NLP ORAL – Sample Question Bank

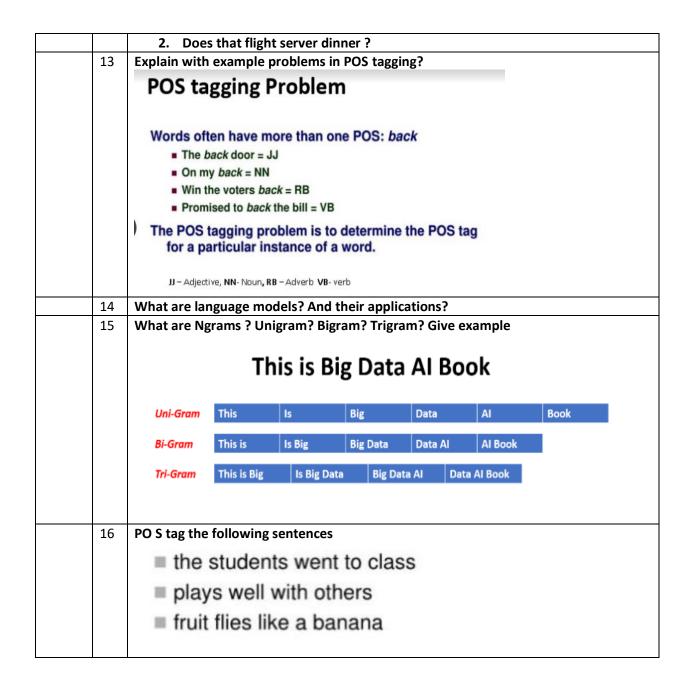| Module No.	Sr. No.	Description
1		**Introduction to NLP**
	1	**What is NLP?** ◻ The understanding & generating text & speech ◻ The use of computers to process written and spoken language for some practical, useful, purpose: to translate languages, to get information from the web on text data banks so as to answer questions, to carry on conversations with machines, so as to get advice about, say, pensions and so on. ◻ The field of computer science devoted…enabling computers to use human languages both as input and as output
	2	**What are applications of NLP?** • Machine Translation – Translation between two natural languages. • See the Babel Fish translations system on Alta Vista. • Information Retrieval – Web search (uni-lingual or multi-lingual). • Query Answering/Dialogue – Natural language interface with a database system, or a dialogue system. • Report Generation – Generation of reports such as weather reports. • Some Small Applications – • Grammar Checking, Spell Checking, Spell Corrector
	3	**What are the forms of Natural Language?** **Forms of Natural Language** • The input/output of a NLP system can be: • written text • speech • We will mostly concerned with written text (not speech). • To process written text, we need: • lexical, syntactic, semantic knowledge about the language • discourse information, real world knowledge • To process spoken language, we need everything required to process written text, plus the challenges of speech recognition and speech synthesis.
	4	**Why NLP is important to study?**

	5	**What are components of NLP?(Ans: Natural Language Understanding(NLU) , Natural Language Generation(NLG))**
	6	**What are different levels of analysis required for NLP applications?** (Ans : Morphological, syntactic, semantic, discourse , Pragmatic Analysis)
	7	**Explain NLP Processing steps?**
	8	**What are challenges in Processing Natural Language?**

	9	**Identify and Describe the ambiguity in following sentences?**
		    a. The man kept the dog in the house
		    b. Book the flight
		    c. I saw a bat
		    d. I made her duck
		    e. John and Mary are married

	10	**What is lexical ambiguity ? Give example** Words have multiple meanings. "I saw a bat." bat = flying mammal / wooden club? saw = past tense of "see" / present tense of "saw" (to cut with a saw.)
	11	**What is Syntactic Ambiguity? Give Example** **Syntactic ambiguity.** **A sentence has multiple parse trees.** Particularly common sources of ambiguity in English are: **Phrase attachment.** "Mary ate a salad with spinach from Califonia for lunch on Tuesday." "with spinach" can attach to "salad" or "ate" "from California" can attach to "spinach", "salad", or "ate". "for lunch" can attach to "California", "spinach", "salad", or "ate" and "on Tuesday" can attach to "lunch", "California", "spinach", "salad" or "ate". (Crossovers are not allowed, so you cannot both attach "on Tuesday" to "spinach" and attach "for lunch" to salad. Nonetheless there are 42 possible different parse trees.)` **Conjunction.** "Mary ate a salad with spinach from Califonia for lunch on Tuesday and Wednesday." "Wednesday" can be conjoined with salad, spinach, California, lunch, or Tuesday.

