NLP QUESTION BANK

Module-1

1.What is Natural language processing (NLP)?

2.Discuss various stages involved in NLP process with suitable example.

3.What is Natural Language Understanding? Discuss various levels of analysis under it

with example. [Levels/ Stages-same]

4.What do you mean by ambiguity in Natural language? Explain with suitable example.

5.Discuss various ways to resolve ambiguity in NLP

6.What do mean by lexical ambiguity and syntactic ambiguity in Natural language? What

are different ways to resolve these ambiguities?

7.Discuss various challenges in processing natural language.

8.List various applications of NLP and discuss any 2 applications in detail. Explain pre-processing operation/steps in NLP: Tokenization, Stop word removal,script validation, filtration

9.Explain block diagram of generic NLP system

Module-2

1.What is Morphology?

2.Why do we need to do Morphological Analysis

3.Discuss various application domains of Morphological Analysis.

4.Define Morphemes and give examples.

5.What is mean by Bound & Free Morphemes Define Affixes and its type.

6.Difference between Orthographic & Morphological Rules.

7.What is Morphotactics

8.Define Inflectional and Derivational Morphology

9.What are different ways to create words from morphemes

10.What is Morphological Analysis? What do you mean by stemming.

11.Explain Porter's stemming algorithun in detail Apply on following words to get the stems:

1.Tapping

2.Smiling

3.Computerization

14.What is language model?

15. Explain the use of Language model/ Applications of LM?

16.Write a note on N-Gram language Model.

17. Exercise on Bigram, Trigram, four gram exercises

18.Consider following Training data:

<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>

Assume that we use a bigram language model based on the above training data. What is the most probable next word predicted by the model for the following word sequences?

(1)<s> Sam

(2) <s>Sam I do...

(3) <s> Sam I am Sam

(4)<s> do I like

19.What is the role of FSA in Morphological analysis? Explain FST in detail.

20.Design a Finite State Automata(FSA) for the words of English numbers 1-99. Write FSA for noun, verb and adjective.

21.Define Regular Relation

22.Write FST for regular and plural noun.

23.Define FST

24.FSA exercises related to NLP problems

25.Exercise on steming by porter stemmer, n-gram, k-gram, laplace smoothing good turing, FSA, FST

Module-3

1.What is POS tagging?

2.Explain types of word classes in English NL

3.Comment on possible tag sets available in ENGLISH NL.

Hint: (Refer Upenn Treebank) Nouns type, Verb(eg. VBZ, VBD, VBG), Adverb, Prepositions, article, detminer

Using the UPenn Treebank tag set, tag the part of speech to the given statement.

The grand jury commented on a number of other topics.

4.Why POS tagging is hard? Discuss possible challenges faced while performing POS tagging

5.Discuss various approaches to perform POS tagging Explain in detail Rule-based POS tagging

6.Explain in detail Stochastic (HMM) POS tagging

7.Explain in detail Hybrid POS tagging.

8.Explain the use of CFG in Natural Language Processing with suitable example.

Convert the following CFG grammar into CNF form

S->A|cB|c

A->Bc|b

B->cAA|Є

9.What is parsing?

10. What is syntax analysis?

11.Explain the Bottom-Up Parsing Method

12.Explain the Top-Down Parsing Method

13.Compare Top-down & Bottom-up approach of parsing with suitable example.

14.Exercises on HMM Model: Formation of Emission Probability Matrix, State Transition Matrix.

15. Construct a parse tree for the following sentence using CFG rules: **The man read this book**

Rules:

S->NP VP

S->VP

NP->Det Nom

Nom->Noun

VP->verb NP

Verb->read

Det->the , this

Noun->book, man

Verb->book, read

15. Based on the given state transition and emission probability matrix, assign POS to the statement: **Time flies like an arrow.**

Emission Probability Matrix

	Time	flies	like	an	arrow
VB	0.1	0.2	0.2	0	0
NN	0.1	0.1	0	0	0.1
IN	0	0	0.25	0	0
DT	0	0	0	0.5	0

State Transition Matrix

	VB	NN	IN	DT	</S>
<S>	0.2	0.8	0	0	0
VB	0	0.3	0.2	0.5	0
NN	0.4	0.5	0.1	0	0
IN	0	0.75	0	0.25	0
DT	0	1	0	0	0

16. Based on the given state transition and emission probability matrix, assign POS to the statement: **That girl smiles.**

Emission Probability Matrix

	DT	NN	VB
That	0.4	0	0
girl	0	0.015	0.0031
smiles	0	0.0004	0.2

State Transition Matrix

	DT	NN	VB
<S>	0.5	0.4	0.1
DT	0.01	0.99	0
NN	0.3	0.3	0.4
VB	0.4	0.4	0.2

16.Using the CKY algorithm find the possible parse tree for the following statement:" **A pilot likes flying planes**" using the following rules

S->NP VP

VP->VBG NNS

VP->VBZ VP

NP->DT NN

NP->JJ NNS

DT->a

NN->pilot

VBZ->likes

VBG->flying

JJ->flying

NNS->planes

17. Using HMM POS tagging, tag the following sentence based on the given corpus:

Sentence to be tagged: **The Park is a book.**

Corpus:

<s> Book a car</s>

<s>Park the car</s>

<s>The book is in the car<s>

<s>The car is in a park</s>

18. Using HMM POS tagging, tag the following sentence based on the given corpus:

Sentence to be tagged: **Justin will spot Will**

Corpus:

<s> Martin Justin can watch Will</s>

<s>Spot will watch Martin</s>

<s>Will Justin Spot Martin<s>

<s>Martin will pat Spot</s>

19. Find the probability of the sentence: **astronomers saw stars with ears** using the given PCFG

S->NP VP 1.0

VP->V NP 0.7

VP->VP PP 0.3

PP->P NP 1.0

P->with 1.0

V->saw 1.0

NP->NP PP 0.4

NP->astronomers 0.1

NP->ears 0.18

NP->saw 0.04

NP->stars 0.18

NP->telescope 0.1

2.Find the probability of string **aaab** using the given PCFG

S->AB 0.5

S->BC 0.5

A->BA 0.3

A->a 0.7

B->CC 0.4

B->b 0.6

C->AB 0.2

C->a 0.8

Module-4

1. What is semantic analysis?
2. Why Semantic Analysis is difficult?
3. Write a note on "WordNet"
4. What is WordNet? How is "sense" defined in WordNet? Explain with example. What do you mean by word sense disambiguation (WSD)? Discuss dictionary based approach
5. Explain Lesk Algorithm for WSD with suitable example. A knowledge dictionary based approach
6. What do you mean by word sense disambiguation (WSD)? Discuss machine learning based (Navie based) approach for WSD
7. Explain with suitable example following relationships between word meanings: Homonymy, Polysemy, Synonymy, Antonymy, Hypernomy, Hyponomy
8. What is Word sense disambiguation? Explain different ways to identify correct sense of an ambiguous word.
9. Explain various approaches to semantic analysis. Discuss different semantic relationships between the words.
10. Explain with suitable example following relationships between word meanings:

Homonymy Polysemy Synonymy Antonymy Hypernomy Hyponomy Meronomy Discuss in detail attachments for fragments of English sentences.

11.Explain how a supervised learning algorithm can be applied for word sense disambiguation

Module-5

1. What is Pragmatics?
2. What are five types of referring expression? Explain with the help of example.
3. What is reference resolution?
4. Explain Anaphora Resolution with the help of Hobb's algorithm.
5. What is discourse processing

Module-6

Short note on case study of

1. Sentiment Analysis
2. Machine Translation
3. Text summarization
4. Question-Answering system
5. Text summarization