is Robinson's resolution principle ? How is it used in proof by refutation ? Illustrate.

4. Differentiate between the following :

   (a) Modus Ponen and Modus Tollen

   (b) Forward and Backward Chaining

Unit III

5. (a) What is Unification ? Write the unification algorithm to find most general unifier.

   (b) What is propositional logic ? What is the difference between predicate logic and propositional logic ? Discuss the different logical connectives used in first order logic.

6. (a) What is fuzzy logic and how does it differ from classical (crisp) logic ? Explain the concept of membership functions in fuzzy logic and how they represent uncertainty ?

   (b) What is NLP ? What are the challenges in it ? Write a note on pragmatic analysis.

Unit IV

7. (a) Explain the differences between supervised, unsupervised and reinforcement learning, and provide examples of each.

   (b) What is the significance of the initial centroid selection in k-means clustering, and how does it affect the algorithm's convergence ? Discuss.

8. (a) What is the concept of density-based clustering, and how do algorithms like DBSCAN work to identify clusters in data ? Discuss.

   (b) How does the choice of distance metric affect the results of clustering and what are some common distance measures used in clustering analysis ? Discuss.