23CAU523N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCA DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)

Branch – **COMPUTER APPLICATIONS**

MAJOR ELECTIVE COURSE – I : NATURAL LANGUAGE PROCESSING

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Define Tokenization in NLP a) Dividing text into paragraphs b) Dividing text into words or units c) Removing punctuation marks d) Translating text into another language	K1	CO1
	2	Explain what English Morphology in NLP deals with a) Sentence level structure b) The internal structure and formation of words c) Semantic interpretation d) Phonetic transcription	K2	CO1
2	3	Show what HMM in NLP stands for: a) Hidden Markov Model b) Hierarchical Memory Machine c) Hybrid Morphological Module d) Hidden Morph Syntax Model	K1	CO2
	4	Describe the purpose of smoothing techniques used in language models. a) Improve pronunciation in speech b) Handle zero probability for unseen words c) Remove stopwords d) Normalize sentence length	K2	CO2
3	5	Identify what a Context-Free Grammar (CFG) consists of a) Only regular expressions b) Production rules with terminals and non-terminals c) Word embeddings d) POS tagging rules	K1	CO3
	6	Explain what Dependency grammar focuses on in sentence analysis a) Relations between words in a sentence b) Frequency of words c) Sentence-level semantics d) Morphological transformations	K2	CO3
4	7	Define Word Sense Disambiguation (WSD) in NLP a) Translating sentences b) Identifying the correct meaning of a word in context c) Splitting words into morphemes d) Generating speech from text	K1	CO4
	8	Explain what Thematic roles represent in semantics a) Grammar production rules b) Functions words play in events or actions c) Types of discourse structures d) Named entity categories	K2	CO4
5	9	Define WordNet a) A POS tagging tool b) A lexical database of English words and their relations c) A parser for English syntax d) A machine translation software	K1	CO5
	10	Identify Penn Treebank is an example of which of the following. a) Semantic role labeller b) Annotated corpus c) Lemmatization tool d) Sentence generator	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain with example how a finite-state automata can be used for tokenization.	K2	CO1
		(OR)		
	11.b.	Describe the role of minimum edit distance in correcting spelling errors with a simple illustration.		
2	12.a.	Apply the concept of bigram language models to compute the probability of a given short sentence (example: "I love NLP").	K3	CO2
		(OR)		
	12.b.	Demonstrate with an example how rule-based Part-of-Speech tagging works for a short text.		
3	13.a.	Construct a context-free grammar (CFG) for simple English sentences involving a noun phrase and a verb phrase.	K3	CO3
		(OR)		
	13.b.	Apply dependency grammar to analyze the structure of the sentence *"The cat sat on the mat."*		
4	14.a.	Analyze the different methods of Word Sense Disambiguation (supervised vs dictionary-based vs bootstrapping) with suitable examples.	K4	CO4
		(OR)		
	14.b.	Given a sentence with ambiguous word meanings, show how thematic roles can be used to resolve ambiguity.		
5	15.a.	Analyze how discourse coherence can be maintained using reference phenomena such as anaphora resolution.	K4	CO5
		(OR)		
	15.b.	Compare the usefulness of two lexical resources (WordNet and PropBank) for NLP applications.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Analyze the process of building a statistical language model for English.	K4	CO1
2	17	Analyze and compare the working of rule-based, stochastic, and transformation-based POS tagging methods.	K4	CO2
3	18	Examine the challenges involved in syntactic parsing of natural language sentences.	K4	CO3
4	19	Analyze how different approaches to Word Sense Disambiguation (WSD) contribute to semantic understanding in NLP.	K4	CO4
5	20	Evaluate the importance of discourse analysis and lexical resources in NLP applications.	K4	CO4

Z-Z-Z END