



**Term Evaluation (Odd) Semester Examination September 2025**

Roll no.....

Name of the Course: BTech CSE (AI & ML Specialization)

Semester: 5<sup>th</sup>

Name of the Paper: Natural Language Processing and Computer Vision

Paper Code: TCS 564

Time: 1.5 hour

**Maximum Marks: 50**

**Note:**

- (i) Answer all the questions by choosing any one of the sub-questions
- (ii) Each question carries 10 marks.

Q1. CO1 (10 Marks)

a. What makes working with Natural Language difficult? Briefly discuss few applications of NLP.

OR

b. Differentiate between Inflectional and Derivational forms of words. What differentiates Stemming from Lemmatization?

Q2. CO2 (10 Marks)

a. Why Smoothing techniques are necessary? Briefly describe any two smoothing techniques.

OR

b. Explain how GloVe uses the word co-occurrence matrix to learn word embeddings. Compare GloVe with Word2Vec in terms of how they capture word semantics.

Q3. CO1 (10 Marks)

a. "Overstemming leads to loss of Precision." – Explain this statement with an example.

OR

b. Write code in spaCy to perform the following tasks: Lemmatization, POS tagging (both coarse grained and fine grained), Named Entity Recognition.

Q4. CO2 (10 Marks)

a. You are given the three following sentences:

The cat sat on the mat.

The dog barked at the cat.

The dog chased the ball.

(i) Create a Bag of Words matrix for the above. (ii) Write code (either using NLTK or spaCy) for the same.

OR

b. You are given the three following sentences:

The cat sat on the mat.

The dog sat on the log.

The cat chased the dog.

(i) Calculate the term frequency of each word in each sentence. (ii) Calculate the Inverse Document Frequency of each word.



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Q5. *cor*

(10 Marks)

a. Explain Dependency Parsing using an example.

OR

b. What are ngrams? Explain unigram, bigrams and trigrams using examples. Consider the sentence: "I saw a movie yesterday with my friend" Using the chain rule of probability, express the joint probability of the sentence in terms of conditional probabilities. Apply the bigram ( $n=2$ ) Markov assumption to simplify the expression.