Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Course: Natural Language Processing — **Semester: VIII**
Program: B.Tech CS with Cyber Law — **Time 03 hrs.**
Course Code: CSEG 415 — **Max. Marks: 100**
Instructions: Answer all the questions

SECTION A

S. No.		Marks	CO
Q 1	Describe augmented grammar use in Natural Language Processing	**4**	**CO2**
Q 2	Demonstrate the semantics of a natural language, and how this differs from the pragmatics?	**4**	**CO1**
Q 3	Compare and contrast the top-down and bottom-up parsing's in NLP	**4**	**CO2**
Q 4	Briefly, explain the morphology operations: compounding, derivation, inflection. Given the root snow, give an example each of the result of applying the three morphology operations.	**4**	**CO1**
Q 5	Construct the Tree for Give an example sentence : I Like the interesting Lecture	**4**	**CO2**
	SECTION B		
Q 6	Demonstrate the term verb phrases and simple sentences, five verb forms and some common verb compliment structure in English	**10**	**CO2, CO3**
Q 7	One of the skills involved in engineering NLP systems is to find solutions that solve practical problems adequately whilst involving minimal complexity in the language models used. Give an example of an application type where it is possible to build systems with different types of language models (e.g. involving simple information about individual words or involving complex information about how sentences convey meaning). Justify that both types of models could be appropriate. Indicate what criteria you might use to choose between these different possibilities for a given situation. Identify the suitable NLP application to solve the above problem, explain in detailed	**10**	**CO4**
8	Define Natural Language Processing and Apply the different phases of NLP to given sentence : "**This is a simple Question "**	**10**	**CO1**
Q 9	Construct the parsing tree for the sentence "**workers dumped sacks of garbage and junk into a bin**", write the grammar rules after applying the sub-categorization of verb, and pre-position. Or Apply the following phases to explain the NLG using appropriate example	**10**	**CO2, CO3**

	i. content Determination ii. Sentence Planning iii. Surface Realization		
	SECTION-C		
Q 10	You are given the grammar below. How many parse trees can you derive for the sentence: **Radha drove to Agra and Delhi in November**. Draw each parse tree. Also, Apply the Early chart after the word Radha has been read. The rules of the CFG grammar where S is the start symbol are: S → NP VP, V P → V NP | V PP | V P PP, NP → NP PP | NP CNJ NP, PP → P NP, NP → Radha | Agra | Delhi | November, V → drove, P → to | in, CNJ → and	**20**	**CO2**
Q 11	Apply the CKY Algorithm for sentence **The rain rains down** by considering following rules: 1. S → NP VP 2. NP → N 3. NP → DT N 4. VP → V ADVP 5. VP → V 6. ADVP → ADV 7. DT → the 8. N → rain 9. N → rains 10. V → rain 11. V → rains 12. ADV → down And apply the chart parsing algorithm to draw the final chart or	**20**	**CO2**
	Apply the Deterministic LR parsing for the following sentence : the man eats fish S --> NP VP NP --> *N NP --> *DET *N NP --> SN PP PP --> *PREP NP VP --> *V NP Construct the parsing table and limitations of LR parsing.	**20**	**CO2, CO3**

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SECTION A

S. No.		Marks	CO
Q 1	Describe the Person and Number features used in Natural Language Processing	**4**	**CO2**
Q 2	Construct the Tree for Give an example sentence : a one-way fare	**4**	**CO2**
Q 3	Demonstrate the semantics of a natural language, and how this differs from the pragmatics?	**4**	**CO1**
Q 4	Describe an Auxiliary sub-categorization for Natural Languages	**4**	**CO2,CO3**
Q 5	Briefly, explain the morphology operations: compounding, derivation, inflection. Given the root snow, give an example each of the result of applying the three morphology operations.	**4**	**CO1**
	SECTION B		
Q 6	Design an algorithm for simple top-down parser with an example	**10**	**CO2**
Q 7	Explain the terms verb phrases and simple sentences, five verb forms and some common verb compliment structure in English. Or Apply the following phases to explain the NLG using appropriate example i. content Determination ii. Sentence Planning iii. Surface Realization	**10**	**CO2, CO3**
Q 8	One of the skills involved in engineering NLP systems is to find solutions that solve practical problems adequately whilst involving minimal complexity in the language models used. Give an example of an application type where it is possible to build systems with different types of language models (e.g. involving simple information about individual words or involving complex information about how sentences convey meaning). Justify that both types of models could be appropriate. Indicate what criteria you might use to choose between these different possibilities for a given situation. Identify the suitable NLP application to solve the above problem, explain in detailed	**10**	**CO4**
Q 9	Consider the following context-free grammar: S -> NP VP N -> dog V -> sees NP -> Det N N ->cat V -> hates VP -> V N -> mouse V -> sneezes VP -> V NP Det -> the (a) Which of the following sentences are recognized by this grammar, and why?	**4+6**	**CO2**

	(i) the dog sneezes the cat (ii) the mouse hates (iii) the cat the mouse hates (iv) the mouse hates the mouse (b) Modify the grammar so that the following sentence is now accepted in addition: **the dog the cat the mouse sees hates sneezes** Your modification should express the linguistic phenomenon as efficiently and elegantly as possible. Justify your choice		
	SECTION-C		
Q 10	You are given the grammar below. How many parse trees can you derive for the sentence: **Radha drove to Agra and Delhi in November**. Draw each parse tree. Also, Apply the Early chart after the word Radha has been read. The rules of the CFG grammar where S is the start symbol are: S → NP VP, V P → V NP | V PP | V P PP, NP → NP PP | NP CNJ NP, PP → P NP, NP → Radha | Agra | Delhi | November, V → drove, P → to | in, CNJ → and	**20**	**CO2**
Q 11	Apply the Deterministic LR parsing for the following sentence : the cat eats fish S --> NP VP NP --> *N NP --> *DET *N NP --> SN PP PP --> *PREP NP VP --> *V NP. Construct the parsing table and limitations of LR parsing. or	**20**	**CO2, CO3**
	i. Given the grammar and lexicon below, show the final chart for the following sentence after applying the bottom-up chart parser. Remember that the final chart contains all edges added during the parsing process. You may use either the notation from class (i.e. nodes/links) or the notation from the book to depict the chart S→ VP VP → Verb NP NP → NP PP NP → Det Noun Find the men in suits. PP → Prep Noun Det → the Verb → Find Prep → in Noun → men | suits ii. Define Natural Language Processing and Apply the different phases of NLP to	**10+ 10**	**CO2, CO1**

	given sentence : “**This is a simple sentence “**		