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B.Sc./5th Sem (H)/COMP/23(CBCS)

2023

5th Semester Examination
COMPUTER SCIENCE (Honours)

Paper : DSE 2-T

[CBCS]

Full Marks : 40

Time : Two Hours

The figures in the margin indicate full marks.

*Candidates are required to give their answers
in their own words as far as practicable.*

[Networking Programming]

Group - A

Answer any *five* questions : $2 \times 5 = 10$

1. What is de-multiplexing?
2. List the flag used in TCP header.
3. Define network congestion.
4. What are the types of port numbers used in transport layer?
5. Why TCP services are called Stream delivery services?

P.T.O.

(2)

6. What are the four main properties of HTTP?
7. Define WWW.
8. What do you mean by TELNET?

Group - B

Answer any *four* questions : $5 \times 4 = 20$

9. What are the advantages of using UDP over TCP?
10. Write briefly about UDP echo server functions and lost datagram.
11. Describe elementary TCP socket functions with an example.
12. Explain how the signals are handled with suitable examples.
13. Write down the three types of WWW documents.
14. What is email? Describe the electronic mail system.

Group - C

Answer any *one* question : $10 \times 1 = 10$

15. Describe the syntax and purpose of each of the following : 2×5

- (i) Socket
- (ii) Bind
- (iii) Accept

(3)

(iv) Listen

(v) Connect

16. What is I/O Multiplexing? Describe I/O multiplexing using sockets. 2+8
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P.T.O.

(4)

OR

[Computational Linguistics]

Group - A

Answer any *five* from the following questions :

2×5=10

1. What is the Pumping Lemma for regular languages?
2. Give examples of a linguistic analysis tasks that can be solved using the concepts of finite-state automata and regular languages?
3. What does the term “word meaning” refer to in the context of lexical semantics?
4. What is the goal of Word Sense Disambiguation (WSD)?
5. What is bottom-up parsing?
6. What do you mean by text corpora?
7. What is NLTK?
8. What do you mean by Part-of-Speech Tagging?

Group - B

Answer any *four* from the following questions :

5×4=20

9. Explain the role of computers in linguistics and natural language processing. Provide two examples of how computational methods can be applied to linguistic analysis.

3+2

10. Describe the fundamental components of a finite-state automaton (FSA) and how it recognizes regular languages. Provide a simple example of a regular language and the corresponding FSA. 3+2
11. Explain how you can use regular expressions to represent regular languages. Provide an example of a regular expression that represents a language and explain its meaning. 3+2
12. Explain the concept of transducers in the context of morphological analysis. How are transducers used to analyse and generate morphological forms in natural language processing? 3+2
13. Differentiate between inflectional and derivational morphology. 5
14. Identify and describe the ambiguities in the following sentences :
 - (i) The man kept the dog in the house.
 - (ii) Book that flight.

Group - C

Answer any **one** from the following questions :

10×1=10

15. (a) Define what N-grams are in the context of language modeling. Provide an example of a bigram (2-gram) and a trigram (3-gram) 2+4

P.T.O.

- (b) Explain the purpose of smoothing techniques in language modelling. Name one common smoothing method used in NLP and briefly describe how it helps handle unseen n-grams. 3+1
16. (a) Explain the concept of semantic roles in linguistic analysis. How do computational approaches capture and utilize semantic roles in natural language processing tasks, such as information extraction or sentiment analysis? 3+3
- (b) Describe how you can use Python and NLTK to search for a specific word within a corpus and count its occurrences. Provide a brief code snippet as an example. 4
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(7)

OR

[Machine Learning]

Group - A

Answer any *five* questions : $2 \times 5 = 10$

1. What is the difference between supervised and unsupervised learning?
2. Define bias.
3. What is the significance of the word 'Naïve' in Naïve Bayes Classifier?
4. Find the logistic value for the given weight (W), input (X) and bias (B) :
 $W = [0.25, 1.6, 2.8]$, $X = [6, 11.2, 4.5]$, $B = 0.1$.
5. What is over-fitting model?
6. How to assess a better machine learning model?
7. What is Support Vector Regression?
8. What is a decision tree?

Group - B

Answer any *four* questions : $5 \times 4 = 20$

9. What do you mean by Neural Network? Describe the components of Artificial Neural Network (ANN).

P.T.O.

10. Explain how the logistic regression model is derived from simple linear regression for classification.
11. Write a short note on multilayer perceptron model.
12. Compare gradient and scholastic gradient descent.
13. Relate Inductive bias concerning Decision tree learning.
14. Explain how dimensionality reduction takes place using PCA.

Group - C

Answer any *one* question.

10×1=10

15. What do you mean by regularization? What are the different regularization techniques? Explain each of the techniques. 2+8
 16. (a) What is Bays' Theorem? Explain using examples. 4
(b) What do you understand by graphical models in machine learning? Explain any two graphical models. 6
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