

Roll No: 

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**BTECH**  
**(SEM V) THEORY EXAMINATION 2024-25**  
**NATURAL LANGUAGE PROCESSING**

TIME: 3 HRS

M.MARKS: 70

**Note:** Attempt all Sections. In case of any missing data; choose suitably.

**SECTION A**

**1. Attempt all questions in brief. 2 x 07 = 14**

Q no.	Question	CO	Level
a.	Write various limitation of natural language Processing.	1	K1
b.	Differentiate between top down and bottom-up parsers.	2	K2
c.	Discuss the concept of Knowledge Representation and Knowledge Base.	3	K2
d.	What are the limitations of Probabilistic Context-Free Grammars (PCFGs)?	3	K1
e.	Write the concept of Phonetics and list out their main branches.	4	K1
f.	Discuss the applications of filter bank methods in speech signal processing	4	K2
g.	What does discourse planning involve?	5	K1

**SECTION B**

**2. Attempt any three of the following: 07 x 3 = 07**

Q no.	Question	CO	Level
a.	Explain Add-k smoothing and discuss different methods for evaluating N-grams.	1	K2
b.	Provide an algorithm for a basic top-down parser with an illustrative example.	2	K2
c.	Describe the thesaurus-based and distributional word similarity methods, along with the advantages of each.	3	K2
d.	Explain the concept of Digital Signal Processing in detail.	4	K3
e.	Elucidate the concepts of parallelization and batch processing techniques, and subsequently compare both methodologies in the context of Natural Language Processing (NLP)?	5	K4

**SECTION C**

**3. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	Provide a pseudo-code algorithm for parsing a finite-state transducer and explain it with an example.	1	K2
b.	What is Zipf's Law, and how is it applied in Natural Language Processing (NLP)	1	K2

**4. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	Explain Augmented Grammars and Lexicon in the context of NLP.	2	K2
b.	For the CFGs given: S → NP VP VP → V NP NP → Det N Draw the shift-reduce parser in processing the sentence	2	K3



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	The woman saw a puppy Use the following lexical entries to create the chart parser. The   a: Det woman   puppy: N saw : V		
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**5. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	Explain the different relationships between word senses. Additionally, discuss the various knowledge sources used in Word Sense Disambiguation (WSD).	3	K2
b.	Explain the concept of Thematic Roles for semantic analysis along with their application.	3	K2

**6. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	Explain the vowels, semi vowels, diphthongs and consonants in respect of Speech recognition system.	4	K2
b.	Explain the Linear Predictive Coding (LPC) method in speech processing? How does LPC model speech signals, and what benefits does it offer in speech analysis and synthesis?	4	K2

**7. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	Explain hidden Markov model with Baum-Welch parameter re-estimation. Also elaborate on its implementation issues.	5	K3
b.	Illustrate the concept and process of Chatbots in detail with any example.	5	K4