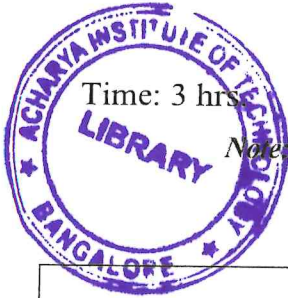


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Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026
Natural Language Processing



Time: 3 hrs

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Define NLP. Explain the challenges of natural language processing.	10	L2	CO1
	b.	Explain the role of transformational rules in transformational grammar with the help of example.	10	L2	CO1

OR

Q.2	a.	Write a note on the following with example : i) X-bar Theory ii) Theta-Theory.	10	L2	CO1
	b.	Examine the n-gram model and derive its expression. Also using the bi gram model solve the following test case sentences : Training set <s>The Arabian Knights </s> <s> these are the fairy tales of the east </s> <s> the stories of the Arabain knights are translated in many languages </s> Test sentence : <s> the Arabian Knights are the fairy tales of the east </s> Apply the bigram model for the test sentence and estimate the Probability.	10	L3	CO1

Module – 2

Q.3	a.	Describe DFA and NFA with example. Mention the properties of finites automation.	10	L2	CO2
	b.	Explain the minimum edit distance algorithm and compute the minimum edit distance between EXECUTION and INTENTION.	10	L3	CO2

OR

Q.4	a.	What is POS tagging? Explain Rule based tagger and Hybrid tagger.	10	L2	CO2
	b.	Write CYK algorithm. Tabulate the sequence of states created by CYK algorithm while parsing "The girl wrote an essay".	10	L3	CO2

Module – 3

Q.5	a.	Explain how the Naïve Bayes classifier applies Bayes theorem to perform text classification. Describe in detail with example.	10	L2	CO3
	b.	Given the following short movie reviews each labeled with a Genre, either comedy or action : i) Fun, couple, love, love comedy ii) Fast, furious, shoot action iii) Couple, fly, fast, fun, fun comedy iv) Furious shoot, shoot, fun action v) Fly, fast, shoot, love action And a new document D: fast, couple, shoot, fly. Compute the most likely class for D. Assume a Naïve bayes classifier and use add-1 smoothing for the likelihood.	10	L3	CO3

OR

OR

Q.6	a.	Illustrate with an example how laplace (add-me) smoothing is used in training a Naïve Bayes classifier why it is necessary.	10	L2	CO3																					
	b.	Determine the posterior score and identify the category to which the test case belongs to, for the following set of sentences. Use Navie Bayes classifier with add-1 smoothing. <table><tr><td></td><td>Category</td><td>Sentence</td></tr><tr><td>Train</td><td>Negative</td><td>Just plain boring</td></tr><tr><td></td><td>Negative</td><td>Entirely predictable and lacks energy</td></tr><tr><td></td><td>Negative</td><td>No surprise and very few laughs</td></tr><tr><td></td><td>Positive</td><td>Very powerful</td></tr><tr><td></td><td>Positive</td><td>The most fun film of the summer</td></tr><tr><td>Test</td><td>?</td><td>Predictable with no fun</td></tr></table>		Category	Sentence	Train	Negative	Just plain boring		Negative	Entirely predictable and lacks energy		Negative	No surprise and very few laughs		Positive	Very powerful		Positive	The most fun film of the summer	Test	?	Predictable with no fun	10	L2	CO3
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Test	?	Predictable with no fun																								

Module – 4

Q.7	a.	List and explain any two classical models of IR systems.	10	L2	CO4
	b.	Explain work NET and its application.	10	L2	CO4
OR					
Q.8		Write short notes on : i) Indexing ii) Stemming iii) Eliminating stop words iv) Zipf's law.	20	L2	CO4

Module – 5

Q.9	a.	What is Machine Translation? Explain in detail.	4	L2	CO2
	b.	Explain the concept of “Digital Divide” in the context of machine translation and information access.	6	L2	CO1
	c.	Discuss the challenges posed by language divergences for machine translation providing examples from the text.	10	L3	CO5
OR					
Q.10	a.	List three applications of machine translation mentioned in the text.	5	L1	CO5
	b.	Describe the basic work order typologies in languages and their implications for machine translation.	5	L2	CO5
	c.	Analyze the difference between web-framed and satellite-framed languages and discuss how these differences might affect machine translation systems.	10	L3	CO5

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