

M.Sc. (C.S.) / Sem II) 94119

(2½ Hours)

[Total Marks: 60]

- N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labelled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

I Choose the correct alternative and rewrite the entire sentence with the correct alternative. (28)

- How many bi-grams can be generated from the given sentence: - *Natural Language Processing is a branch of AI.*
 - 5
 - 6
 - 7
 - 8
- Assignment of POS tag with the help of Markov model uses
 - dependency between POS tag of the previous word.
 - dependency between POS tag of the next word.
 - dependency between POS tag of the first word.
 - dependency between POS tag of the last word.
- Given a sound clip of a person or people speaking, determine the textual representation of the speech.
 - Text-to-speech
 - Speech-to-text
 - Text-to-Text
 - Speech-to-Speech
- Automatic tagging is used in
 - Rule based
 - TBL
 - Neural model
 - Hybrid
- _____ is the process of converting a well-defined text corpus into its component words and sentences.
 - Word Segmentation
 - Text Normalization
 - Text segmentation
 - Word Normalization
- When the parser starts constructing the parse tree for the start symbol and then tries to transform the start symbol to the input, it is called?
 - Bottom-up parsing
 - Top-down parsing
 - Reduction
 - Derivation
- NLU stands for _____.
 - Natural Language Underline
 - Natural Language Understanding
 - Nature Based Language Utilizing
 - Natural Language Using

19. _____ is an algorithm that accepts text corpus as an input and outputs a vector representation for each word.
- a. LSTM
 - b. Word2Vec
 - c. BERT
 - d. Masked Language Model
20. Finding the meaning of the word by the use of word in particular context is _____.
- a. Wordsense
 - b. Word morphology
 - c. Wording
 - d. wordology
21. Which of the following is used study of construction of words from primitive meaningful units?
- a. Phonology
 - b. Shonology
 - c. Morpheme
 - d. Morphology
22. What is the language of machine translation?
- a. Converts one human language to another human language
 - b. Converts machine language to human language
 - c. Converts human language to machine language
 - d. Converts machine language to machine language
23. Which of the text parsing techniques can be used for noun phrase detection, verb phrase detection, subject detection, and object detection in NLP?
- a. Continuous Bag of Words
 - b. Skip Gram and N-Gram extraction
 - c. Part of speech tagging
 - d. Dependency Parsing and Constituency Parsing
24. The main aim of tutorial system is
- a. Provide help to leaners
 - b. Provide immediate and customized instruction or feedback to learner.
 - c. Provide tutorial to learners.
 - d. Provide classrooms to learners
25. In NLP, the algorithm decreases the weight for commonly used words and increases the weight for words that are not used very much in a collection of documents
- a. Term Frequency (TF)
 - b. Word2Vec
 - c. Latent Dirichlet Allocation (LDA)
 - d. Inverse Document Frequency (IDF)
26. Main components of Automatic Tutorial System are
- a. Student , expert
 - b. Student, expert, teaching aid
 - c. Student, teaching aids
 - d. Student, expert, pedagogical system
27. In NLP, multinomial Logistic Regression as a 1 Layer Network, instead of a single sigmoid at the output, we have a _____ to turn the output values into probabilities.
- a. Softmax
 - b. Vector
 - c. Scalar
 - d. Bias
28. The detection of negative meaning from positive message is known as _____.
- a. Sentiment analysis
 - b. Slang detection
 - c. Sarcasm detection
 - d. Error detection

- II Attempt any two of the following:** **8**
- a) How does NLP advantageous in day-to-day life?
 - b) What are the steps to build an NLP application?
 - c) State different types of ambiguities with example.
 - d) What is n-gram model? Explain with chain rule of probability.
- III Attempt any two of the following:** **8**
- a) Explain Hidden Markov Model to embed POS tags in inputted text.
 - b) Explain Lemmatization process with the help of python code.
 - c) How does POS tagging do with the help of TBL?
 - d) Compare Top-down parsing and Bottom-up parsing.
- IV Attempt any two of the following:** **8**
- a) Write a note on vector semantics.
 - b) State the working of Tf-Idf.
 - c) How to measure semantics using dense vector?
 - d) Which are the techniques used in embedding with prediction? Explain any one of the techniques.
- V Attempt any two of the following:** **8**
- a) What is Pseudo translation? Explain the benefit of using Pseudo translation.
 - b) Explain FFD filter used for translating file.
 - c) Explain the model for speech recognition.
 - d) In short explain the working of chat bot application.
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1. Which activity is concerned with identifying the task at the final embedded systems?
 - a. scheduling
 - b. task-level concurrency management
 - c. high-level transformation
 - d. compilation
2. Which level simulates the algorithms that are used within the embedded systems?
 - a. algorithmic level
 - b. switch level
 - c. gate level
 - d. circuit level
3. Which of the following helps in reducing the energy consumption of the embedded system?
 - a. emulator
 - b. debugger
 - c. simulator
 - d. compiler
4. Which of the following offers external chips for memory and peripheral interface circuits?
 - a. Embedded system
 - b. Peripheral system
 - c. Microcontroller
 - d. Microprocessor
5. Which of the architecture is more complex?
 - a. MC68040
 - b. MC68030
 - c. SPARC
 - d. 8086
6. Which of the following statements are true for von Neumann architecture?
 - a. separate bus between the program memory and data memory
 - b. external bus for program memory and data memory
 - c. external bus for data memory only
 - d. shared bus between the program memory and data memory
7. Which of the following is the biggest challenge in the cache memory design?
 - a. coherency
 - b. memory access
 - c. size
 - d. delay
8. Which ports are used in the multi-master system to avoid errors?
 - a. bidirectional port
 - b. tridirectional port
 - c. multi directional port
 - d. unidirectional port

