Total No. of Printed Pages: 2

PRN No.	

PAPER CODE	U325-213 (ESE)

(AY:2024-25) May 2025 (ENDSEM) EXAM

TY (SEMESTER - II)

COURSE NAME: Natural Language Processing Branch: AI&DS COURSE CODE: ADUA32203

(T.Y PATTERN 2020R1)

Time: [1Hr 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks. Use of scientific calculator is allowed**
2) **Use suitable data wherever required**
3) **All questions are compulsory. Solve any two sub question each from Questions 1 and 2**
4) **Solve any one sub question (2 marks) from Questions 3 ,4 ,5 and 6 and sub question of 4 marks is compulsory from questions 3,4,5,and 6**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) List and explain different phases of analysis in Natural Language Processing (NLP) with an example for each.	[4]	CO1	Remember
	b)Explain the various types of ambiguity in natural language, including lexical, syntactic, semantic, and pragmatic ambiguity, with appropriate examples.	[4]	CO1	Remember
	c) Explain the concept of NLP and Briefly describe its main applications.	[4]	CO1	Remember
Q2	a) Why are we using N-grams to approximate a language model? Consider the following corpus: <s> I am from Chennai </s> <s> I am a teacher </s> <s> students are good and are from various cities </s> <s> students from Chennai do engineering </s> Find the Bigram probability of the following test sentence: **<s> students are from Chennai </s>** Here <s> and </s> are special symbols used to mark the beginning and end of the sentences respectively.	[4]	CO2	Understand
	b) Compare **inflectional** and **derivational** morphology in detail with suitable examples from English.	[4]	CO2	Understand
	c) How are **Finite State Transducers used in two-level morphology**?	[4]	CO2	Understand
Q3	a) What is POS tagging? Explain Rule based taggers with suitable example. OR	[2]	CO3	Understand
	b)Define Chunking, Parsing, and POS Tagging in the context of Natural Language Processing.	[2]	CO3	Understand

	c) What is parsing? Show derivation of **"the boy likes a pizza"** in parse tree using Top down parser. consider following grammar rule: S->NP VP VP ->Verb NP NP-> Det NOM NOM -> Noun Noun-> boy | pizza Verb -> sees | likes Adj -> big | small Adv -> very Det -> a | the	[4]	CO3	Apply
Q4	a) Illustrate the representation of '**I have a laptop**' using different approaches or methods of meaning representation. OR b) Explain with suitable examples following relationships between word meanings. **Homonyms, Polysemy, Meronmy, Hyponym.** c)Discuss the concepts of **anaphora, antecedent, and cataphora**, and explore the application of **Hobbs' algorithm** as a baseline for pronominal anaphora resolution in NLP.	[2] [2] [4]	CO4 CO4 CO4	Remember Remember Apply
Q.5	a) Describe the concept of Information Retrieval and explain the significance of NLP in enhancing Information Retrieval systems. OR b) Compute the ROUGE-2 score for the given candidate summary using the provided three reference summaries. Candidate Summary (Generated by system): **"The cat sat on the mat"** Reference Summary1: **"The cat is sitting on the mat"** Reference Summary 2: **"A cat sat on a small mat"** Reference Summary 3: **"The feline rested on the mat"** c) Apply your knowledge of text summarization techniques to demonstrate how single-document summarization is performed. Illustrate the process with a **clearly labelled diagram** showing the key stages involved.	[2] [2] [4]	CO5 CO5 CO5	Understand Understand Apply
Q.6	a)Calculate the modified precision for the **bigram** in the following example: Reference 1: **the cat sat on the mat** Output (Machine translated text): **the the cat sat on on the mat mat** OR b)Explain different types of divergences (lexical, syntactic, semantic) with suitable examples. c)Discuss the various approaches used in Machine Translation. Provide a detailed explanation of Statistical Machine Translation (SMT).	[2] [2] [4]	CO6 CO6 CO6	Understand Understand Apply