

NATURAL LANGUAGE PROCESSING

Paper-PE-CS-AIML-426A

Time Allowed : 3 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 are the basic building blocks of CD theory? Convert "John gave Mary a book" into CD representation.
- (b) What is pragmatic analysis? How does pragmatic analysis differ from other linguistic analyses, such as syntactic or semantic analysis?
2. (a) What are Minsky frames, and what role do they play in cognitive science and artificial intelligence? Differentiate between declarative and procedural frames.
- (b) Write a note on applications of NLP.

UNIT-II

3. (a) What is an ambiguous grammar in the context of Formal Language Theory? How does ambiguity manifest in the rules of a Grammar?

- (b) Describe the four levels of the Chomsky Hierarchy. What are the defining characteristics of each level? Discuss.
4. (a) What are the different Sections in a PROLOG Program? Discuss.
- (b) Write a note on Propositional and Predicate logic and discuss the Robinson's Resolution Principle.

UNIT-III

5. (a) What are Augmented Transition Networks (ATNs)? What are the main components of an ATN? How do transitions and states interact in these network models?
- (b) Describe the key steps involved in Earley's algorithm for Parsing. How does Earley's algorithm handle ambiguity in grammars during parsing?
6. (a) What is Tomita's algorithm, and how does it relate to Earley's algorithm? What problem does Tomita's algorithm address in parsing?
- (b) How are semantic networks organized hierarchically? Explain how inheritance and specialization are represented in semantic networks?

UNIT-IV

7. (a) How does NLP facilitate machine translation between Languages? Discuss.
- (b) How does NLP contribute to Information Retrieval tasks, such as Search Engine? Discuss.

8. (a) How do question answering systems leverage NLP to provide accurate and relevant answers to user queries?
- (b) How does NLP facilitate the analysis of Social media content, including text, images, and videos?

