ourse Code Descriosi CH2024250101603 Slot Natural Language Processing Course Title Class Nbr Max. Marks 100 3 hours Time · Write only Register Number in the Question Paper where space is provided (right-side a **General Instructions** not write any other details. **Course Outcomes** 1. Understand the fundamental concepts of Natural Language Processing. Develop useful systems for language processing and related tasks involving text pro monstrate text-based processing of natural language with respect to morphology. .Check the syntactic and semantic correctness of natural language. 4.Select a suitable language modelling & Feature Representation to develop al-world applications 5. Develop computational methods for real-world applications using deep learning. Section - I Answer all Questions (10 × 10 Marks) *M Q.No Question *M Analyze the ambiguities in the following sentences. Discuss the interpretations for the 01. (5*2=10 Marks)a) The coach saw the player with the binoculars. b) The cake is too light c) They are hunting dogs d) The manager told the employee that he was going to get a promotion e) We saw her duck Apply Porter's stemming algorithm to the highlighted words in the given paragraph. List the 02.

resulting stems and explain the specific rules used for each transformation. (10 Marks)

"Imagine you are the head chef in a renowned restaurant, guiding a food critic through your kitchen as you prepare exquisite dishes. As you showcase the meticulously crafted plates and the fresh, vibrant ingredients, the critic expresses a keen interest in replicating your culinary techniques in their own cooking endeavors."

Imagine you are a computational linguist working on a natural language processing (NLP) system designed to understand sentences by analyzing word relationships. Using the sentence The cat chased a mouse," demonstrate how transition-based parsing works. Elucidate each step with transitions and include a diagram of the parsing structure at each steps in the parsing structure,

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Demonstrate the process of determining the grammatical validity for the sentence, "Did the cat 3 3 Demonstruct the dog in the park with the ball?". Construct the Cocke Kasami Younger (CKY) parsing table and analyze it with the grammar rules given below. (10 Marks)

 $S \rightarrow Aux NP VP$

 $VP \rightarrow V NP / V NP PP / VP PP$

NP → Det N | NP PP

 $PP \rightarrow PNP$

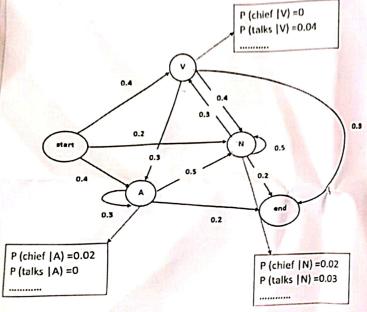
Aux → "Did"

 $Det \rightarrow "the"$

N → "cat" | "dog" | "park" | "ball"

V → "chase"

Consider the following Hidden Markov Model (HMM) for Part-of-Speech (POS) tagging:



- a) Calculate the probability P (chief talks, N N). (3 Marks)
- b) Calculate the probability of observing the sequence "chief talks" with a POS tag A for "chief". (4 Marks)
- c) Determine the probability of the POS tag sequence N V occurring. (3 Marks)
- Analyze the context of the word 'pined' in the given sentences with Lesk algorithm to 10 3 06. disambiguate its meaning and demonstrate the same
 - a) "Rani pined for her lost wallet". (5 Marks)
 - b) "After her sister's loss rani pined away, especially her health". (5 Marks)
- Consider a sentiment analysis task with two classes: Good (G) and Bad (B). Use the following 10 07. miniature training and test documents, simplified from actual movie reviews. Apply text classification using Laplace smoothing to predict the class of the test document. (10 Marks)

	Class	Document
Training		Harry Potter movie was awesome movie and awesome experience
	G	The movie is well-organized and the songs in the movie are mind-blowing
	В	Continuity is missing in the Harry Potter movie
	G	Very Powerful
	B	The plot was acadictable and boring
Testing	?	With a lot of fun

a) Analyze the following pairs of sentences with a common noun phrase (NP) that has the same grammatical function but different thematic roles. Identify the grammatical function and thematic roles of the NP in each pair. Justify your answers. (6 Marks) John list the mail on the bead.			noun phrase (NP) that has the same	10			
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