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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**

Branch: Computer Science and Engineering **Duration: 3 hrs.**

Course Code: 22CS7PENLP **Max Marks: 100**

Course: Natural Language Processing

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Discuss the components of transformational grammar with an appropriate example.	*CO1*	*PO1*	**10**
	b)	Discuss Xbar theory and depict the general structure. Write the particular structure for the following sentence. i. The food in a dhaba ii. Ate food in a dhaba iii. Very proud of his country iv. In the dhaba	*CO1*	*PO1*	**10**
		OR			
2	a)	Derive C-structure and f-structure for the sentence “He saw stars”, write the context-free grammar rules along with functional specifications to handle the sentence.	*CO1*	*PO1*	**10**
	b)	Analyze the layered representation of Paninian grammar and issues in it.	*CO2*	*PO2*	**05**
	c)	Using Bi-gram model estimate the probability of sentence ”The Arabian Knights are the fairy tales of the east” where the training set is given below The Arabian Knights These are the fairy tales of the east The stories of the Arabian Knights are translated in many languages	*CO1*	*PO1*	**05**
		UNIT - II			
3	a)	Discuss two step morphological parser. Develop simplified finite-state transducer for mapping English nouns to the intermediate form. Write the possible sequence of states that transducer undergoes, given the surface forms birds and boxes.	*CO1*	*PO1*	**08**
	b)	Write the minimum distance algorithm and find the same for the words tutor and tumour.	*CO1*	*PO1*	**08**

		c)	Differentiate between various part-of -speech tagging methods. What are the solutions to unknown words problem.	*CO2*	*PO2*	**04**
			OR			
	4	a)	Discuss the operations of Earley parser algorithm . Analyze the following grammar and show how the parsing for the sentence is carried on using Earley parser: "Read this book" S -> NP VP S -> VP NP -> PRON NP -> Det Nom Nom -> N Nom -> Nom N VP -> V VP -> V NP Det -> the |a |this PRON -> he|she N -> book| boys| girl PRP -> with |in V -> read | take	*CO2*	*PO2*	**10**
		b)	Write the Cocke-Younger-Kasami (CYK) algorithm. Consider the following simplified grammar in CNF: S -> NP VP VP -> V NP NP -> Det Noun Det -> the |an V -> wrote Noun ->girl Noun -> essay Parse the sentence 'The girl wrote an essay' and write the sequence of states created in the chart by the same algorithm.	*CO1*	*PO1*	**10**
			UNIT - III			
	5	a)	Illustrate how a syntax- driven semantic analyzer builds the meaning representation of a sentence "Principal nominate coordinator".	*CO3*	*PO3*	**10**
		b)	Apply resolution of anaphora procedure for the following text and resolve the references. "John saw bike in the showroom. He enquired about it. He bought it" . Salience factors and their weights (Lappin and Leass 1994) Sentence recency 100 Subject emphasis 80 Head noun emphasis 80 Existential emphasis 70 Accusative emphasis 50 Non-adverbial emphasis 50 Indirect object and oblique complement emphasis 40	*CO1*	*PO1*	**10**
			OR			

	6	a)	Categorize the antecedent indicators used in Mitkov's pronoun resolution algorithm.	*CO2*	*PO2*	**5**
		b)	Analyze the characteristics of meaning representation languages must possess along with example.	*CO2*	*PO2*	**5**
		c)	Discuss the procedure for analyzing the discourse. Consider the following phrases and write the discourse structure. Sa: Susmitha joined the institute last year. Sb: It was all okay for eight months, Sc: Initially, she thought to stay there. Sd: But then she was assigned UG classes at a remote centre. Se: Um, it was more than 100km from the institute and that too in some ashram, who could have enough time to waste the whole day for a class. Sf: So, she decided to leave and go back to her parent Sg: Institute | and that's how she is back to the university.	*CO1*	*PO1*	**10**
			UNIT - IV			
	7	a)	Distinguish between the surface realization approaches based on systemic grammar and functional unification grammar.	*CO2*	*PO2*	**10**
		b)	Discuss and compare the various machine translation system involving Indian languages.	*CO2*	*PO2*	**10**
			OR			
	8	a)	Differentiate the classification of various machine translation approaches.	*CO2*	*PO2*	**10**
		b)	Differentiate the various architectures of natural language generation systems.	*CO2*	*PO2*	**6**
		c)	Mention the applications of natural language generation.	*CO1*	*PO1*	**4**
			UNIT - V			
	9	a)	Characterize the design features of information retrieval systems.	*CO2*	*PO2*	**8**
		b)	Discuss and differentiate between the various alternate models of information retrieval.	*CO2*	*PO2*	**9**
		c)	List the criteria given by Cleverdon that can be used for evaluating the information retrieval systems.	*CO1*	*PO1*	**3**
			OR			
	10	a)	Discuss WordNet with example and give its applications.	*CO1*	*PO1*	**8**
		b)	What is the role of part-of speech tagger in NLP applications and distinguish between various POS tagger.	*CO2*	*PO2*	**8**
		c)	Discuss the use of stemmers and list any three of them.	*CO1*	*PO1*	**4**

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