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Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Tech.(CSE)-AIML-2021/B.Tech.(CSE)-AIML-2022/B.Tech.(CSE)-AIML-2023/B.Tech.(CSE)-2023

Course Name – Speech and Natural Language Processing

Course Code - PEC-CSM602C/PEC-CSG602C

(Semester VI)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Identify the type of ambiguity illustrated when duck can be both a noun and a verb.
 - a) Semantic ambiguity
 - b) Pragmatic ambiguity
 - c) Morphological or syntactic ambiguity
 - d) Discourse ambiguity
- (ii) Select an option for identifying that machine learning can be used to improve the accuracy of spell checking in NLP applications
 - a) By manually defining a list of all possible misspelled words
 - b) By training a model on a large corpus of text with labeled spelling errors
 - c) By applying a set of pre-defined rules for identifying and correcting errors
 - d) By using a dictionary of correctly spelled words for comparison
- (iii) Select the number of parse trees for the string aaa. Consider the CFG: $S \rightarrow SS \mid a$
 - a) 1
 - b) 2
 - c) 3
 - d) 5
- (iv) Select the Precision of the spell checker. A document contains 100 words. 10 words are actually misspelled. A spell checker flags 14 words as incorrect. Out of these, 8 are true misspellings.
 - a) 0.57
 - b) 0.62
 - c) 0.71
 - d) 0.80
- (v) Identify the potential impact of NLP on the future of education
 - a) Personalized learning experiences with adaptive learning platforms
 - b) Automated grading and feedback on written assignments
 - c) Development of intelligent tutoring systems for individualized learning
 - d) All of the mentioned
- (vi) Select from the following that best describes the process of reasoning from consequents to antecedents.
 - a) Deduction
 - b) Induction

- c) Abduction d) Reduction
- (vii) Identify the Thematic role for the definition: "The volitional causer of an event".
 a) EXPERIENCER b) FORCE
 c) RESULT d) AGENT
- (viii) Identify the option that best describes Prolog's approach to inference.
 a) Forward chaining b) Backward chaining
 c) Random chaining d) Bidirectional chaining
- (ix) Select the option that best describes the meaning of the statement "Discourses are coherent":
 a) the discourse has meaningless connection b) the discourse has no connection
 c) the discourse has no meaningful connection d) the discourse has some sort of meaningful connection
- (x) Choose the correct statement regarding Lemmatizer:
 a) Attempts to map words to database b) Attempts to map words to their synonyms
 c) Attempts to map words to their dictionary form d) Attempts to map words to their corresponding nouns or verbs
- (xi) Identify which of the following techniques can be used to compute similarity between two sentences in NLP.
 a) Lemmatization b) Part of Speech Tagging
 c) Cosine Similarity d) N-grams
- (xii) Identify the following techniques can be used to compute the distance between two words.
 a) Lemmatization b) Part of Speech Tagging
 c) Dekang Lin d) N-grams
- (xiii) Trace one which is most similar to n-grams
 a) Word embeddings b) Part-of-speech tags
 c) Named entity recognition tags d) Syntactic dependency labels
- (xiv) The primary goal of syntax-driven semantic analysis is:
 a) Chart b) Semantic Parsing
 c) Judge d) Compute
- (xv) Identify what the transition probability represents in an HMM.
 a) The probability of observing a specific word b) The probability of moving from one hidden state to another
 c) The probability of emitting an observation from a state d) The probability of staying in the same state

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Illustrate a regular expression that matches a weight value written as a number followed by a unit like kg or g. The weight may be an integer or a decimal. Examples: 5kg, 12.5 kg, 250g (3)
3. Describe the structure and functioning of a deterministic finite-state automation (3)
4. Illustrate the trigrams and trigram probabilities for the given corpus: She likes coffee. She likes tea. (3)
5. Explain the components required to construct a morphological parser. (3)
6. Evaluate the proportion of anaphoric references. A paragraph contains 25 noun phrases. Out of them: 15 are anaphoric references (3)

OR

Evaluate the accuracy of the system. A reference resolution system processed 40 pronouns. Out of these: 32 pronouns were resolved correctly. (3)

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Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain the structure of semantic roles in PropBank using examples. (5)
 8. Differentiate between the following: WSD using Supervised learning, WSD using Dictionary, WSD using Thesaurus. (5)
 9. Summarize the use of FSTs (Finite State Transducers) in morphological analysis. (5)
 10. Employ an example to examine the Word Level Analysis. (5)
 11. Summarize the Reference Phenomena for the text: Alice loves to read books. She often visits the library to borrow new ones. The librarian there is very helpful and always recommends interesting titles. (5)
 12. Discourse Analysis is beneficial for Question answering. Justify this statement. (5)
- OR**
- Summarize the main aspects of Reference Phenomena. (5)

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