

### A. Questions referred from different university

#### 1. Identify the head and morphological type (Noun Phrase, Verb Phrase, Adjective Phrase, Adverbial Phrase) of the following sentence segments.

- I. The president of the company
- II. Looked up the chimney
- III. Angry as a hippo
- IV. Rapidly like a bat
- V. important to Bill
- VI. looked up the tree

#### 2. Given the following CFG grammar from ATIS System, USA. Perform syntactic analysis of the following sentence using any of the parsing method.

*"Book the flight through Houston."*

S → NP VP	Det → that   this   a   the	Nominal → Nominal PP
S → Aux NP VP	Noun → book   man   flight	VP → Verb
S → VP	Verb → book   include   prefer   man	VP → Verb NP
NP → Pronoun	Pronoun → I   she   me	VP → Verb NP PP
NP → Proper-Noun	Proper-Noun → Houston   TWA	VP → Verb PP
NP → Det Nominal	Aux → does	VP → VP PP
Nominal → Noun	Preposition → from   to   through	PP → Preposition NP
Nominal → Nominal Noun		

#### 3. Explain the different levels of language analysis.

#### 4. Identify and describe the ambiguities in the following sentences.

- I. The man kept the dog in the house.
- II. Book that flight.
- III. Time flies like an arrow
- IV. He crushed the key to my heart

#### 5. Analyze the significance of Word Sense Disambiguation in NLP. Explain any one WSD method

#### 6. Analyse how statistical methods can be used in machine translation

#### 7. Design a finite state transducer with E-insertion orthographic rule that parses from surface level "foxes" to lexical level "fox+N+PL" using FST.

#### 8. Differentiate between top-down and bottom-up parsing.

9. What is Natural Language Processing? Discuss with some applications.

10. What is meant by the semantics of a natural language, and how this differs from the pragmatics?

11. Describe augmented grammar in syntactic analysis

12. Explain POS tagging with example

13. Distinguish between bounded movement and unbounded movement and give examples.

14. Perform parsing using simple top down parsing for the sentence “The dogs cried” using the grammar given below:

S→NP VP

NP→ART N

NP→ART ADJ N

VP→V

VP→V NP

15. The parse tree for the sentence “A restaurant serves dosa” is given below. Perform semantic analysis and show the semantic interpretations of the constituents. Explain the process



16. Explain vector space model of information retrieval

17. Explain surface anaphora and the different methods for dealing with surface anaphora

18. Explain the difference of discourse structure from other reference mechanisms

19. Explain direct machine translation

20. Explain text summarization and multiple document text summarization with neat diagram

21. Describe transfer model of Machine Translation. List out its three phases

22. State the difference between hypernymy and hyponymy and give an example of each.

23. Derive a top-down, depth-first, left-to-right parse tree for the given sentence:

*The angry bear chased the frightened little squirrel*

Use the following grammar rules to create the parse tree:

$S \rightarrow NP VP$	$Det \rightarrow the$
$NP \rightarrow Det Nom$	$Adj \rightarrow little \mid angry \mid frightened$
$VP \rightarrow V NP$	$N \rightarrow squirrel \mid bear$
$Nom \rightarrow Adj Nom \mid N$	$V \rightarrow chased$

24. Explain the Bayes' rule on conditional probability of an event A given an event B.

25. Draw the shift-reduce parser in processing the sentence

*The woman saw a puppy*

26. Analyze the naive Bayes classifier approach to Word Sense Disambiguation in NLP.

27. Define the following with respect to Information Retrieval:

- I. Vector Space Model
- II. Term Frequency
- III. Inverse Document Frequency

28. What is meant by knowledge representation?

29. Describe discourse segments.

30. Briefly describe what is meant by reference resolution.

31. Give any 3 different evaluation metrics available for text classification?

## **B. Questions Asked in 2021 MU**

**32. Challenges in NLP**

**33. Define WordNet with applications and types of representation**

**34. Stemming (Porter Stemmer) with steps and algorithm**

**35. Context Free Grammar**

**36. IR vs Information Extraction/Data Mining**

**37. Word Sense Disambiguation with approaches, limitations and applications**

## **In Syllabus but never asked:**

**38. Reference Resolution, Reference Phenomena**

**39. QnA Systems**

**40. BabelNet**

**41. Syntactic & Semantic constraint on coherence;**

**42. Anaphora Resolution using Hobbs and Canterling Algorithm**

**43. Homonymy, Polysemy, Synonymy, Hyponymy; Semantic Ambiguity;**

**44. Hidden Markov Model (HMM Viterbi) for POS tagging; Issues in HMM POS tagging; Discriminative Model:**

**45. Maximum Entropy model, Conditional random Field (CRF)**

**46. Evaluating N-grams: Perplexity; Smoothing: Laplace Smoothing, Good-Turing Discounting;**