

Dr. Deven Kumar Singh, Dated: 1-12-2023 (178)



**National Institute of Technology Hamirpur (H.P.)**  
**End Semester Theory Examination (November 2023)**  
**Department of Computer Science and Engineering**

**Branch/Year:** BTech-DD (4<sup>th</sup> Year)

**Subject code:** CS-712

**Subject Name:** Speech and Natural language processing

**Date:** 01/12/2023

**Semester:** 7<sup>th</sup>

**Duration:** 3 Hours

**Max Marks:** 50

**Time:** 02:30 PM – 05:30 PM

**Note: All questions are compulsory.**

**Q1) What is tokenization? How is it used to find the Minimum edit distance? (5)**

**Q2) Write Regular Expression for following:**

(a) A Language T defined over  $T=\{a,b\}$ , having all words in which a appears tripled, if at all. This means that every clump of a's contains 3 or 6 or 9 or 12....as. (1)

(b) A language T defined over  $T=\{a,b\}$ , having all strings that do not having substring "bba". (1)

(c) The set B of all strings defined over  $T=\{a,b\}$  with at most one pair of consecutive a's and at most one pair of consecutive b's. (1)

(d) Let us consider the regular expression  $(a+b)^*a(a+b)^*b(a+b)^*$ . (1+1)

(i) Show that this is equivalent to  $(a+b)^*ab(a+b)^*$  in the sense that they define the same language.

(ii) Show that  $(a+b)^*ab(a+b)^*+b^*a^*=(a+b)^*$ .

**Q3) Explain Probabilistic Parsing and write about the problems faced by it. (5)**

**Q4) What are word classes? Write about Parts-of-speech (POS) tagging and the different tags used for basic word classes with examples? (5)**

**Q5) What is ambiguity and parsing? Write about the different types of ambiguity and parsing. (5)**

**Q6) Consider a natural language processing system designed to generate responses in a chatbot. Discuss how pragmatic analysis plays a crucial role in ensuring the system's responses are contextually appropriate. Provide**

specific examples and explain how the system might handle different pragmatic phenomena such as presupposition, implicature, and deixis. Additionally, highlight the challenges in implementing robust pragmatic analysis in real-world applications. (5)

**Q7)** Write about Semantics roles and analysis along with attribute grammar. (5)

**Q8)** What are the different types of continuous signals? Write about their classification. (5)

**Q9)** What are speech distortion measures? Name any two considerations used for the same. (5)

**Q10)** Write in short about the origins of NLP and the challenges it faces in the world today. (5)