K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

April – May 2024
Program: B. Tech Information Technology   Scheme : II
Examination: LY   Semester: VIII
Course Code: ITDLC8021   and   Course Name: Natural Language Processing

Date of Exam: 16/05/2024   Duration: 2.5 Hours   Max. Marks: 60

Instructions:
   (1) All questions are compulsory.
   (2) Draw neat diagrams wherever applicable.
   (3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	**Solve any six questions out of eight:**	**12**		
i)	Compare derivational and inflectional morphemes. Classify the following words into inflectional or derivational morphemes. Happiness, supermarket, determine	02	CO2	A
ii)	What would be the output of words democracy, democratic, and democratization on applying porter stemmer algorithm?	02	CO2	U
iii)	Identify number of bigram and trigram in the following sentence. " Birds dance across the azure sky, their melodious songs harmonizing with the whispers of the wind."	02	CO3	U
iv)	Define discourse cohension.	02	CO5	U
v)	Explain the role of selectional restriction in semantic interpretation.	02	CO4	U
vi)	What are the three phases of transfer model of machine translation?	02	CO6	U
vii)	Apply the concept of coreference and give the coreference chains. "Meena loves the bass because she loves it"	02	CO5	A
viii)	What is meant by Lexicon? How is it useful in NLP?	02	CO1	U
Q.2	**Solve any four questions out of six.**	**16**		
i)	How to Solve the Sparsity Problem in the N-gram Language Model?	04	CO2	U
ii)	Use PENN tree bank to identify POS tags for the following sentence. Justify how context affects the tag. "Majestic mountains pierce the sky, their rugged peaks kissed by the golden light of dawn."	04	CO3	An
iii)	Explain noun phrase, verb phrase in language .Identify the head and morphological type (Noun phrase, verb phrase ,Adjective phrase,	4	CO1	A

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	Adverbial phrase)of the following sentences : i. President of the company , ii Look up the chimney iii. angry as a hippo iv Rapidly like a bat			
iv)	How Semantic Analysis is different than Pragmatic Analysis?	**04**	CO4	A
v)	Explain the Anaphora Resolution using Hobbs algorithm.	**04**	CO5	U
vi)	List and Explain different IR models.	**04**	CO6	An
Q.3	**Solve any two questions out of three.**	**16**		
i)	Discuss various stages involved in the NLP process with suitable examples.	8	CO1	U
ii)	Consider the Context free grammar: S → NP VP N → teacher J → teacher S → N VP N → strikes J → idle NP → J N N → kids V → strikes VP → V NP V → idle VP → V N Create a parse tree for the sentence "Teacher strikes idle kids" Design Shift Reduce parser for the above sentence.	**08**	CO2	A

iii)	Apply POS tagging using HMM on the given corpus and find the probabilities
	Training data: Martin Justin can watch Will.
	     Spot will watch Martin.
	     Will Justin spot Martin.
	     Martin will pat the spot.
	Test data: Justin will park Will
		08	CO3	A

Q.4	**Solve any two questions out of three.**	**16**		
i)	Explain the methods of Word Sense Disambiguation in natural language processing.	**08**	CO4	U
ii)	Explain Number Agreement and Person and Case Agreement Semantic Constraints with examples.	**08**	CO5	A
iii)	Explain text summarization and multiple document text summarization with a neat diagram.	**08**	CO6	A