R18

Code No: 155CK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January - 2025

NATURAL LANGUAGE PROCESSING

(Common to CSE, CSD)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What are the components of a word in morphological analysis?	[2]
b)	Why is it important to analyze the structure of documents in NLP?	[3]
c)	Define *parsing* in the context of natural language processing.	[2]
d)	Explain how Treebanks contribute to syntactic analysis.	[3]
e)	What is the goal of semantic parsing?	[2]
f)	Describe the difference between semantic interpretation and syntactic parsing.	[3]
g)	What is the purpose of predicate-argument structure in NLP?	[2]
h)	Explain how meaning representation systems enhance natural language understanding.	[3]
i)	What is an n-gram in language modeling?	[2]
j)	How does reference resolution improve discourse coherence?	[3]

PART – B

(50 Marks)

2. Compare and contrast rule-based and statistical methods for analyzing the structure of documents. Provide examples to justify your comparison. [10]

OR

3. Design an algorithm to extract the morphological structure of words from a given document and evaluate its performance using precision and recall metrics. [10]

4. Evaluate the effectiveness of dependency parsing versus constituency parsing for analyzing complex sentences in multilingual NLP tasks. Provide detailed justification. [10]

OR

5. Create a syntactic parser for a small subset of English grammar. Provide pseudocode and explain how it resolves ambiguities in parsing. [10]

6. Construct a semantic representation using predicate logic for the sentence *"She bought a red car from the dealer."* [10]

OR

7. Analyze the challenges of semantic parsing in multilingual contexts. How can these challenges be addressed in NLP systems? [10]

8. Create a predicate-argument structure for the sentence *"The scientist discovered a new particle in the lab."* Explain its significance. [10]

OR

9. Evaluate the trade-offs between symbolic and statistical approaches for meaning representation in NLP, using examples to support your arguments. [10]

10. Analyze the role of cohesion and reference resolution in improving the quality of machine translation systems. [10]

OR

11. Construct a bigram model for the phrase *"Artificial intelligence is transforming industries"* and calculate the probability of the phrase given example probabilities. [10]

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