B.Sc./5th Sem (H)/Comp/22(CBCS)

2022

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.

[Network Programming]

Group - A

1. Answer any ***five*** questions : 2×5=10

(a) What is packetizing ?

(b) What is IANA ?

(c) Name the timers used by TCP ?

(d) What is a socket address ?

(e) What are inet_aton and inet_ntoa functions ?

(f) What are readn, writen, and readline functions ?

(g) What is bind function ?

(h) What is the full form and purpose of SCTP ?

P.T.O.

Group - B

2. Answer any ***four*** questions : 5×4=20

(a) Explain the fields of UDP datagram.

(b) Discuss the TCP segment format.

(c) What is IPv4 socket address structure ?

(d) Why do we need POP3 or IMAP4 for electronic mail ?

(e) What are the functions of a network management system ?

(f) Describe SMI and MIB protocols.

Group - C

3. Answer any ***one*** question : 10×1=10

(a) Discuss the TCP client/server model. Write a code to create UDP socket.

(b) Explain the Three-Way Handshake steps. Write the short note (any *one*) : WWW & HTTP.

OR

[Computational Linguistics]

Group - A

1. Answer any ***five*** questions : 2×5=10

(a) Describe the Semantic Knowledge of Computational Linguistics.

(b) What is Latent Semantic Indexing (LSI)?

(c) What will be the output of the following program and why ?

```
import nltk
from nltk.stem import PorterStemmer
word_stemmer = PorterStemmer()
word_stemmer.stem('writing')
```

(d) Find out how many strings of length less than 4 contains the language described by the regular expression $(x+y)^*y(a+ab)^*$?

(e) L and ~L are recursively enumerable then state the grammar of L.

(f) List any two real-life applications of Natural Language Processing.

(g) What are stop words ?

(h) What is semantic wordnet in NLP ?

P.T.O.

(i) What are Regular Expressions ?

(j) What do you mean by mental lexicon ?

Group - B

2. Answer any ***four*** questions : 5×4=20

(a) What is Syntactic Analysis ? Discuss the steps of Syntactic Analysis. 2+3

(b) Define unigrams, bigrams, trigrams and n-grams in NLP with corresponding examples.

(c) (i) What is meant by Lexicon ? How is it useful in NLP ?

(ii) Differentiate between top-down and bottom-up parsing. 2+3

(d) What is the difference between NLP and NLU ?

(e) What is Feature Extraction in NLP ?

(f) What is the difference between Lemmatization and Stemming ?

Group - C

3. Answer any ***one*** question : 10×1=10

(a) What do you understand by POS tagging? Describe how the POS process can be modeled by using a Hidden Markov Model (HMM). What

are the advantages of HMM based POS tagging method compared to the traditional methods ?

(b) Write short note on following topies (any *two*)

(i) Semi-supervised Learning;

(ii) Supervised Learning;

(iii) Bag of Words (BOW).

P.T.O.

OR

[Machine Learning]

Group - A

1. Answer any ***five*** questions : 2×5=10

   (a) What is the difference between machine learning and traditional program ?

   (b) What do you mean by reinforcement learning ?

   (c) Define bias.

   (d) What is boosting ?

   (e) What is the difference between classification and regression ?

   (f) What is underfitting ?

   (g) Find the Euclidian distance between (4,3) and (7,9).

   (h) Define f1-score.

Group - B

2. Answer any ***four*** questions : 5×4=20

   (a) Describe the components an Artificial Neural Network (ANN) and relates it to biological neuron.

   (b) Explain the linear regression model with one variable.

(c) Write a short note on multilayer perceptron model.

(d) Compare supervised and unsupervised learning.

(e) Explain the Naïve Bayes classification algorithm.

(f) What do you mean by training, validation and test set ?

Group - C

3. Answer any *one* question : 10×1=10

(a) Perform the following actions in MATLAB/Python/ Octave

(i) Find the transpose of a matrix.

(ii) Find the norm of a matrix.

(iii) Find the Eigen values of a matrix.

(iv) Find the sum of each column of a matrix.

(v) Store the element of a matrix in a vector (row-wise).

(b) What do you mean by regularization ? What is its utility in machine learning ? What is the difference between gradient descent and stochastic gradient descent ? What is feature scaling and why it is necessary ? 2+2+2+(2+2)
