

**SRI VASAVI ENGINEERING COLLEGE (Autonomous)**  
**B.Tech. V Semester Regular Examinations November 2025**  
**NATURAL LANGUAGE PROCESSING**  
 (Common to AIML)

Time: 3 Hrs

Max. Marks:70

**PART-A**

Answer All the Questions.

**20M**

1.

- i. Describe the purpose of a transducer in NLP.
- ii. Define lemma and root word.
- iii. Describe the concept of N-gram model.
- iv. Define part-of-speech tagging.
- v. Describe a grammar rule with an example.
- vi. Define dependency grammar.
- vii. Describe the concept of Semantics in NLP.
- viii. Define synonymy with one example.
- ix. List any two lexical resources used in NLP.
- x. Define discourse coherence.

**20 M**

CO1-K1(2M)  
 CO1-K1(2M)  
 CO2-K1(2M)  
 CO2-K1(2M)  
 CO3-K1(2M)  
 CO3-K1(2M)  
 CO4-K1(2M)  
 CO4-K1(2M)  
 CO5-K1(2M)  
 CO5-K1(2M)

**PART-B**

All Questions Carry Equal Marks

**50M**

2.

- A. i. Explain grammar-based and statistical language models with examples.  
 ii. Illustrate the morphological analysis performed by finite-state transducer with an example.

**10 M**

CO1- K2(5M)  
 CO1- K2(5M)

**OR**

- B. i. Describe the structure of a finite state automaton and its role in language recognition.  
 ii. Explain English morphology types with suitable examples.

CO1- K2(5M)  
 CO1- K2(5M)

3.

- A. i. Explain stochastic (HMM-based) POS tagging.  
 ii. Illustrate the Viterbi algorithm for HMM POS tagging.

**10 M**

CO2- K2(5M)  
 CO2- K3(5M)

**OR**

- B. i. Describe the rule-based POS tagging with an example.  
 ii. Illustrate the Maximum Entropy models for POS tagging.

CO2- K2(5M)  
 CO2- K3(5M)

4.

- A. i. Explain the components of a Context-Free Grammar with examples.  
 ii. Illustrate the top-down and bottom-up parsing strategies with examples.

**10 M**

CO3- K2(5M)  
 CO3- K3(5M)

**OR**

- B. i. Explain how the Chomsky Normal Form (CNF) transforms CFGs.  
 ii. Illustrate the concept of dynamic programming parsing with the help of CYK algorithm.

CO3- K2(5M)  
 CO3- K3(5M)

5.

- A. i. Explain the need for semantic representation in NLP.  
 ii. Illustrate the concept of Selectional restrictions and their role in semantic interpretation.

**10 M**

CO4- K2(5M)  
 CO4- K3(5M)

**OR**

- B. i. Explain the concept of Syntax-driven Semantic analysis.  
 ii. Illustrate the supervised learning approach to Word Sense Disambiguation (WSD).

CO4- K2(5M)  
 CO4- K3(5M)

6.

- A. i. Describe Hobbs' algorithm for anaphora resolution.  
 ii. Illustrate the concept of FrameNet and PropBank for semantic role labeling.

**10 M**

CO5- K2(5M)  
 CO5- K3(5M)

**OR**

- B. i. Explain the centering theory for discourse coherence.  
 ii. Illustrate anaphora and cataphora with examples.

CO5- K2(5M)  
 CO5- K3(5M)

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