

Duration: 3hrs

Max Marks:80

- N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any FOUR [20]
- a Compare Derivational & Inflectional morphology
 - b What is the output of Morphological Analysis for Regular Verb, Irregular verb, Singular noun, Plural noun.
 - c What are the limitations of Hidden Markov Model (HMM) and MaxEnt Model for POS Tagging.
 - d Explain pre-processing steps generally used in NLP.
 - e Explain following Syntactic and Semantic Constraints on Co reference
1) Number Agreement 2) Person & Case Agreement

- 2 a Explain concepts of Bi-gram and n-gram with formula. [10]

For following corpus, apply Bi-gram model

Training Corpus:

<s> I am Sam </s> <s> Sam I am </s> <s> Sam I like </s>

<s> Sam I do like </s> <s> do I like Sam </s>

1. What is the most probable next word predicted by the model for the following word sequences?

(a) <s> Sam . . . (b) <s> Sam I do . . . (c) <s> Sam I am Sam . . .

(d) <s> do I like . . .

2. Which of the following sentences is better, i.e., gets a higher probability with this model?

(e) <s> Sam I do I like </s>

(f) <s> Sam I am </s>

(g) <s> I do like Sam I am </s>

- b Explain different stages of NLP. Also explain generic NLP system. [10]

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- 3 a i) Why there is need of word sense disambiguation [10]
 ii) Explain Naive Bayes Supervised algorithm for Word sense Disambiguation
 b Explain Shift Reduce Parser in NLP with example [10]

4 a

<S>	Martin	Justin	can	watch	Will	<E>	[10]
<S>	Spot	will	watch	Martin	<E>		
<S>	Will	Justin	spot	Martin	<E>		
<S>	Martin	will	pat	Spot	<E>		

For given above corpus, S indicates start of the statement and E indicates end of the statement

N: Noun [Martin, Justin, Will, Spot, Pat]

M: Modal verb [can, will]

V: Verb [watch, spot, pat]

Create Transition Matrix & Emission Probability Matrix

Statement is "Justin will spot Will"

Apply Hidden Markov Model and do POS tagging for given statements

- b How Anaphora Resolution is performed with Hobbs and Centering Algorithm [10]
- 5 a For a given grammar using CYK or CKY algorithm parse the statement [10]
 "The man read this book" Rules:

S → NP VP	Det → that this a the
S → Aux NP VP	Noun → book flight meal man
S → VP	Verb → book include read
NP → Det NOM	Aux → does
NOM → Noun	
NOM → Noun NOM	
VP → Verb	
VP → Verb NP	

- b Explain the significance of regular expression in NLP. [10]
- 6 Write Short Note [20]
 a Explain Semi-supervised method (Yarowsky) Unsupervised (Hyperlex) [10]
 b Explain Question Answering System with Algorithmic approach [10]