	12	**What is Semantic Ambiguity? Give Example** "The dog is chasing the cat." vs. "The dog has been domesticated for 10,000 years." In the first sentence, "The dog" means to a particular dog; in the second, it means the species "dog". "John and Mary are married." (To each other? or separately?) Compare "John and Mary got engaged last month. Now, John and Mary are married." Ref: https://cs.nyu.edu/faculty/davise/ai/ambiguity.html
	13	**State and explain any one application of NLP in detail** ## NLP Applications Easy · Chunking · Part-of-Speech Tagging · Named Entity Recognition · Spam Detection · Thesaurus Medium · Syntactic Parsing · Word Sense Disambiguation · Sentiment Analysis · Topic Modeling · Information Retrieval Hard · Machine Translation · Text Generation · Automatic Summarization · Question Answering · Conversational Interfaces

	14	**Why NLP is Hard?**
		
		• Natural language is extremely rich in form and structure, and very ambiguous.
		  • How to represent meaning,
		  • Which structures map to which meaning structures.
		• One input can mean many different things. Ambiguity can be at different levels.
		  • Lexical (word level) ambiguity -- different meanings of words
		  • Syntactic ambiguity -- different ways to parse the sentence
		  • Interpreting partial information -- how to interpret pronouns
		  • Contextual information -- context of the sentence may affect the meaning of that sentence.
		• Many input can mean the same thing.
		• Interaction among components of the input is not clear.

	15	Explain different types of ambiguity in Natural Language with example

		## Ambiguity
		
		- Some interpretations of : I made her duck.
		  1. I cooked *duck* for her.
		  2. I cooked *duck* belonging to her.
		  3. I created a toy duck which she owns.
		  4. I caused her to quickly lower her head or body.
		  5. I used magic and turned her into a *duck*.
		- duck – morphologically and syntactically ambiguous: noun or verb.
		- her – syntactically ambiguous: dative or possessive.
		- make – semantically ambiguous: cook or create.
		- make – syntactically ambiguous:

	16	Which techniques are used to resolve ambiguities in NL? (Ans : POS tagging , Word Sense Disambiguation, lexical disambiguation, syntactic disambiguation) ## Resolve Ambiguities - We will introduce *models* and *algorithms* to resolve ambiguities at different levels. - **part-of-speech tagging** -- Deciding whether duck is verb or noun. - **word-sense disambiguation** -- Deciding whether make is create or cook. - **lexical disambiguation** -- Resolution of part-of-speech and word-sense ambiguities are two important kinds of lexical disambiguation. - **syntactic ambiguity** -- her duck is an example of syntactic ambiguity, and can be addressed by probabilistic parsing.
2		**Morphological Analysis**
	1	**What is Morphology?** ☐ Morphology is the study of the structure and formation of words morphemes un happy ness prefix affixes stem suffix *un* means "not" *ness* means "being in a state or condition". *Happy* is a *free morpheme*
	2.	**What is Inflectional Morphology ?**
	3	**What is derivational Morphology?**

- There are two broad classes of morphology:
  - Inflectional morphology
  - Derivational morphology
- After a combination with an **inflectional morpheme**, the meaning and class of the actual stem usually do not change.
  - eat / eats   pencil / pencils
  - gel / geliyorum   masa / masam
- After a combination with an **derivational morpheme**, the meaning and the class of the actual stem usually change.
  - compute / computer   do / undo   friend / friendly
  - Uygar / uygarlaş   kapı / kapıcı
- The irregular changes may happen with derivational affixes.

