5. (a) Explain the concept of a chatbot or dialog system. What are the key objectives and use cases for implementing such systems ? (CO5)

(b) Explain the concept of a conversation state and how it is managed in a chatbot. (CO5)

(c) Discuss the advantages and limitations of using deep learning for chatbot development compared to traditional rule-based approaches. (CO5)

H Roll No. .....

TCS–771

B. TECH. (CSE) (SEVENTH SEMESTER) END SEMESTER EXAMINATION, Dec., 2023

NATURAL LANGUAGE PROCESSING USING BIG DATA

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Differentiate between programming languages and natural languages. What are the challenges in processing natural languages ? (CO1)

(b) Give examples of linguistic ambiguity (e.g., lexical, syntactic, semantic) and explain how it affects the understanding of natural language. (CO1)

(c) Explain the role of NLP libraries like SpaCy and NLTK in natural language processing. What are their key features and advantages ? (CO1)

2. (a) Discuss the key components of the Bag of Words model, including the vocabulary, term frequency, and document-term matrix. (CO2)

(b) Explain the steps involved in web scraping using Python. How can you extract specific information from web pages ? (CO2)

(c) Describe linguistic analysis and its role in understanding the structure and meaning of language. What are the key components of linguistic analysis ? (CO2)

3. (a) What is Part-of-Speech (POS) tagging, and why is it important in NLP ? Explain how SpaCy performs POS tagging on text. (CO3)

(b) Discuss the importance of analyzing sentence structure in NLP. How can identifying the structure of a sentence contribute to understanding its meaning ? (CO3)

(c) What is a Naive Bayes classifier, and how is it used in NLP ? Explain the concept of conditional probability and its application in text classification. (CO3)

4. (a) What is text classification, and why is it an important task in Natural Language Processing (NLP) ? Provide examples of applications where classification and other NLP tasks. Provide examples of deep learning models used in NLP. (CO4)

(c) Explain the concept of higher abstraction in text analysis. How do higher-level abstractions help in understanding the meaning of texts ? (CO4)