

Time: 3 Hours

Total Marks: 80

N.B. : 1) Question No.1 is **Compulsory**.

2) Attempt any **THREE** from the remaining questions.

3) Figures to the right indicate full marks.

Q1. Write Short Notes on the following:

- (a) Regular Expression with five tags. [5]
- (b) Text classification [5]
- (c) Describe different applications of NLP. [5]
- (d) Noun and Verb phrases. [5]

- Q2. (a) What is NLP? Describe Levels/Phases of NLP. [10]
(b) Define POS tagging. Explain rule based and stochastic POS tagging with example. [10]

- Q3. (a) Explain Porter's Stemmer algorithm in detail. [10]
(b) What is Word Sense Disambiguation? Explain approaches for Word Sense Disambiguation. [10]

- Q4. (a) What is semantic analysis. Explain following elements of Semantic analysis. [10]
1. Homonym
2. Hypernym
3. Polysemy
4. Synonym
5. Antonym

(b) What is the role of FSA in morphological analysis? Explain FST in detail. [10]

- Q5. (a) Explain Hidden Markov Model. State it's applications in NLP. [10]
(b) What is CFG? Derive a top-down and Bottom-up parse tree for the given sentence: [10]

"John saw the dog".

Use the following grammar rules to create the parse tree:

- 1. S -> NP VP
- 2. NP -> 'John' | Det N
- 3. VP -> V NP
- 4. Det -> 'the'
- 5. N -> 'dog'
- 6. V -> 'saw'

- Q6. (a) Write a short note on Lexrank algorithm. [20]
(b) Differentiate Stemming and Lemmatization.
(c) Differentiate Inflectional morphology & Derivational morphology
(d) Explain Text Classification in detail.