	4	What is FST (Finite State Transducers)? What is their Use in Morphological analysis?
	5	Give the formal definition of FST? • **Q**: a finite set of states • **I,O**: input and an output alphabets (which may include ε) • **Σ**: a finite alphabet of complex symbols i:o, (i∈I and o∈O • **Q$_0$:** the start state • **F:** a set of accept/final states (F⊆Q) • A transition relation δ that maps QxΣ to 2^Q
	6	What are the uses of FST in NLP? • **Translators**: input one string from I, output another from O (or vice versa) • **Recognizers**: input a string from IxO • **Generator**: output a string from IxO
	7.	What is lemmatization?
	8	What is stemming?
	9	What is the role of Lemmatization and stemming in text processing?
	10	Explain Porters stemming algorithm?
	11	What is R.E.? What is role of RE in Morphological Analysis?

		• What is Morphology? Why we need to do Morphological analysis?
		• Explain derivational and inflectional morphology in detail with suitable example
		• What are Morphemes? What are different ways to create word from morphemes?
		• What is language Model? Explain the use of language model>
		• ' language model ?
		• What is role of FSA in Morphological analysis? Explain FST in detail.
3		**Syntax Analysis**
	1	**What is Syntax Analysis?**
	2	**What are the challenges in Syntax Analysis?**
	3	**What is POS tagging and its use in Syntax analysis?**
	4.	**What are different types of POS tagging>**
	5	**What are different syntax analysis techniques?** ## Syntax techniques • **Lemmatization** – reducing the various inflected forms of a word into a single form for easy analysis. • **Morphological segmentation** – Dividing words into individual units called morphemes. • **Word segmentation** – divides words into distinct units. • **Part of speech tagging** – identifies POS tags for every word. • **Parsing** – undertaking grammatical analysis for given sentence • **Sentence breaking** – placing sentence bounderies. • **Stemming**- cutting the inflected words to their root forms.
	6	**What are the uses of POS Tagging?** ## Motivation & uses of POS tagging • Speech recognition — class-based N-grams • Information retrieval — stemming, selection high-content words • Word-sense disambiguation • Corpus analysis of language & lexicography
	7	**What are different types of tagging?**
	8	**What is Rule based tagging?**
	9	**What is stochastic tagging?**
	10	**What is transformation based tagging?**
	11	**Give examples of Open classes and Close classes of pos tagging for English langauge**
	12	**POS TAG the following sentence** 1. **Book that flight**

		2. Does that flight server dinner ?
	13	**Explain with example problems in POS tagging?**

POS tagging Problem

Words often have more than one POS: *back*
- The *back* door = JJ
- On my *back* = NN
- Win the voters *back* = RB
- Promised to *back* the bill = VB

) The POS tagging problem is to determine the POS tag for a particular instance of a word.

JJ – Adjective, **NN**- Noun, **RB** – Adverb **VB**- verb |
| | 14 | **What are language models? And their applications?** |
| | 15 | **What are Ngrams ? Unigram? Bigram? Trigram? Give example**

This is Big Data AI Book

Uni-Gram	This	Is	Big	Data	AI	Book
Bi-Gram	This is	Is Big	Big Data	Data AI	AI Book	
Tri-Gram	This is Big	Is Big Data	Big Data AI	Data AI Book			
	16	**PO S tag the following sentences**

- the students went to class
- plays well with others
- fruit flies like a banana |

		■ the students went to class DT NN VB P NN ■ plays well with others VB ADV P NN NN NN P DT ■ fruit flies like a banana NN NN VB DT NN NN VB P DT NN NN NN P DT NN NN VB VB DT NN
	17	• Identify the parts of speech of each word in the following text. Machine translation (MT) is the application of computers to the task of translating texts from one natural language to another.
	18	• Give 5 examples of a word that belongs to more than one grammatical category. • Example: book N – I bought a book. book V – I booked a ticket.
	19	What are advantages and drawbacks of - stochastic tagger? Transformation based tagger?
	20	• Explain various approaches to perform Part- of- speech(POS) • Explain rule based and stochastic POS tagging with example
	21	• Why POS tagging is hard? What are possible challenges? • Discuss various approaches/algorithms to perform POS tagging? • Explain transformation based tagging with suitable example. • Explain open and closed word classes in English Language.Comment on possible tag sets available in English NL. Show how tags are assigned to the words of the following sentence " Time flies like an arrow"
	22	What is HMM? What are applications of HMM
	23	What is CRF?

	23	MINII PROJECT RELATD QUESTIONS: Describe your Mini Project?Which NLP techniques you have used in the project? What are the challenges in handling text data? What you will include in the future version of the project