

# KADI SARVA VISHWAVIDHYALAYA

## B.E. Semester VII EXAMINATION (March - 2025)

Subject Code: CT703C-N

Subject Name: Natural Language Processing

Date: 00/03/2025

Time: 12:00 PM TO 03:00 PM

Total Marks: 70 Marks

01/04/25

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Use of scientific calculator is permitted.
4. Indicate clearly, the options you attempt along with its respective question number.
5. Use the last page of main supplementary for rough work.

### Section-I

Q:1 Attempt Following.

- (A) Compare stemming vs. lemmatization with an example.
- (B) Write a note on text pre-processing
- (C) Explain the Bag-of-Words (BoW) with an example.

OR

Q:1 (C) Explain the NLP pipeline with each component.

Q:2 Answer the following question.

- (A) Define the language model. Explain the unigram, bigram, and trigram language model.
- (B) Explain 2 smoothing methods for the language model.

OR

Q:2 (A) Explain N-gram Language Model.

- (B) Define perplexity with an example. What is the interpretation of lower perplexity in the context of the language model?

Q:3 Answer the following question.

- (A) Explain various text representation techniques.
- (B) Calculate the TF/IDF matrix for the words: "data, science, analyze, important, one" from the following sentences:
  - D1: 'data science is one of the most important fields of science'
  - D2: 'this is one of the best data science courses'
  - D3: 'data scientists analyze data'

OR

Q:3 (A) Explain Word2Vec Architecture.

- (B) Compare Word embedding vs Sentence Embedding. Explain Doc2Vec in brief.

### Section II

Q:4 (All Compulsory)

- (A) Compare Supervised vs. Unsupervised learning.
- (B) Explain k-means in the context of text clustering.
- (C) Write a note on Support vector Machine.

OR

- Q:4 (C) Write a note on Hierarchical clustering. [5]
- Q:5 Answer the following question.  
(A) Explain Word morphology. [5]  
(B) Write a note on LSTM. [5]
- OR
- Q:5 (A) Compare Recurrent Neural network vs. Feed-forward Neural Network. [5]  
(B) Explain the importance of Part-of-speech tagger in the context of NLP. [5]
- Q:6 Answer the following question.  
(A) What does "parsing" mean in the world of NLP? Explain it in detail. [5]  
(B) Define Context-free Grammar. Explain the role of CFG in the NLP. [5]
- OR
- Q:6 (A) Write a note on Lexical semantics. [5]  
(B) Explain Information Extraction with example. [5]