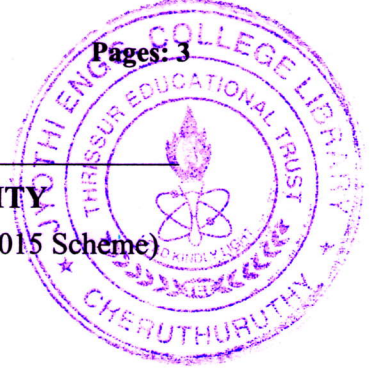


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree (S, FE) Examination January 2024 (2015 Scheme)

**Course Code: CS366****Course Name: NATURAL LANGUAGE PROCESSING**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer all questions, each carries 3 marks.*

Marks

- 1 Differentiate between syntax, semantics and pragmatics with the following sentences: (3)
- Green frogs have large noses.
 - Green ideas have large noses.
 - Large have green ideas nose.
- 2 What are the two different ways to evaluate a language understanding system? (3)
- 3 What are word senses? Can you identify the following words based on their senses (synonym, antonym, hypernym) to each other: (3)
- freezing, hot, cold, temperature.
- 4 What is backtracking and how is it useful while parsing techniques are used? (3)

PART B*Answer any two full questions, each carries 9 marks.*

- 5 a) What are noun phrases? (3)
- b) What is a lexicon? (3)
- c) Differentiate between adverb phrases and adjective phrases. (3)
- 6 a) Write the graph unification algorithm to unify the DAG rooted at node N with a DAG rooted at node M. (7)
- b) Draw the feature structure of "a cat". (2)
- 7 a) Name the different levels of language analysis. (3)
- b) Draw the parse tree structure for the following sentence: (6)

"Daisy eats lunch with spoon"

Use the following grammar rules to create all trees possible:

 $S \rightarrow NP VP \mid VP$ $N \rightarrow \text{spoon, Daisy, lunch}$ $NP \rightarrow N \mid NP PP$ $V \rightarrow \text{eats}$ $VP \rightarrow V NP \mid V NP PP$ $P \rightarrow \text{with}$ $PP \rightarrow P NP$

PART C*Answer all questions, each carries 3 marks.*

- 8 Based on the concept of conditional probability, write the Bayes' rule. (3)
- 9 Why are gaps and fillers essential to handle movements in language? (3)
- 10 What are semantic networks? (3)
- 11 What are scope islands with respect to vertical scoping relations? (3)

PART D*Answer any two full questions, each carries 9 marks.*

- 12 a) How is evaluation of statistical methods done? (4.5)
- b) Classify the quantifiers used in noun phrases. (4.5)
- 13 Calculate the PCFG of the sentence "*astronomers saw stars with ears*" and find (9)
which has the best grammar structure.

1.0 S → NP VP

0.4 NP → NP PP

2.0 PP → P NP

0.1 NP → astronomers

0.7 VP → V NP

0.18 NP → ears

0.3 VP → VP PP

0.04 NP → saw

1.0 P → with

0.18 NP → stars

1.0 V → saw

0.1 NP → telescopes

- 14 a) Give the SEM features for the given sentence by using a parse tree: (5)
"*Mary sees Jack*"
- b) Write about template matching and how it is used for semantic interpretation. (4)

PART E*Answer any four full questions, each carries 10 marks.*

- 15 a) Write the FOPC representation for the following sentences: (5)
- There is a dog.
 - Every dog is an animal.
 - Some dog is a pet.
 - Brothers are siblings.
 - No one likes Fifi.
- b) Explain resolution rule and Horn clauses techniques in Knowledge representation (5)
- 16 a) Differentiate between Equality based and Abduction-based techniques in (5)
interpretation and expectation of world knowledge.
- b) Write about Segmentation and Cue phrases (5)

- 17 a) What are the important components of an intelligent system? (7)
- b) What are discourse entities? (3)
- 18 a) Explain Interlingua Machine Translation. (5)
- b) How is the statistical Machine Translation using faithfulness and fluency? (5)
- 19 Differentiate between the different types of Information retrieval methods. (10)
- 20 a) Explain any two information extraction algorithms in brief. (6)
- b) Distinguish between single document summarization and multiple document summarization. (4)
