D Y PATIL UNIVERSITY — RAMRAO ADIK INSTITUTE OF TECHNOLOGY

RAMRAO ADIK INSTITUTE OF TECHNOLOGY, NERUL

(D Y Patil Deemed to be University) 13 DEC 2023

Program: Computer Engineering
End Semester Examination: B.Tech. Semester VI
Course Code: CEMDC602 Course Name: Natural Language Processing
Time: 2 hour
Max. Marks: 60

Instructions: 1. All three questions are compulsory

Que. No.	Question	Max. Marks	CO	BT
Q1	Solve any **Four**			
i)	Discuss various challenges in processing natural language.	5	CO1	BT2
ii)	Compare derivational morphology with inflectional morphology.	5	CO2	BT4
iii)	Comment on possible tag sets available in ENGLISH NL. Show how the tags are assigned to the words of following sentence: "Time flies like an arrow."	5	CO3	BT4
iv)	Illustrate any four semantic relationships with example.	5	CO4	BT3
v)	Discuss the reference resolution problem in discourse analysis.	5	CO5	BT2
vi)	How is Information Retrieval System different from Information Extraction System? Explain with example.	5	CO6	BT4

Que. No.	Question	Max. Marks	CO	BT
Q2	Solve any **Two**			
i)	What is Natural language processing (NLP)? Illustrate every stage of analysis in NLP process with suitable example.	10	CO1	BT3
ii)	Consider following Training data: <s>They are Parents</s> <s> Parents they are</s> <s>Parents they like </s> <s> Parents they do like </s> <s> do they like Parents</s> Use a bigram language model and predict the most probable next word for the following word sequences: (1) <s> Parents ... (2) <s> Parentsthey do ... (3) <s> Parentsthey are Parents ... (4) <s> do they like ...	10	CO2	BT4

iii)	Consider following grammar rules: S → NP VP |Aux NP VP | VP NP → Det NOM NOM → Noun |Noun NOM VP → Verb |Verb NP Det → that | this | a | the Noun → book | flight | meal | man Verb → book | include | read Aux → does Construct parse tree with respect to above grammar for the following sentences: a) Book that flight b) Does that flight include meal	10	CO3	BT6

Que. No.	Question	Max. Marks	CO	BT
Q3	Solve any **Two**			
i)	What do you mean by word sense disambiguation (WSD)? Explain Lesk Algorithm for WSD with suitable example.	10	CO4	BT2
ii)	Discuss various Syntactic and Semantic Constraints on Coreference.	10	CO5	BT2
iii)	Choose any Indian regional language of your choice and discuss the steps to construct a machine translator to translate English language to the chosen regional language.	10	CO6	BT6

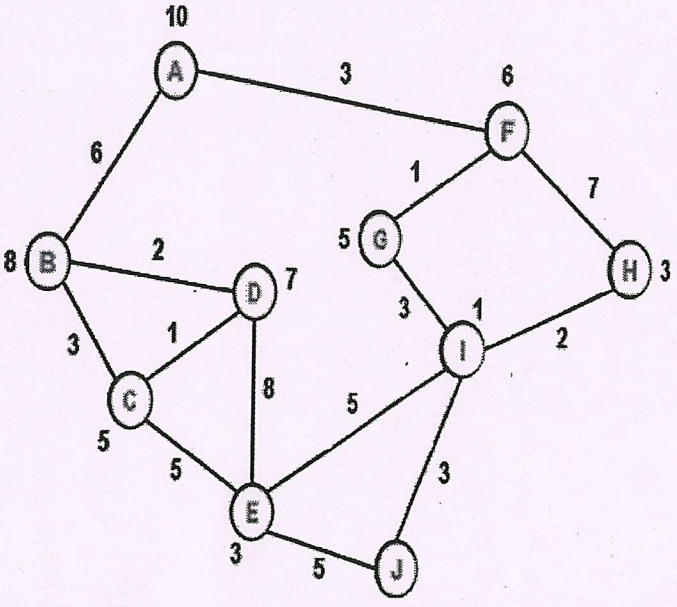
==========

Course Outcomes (CO) -Learner will be able to:

CO1: Understand the capabilities and limitations of natural language processing.
CO2: Model linguistic phenomena with formal grammars.
CO3: Design and implement algorithms for syntax analysis.
CO4: Use the mathematical and linguistic foundations for semantic analysis.
CO5: Identify and resolve references between sentences from the discourse.
CO6: Apply NLP techniques to design real world NLP applications.

BT1- Remembering, BT2- Understanding, BT3- Applying, BT4- Analyzing, BT5- Evaluating, BT6- Creating

	chaining.			
ii)	What is a Fuzzy Inference system? Give the basic structure of Fuzzy Inference system. Explain briefly the entire Fuzzy Inference process.	10	CO5	BT6

Que. No.	Question	Max. Marks	CO	BT
Q3	Solve any **Two**			
i)	Consider the following graph-  The numbers written on edges represent the distance between the nodes. The numbers written on nodes represent the heuristic value. Find the most cost-effective path to reach from start state A to final state J using A* Algorithm.	10	CO3	BT5
ii)	Consider the fuzzy rule R: If *service is good* Then *customer is satisfied.* Related universes are *service-rating*={a,b,c,d,e}, and *satisfaction-grade*={1,2,3,4,5} where the service ratings a,b,c,d,e are in descending order and the satisfaction-grades 1,2,3,4,5 are in the ascending order. The fuzzy sets *good-service* and *satisfied* are defined as follows: $$good\text{-}service = \frac{1.0}{a} + \frac{0.8}{b} + \frac{0.6}{c} + \frac{0.4}{d} + \frac{0.2}{e}$$ $$satisfied = \frac{0.2}{1} + \frac{0.4}{2} + \frac{0.6}{3} + \frac{0.8}{4} + \frac{1.0}{5}.$$ Find the relation matrix for this rule according to Jadeh's interpretation.	10	CO5	BT6
iii)	Explain planning in AI. Compare Partial order Planning with Conditional Planning. Also, Explain the real time application of hierarchical planning.	10	CO6	BT4

==========

RAMRAO ADIK INSTITUTE OF TECHNOLOGY, NERUL

(D Y Patil Deemed to be University)

Course Outcomes (CO) -Learner will be able to:

CO1: Identify the various characteristics of Artificial Intelligence techniques.
CO2. Choose an appropriate uninformed problem solving.
CO3. Apply informed search techniques for real world problem solution.
CO4. Analyze and apply the knowledge representation and reasoning to AI problem solving.
CO5. Design fuzzy inference system.
CO6. Understand and apply various planning strategies to perceive the real world.

BT1- Remembering, BT2- Understanding, BT3- Applying, BT4- Analyzing, BT5- Evaluating, BT6- Creating