9. Which of the following events will not necessarily trigger a PUC?
- A CPU instruction fetch from the peripheral address range of 0000H to 01FFH
 - A watchdog timer security key violation
 - A watchdog timer expiration in any mode
 - A Flash memory security key violation
10. What is the address of Reset Interrupt Vector?
- Any address from the available memory map
 - 0xFFFE
 - 0xFFFC
 - Reset Interrupt is not a vectored Interrupt
11. Which of the following flags when '1' represents generation of non - maskable interrupt?
- ACCVIFG
 - TAIFG
 - OFIFG
 - WDTIFG
12. What is the correct sequence for execution of an Interrupt subroutine?
- Any currently executing instruction is completed
 - PC and SR contents of the main program are stored on Stack
 - SR is cleared.
 - Contents of stack are restored into PC and SR
 - Interrupt flag is cleared (for single source interrupt)
 - Interrupt subroutine code is executed
 - Interrupt with highest priority is selected if multiple interrupts were pending and associated subroutine is selected.
- 1 → 2 → 3 → 4 → 5 → 7 → 6
 - 1 → 2 → 7 → 5 → 3 → 6 → 4
 - 1 → 4 → 6 → 5 → 3 → 2 → 7
 - 2 → 1 → 5 → 4 → 3 → 6 → 7
13. The inputs of any Programmable Logic Device is fed through
- OR gates
 - NOR gates
 - AND gates
 - NAND gates
14. Which of the following is false about IoT devices?
- IoT devices use the internet for collecting and sharing data
 - IoT devices need microcontrollers
 - IoT devices use wireless technology
 - IoT devices are completely safe
15. Which of the following is not a fundamental component of an IoT system?
- Sensors
 - Connectivity and data processing
 - User interface
 - Transformer
16. Which layer is used for wireless connection in IoT devices?
- Application layer
 - Network layer
 - Data link layer
 - Transport layer
17. Which of the following is false about the IoT components?

- a. A light sensor (photoresistor) is an analog sensor
 b. A microphone is a digital sensor
 c. A push button is a digital sensor
 d. A keyboard is a digital sensor
18. Which of the following is false about the MANET IoT network?
 a. It is a self-configuring network
 b. It has a low data rate
 c. It doesn't have any encryption
 d. Power is readily available for complex security
19. Which of the following is not a sensor in IoT?
 a. BMP280
 b. DHT11
 c. Photoresistor
 d. LED
20. Which of the following is used to reprogram a Bootloader in IoT devices?
 a. VHDL programming
 b. IDE
 c. ICSP
 d. MANET
21. IoT gateway must provide _____
 a. Protocol abstraction
 b. Data storage
 c. Security with hardware
 d. Simple and fast installation
22. Which service permits the changes to the IoT services?
 a. Update
 b. Registered service status
 c. Enable from suspension
 d. Enable
23. What is the role of Cloud in smart grid architecture of IoT?
 a. Security
 b. Collect Data
 c. Manage Data
 d. Store data
24. Which of the following IoT gateway must provide?
 a. Protocol abstraction
 b. Security and hardware
 c. Simple and fast installation
 d. Data storage
25. Which of the following API allows the user to control electronic components.
 a. CoAP API
 b. MQTT API
 c. RESTful API
 d. Android API
26. Identify the lightweight protocol.
 a. HTTP
 b. MQTT
 c. CoAP
 d. IP
27. Identify among the following which is not a data link layer technology.
 a. Uart
 b. Bluetooth
 c. Wifi
 d. HTTP
28. On what is MQTT based upon?
 a. Publish-subscribe architecture
 b. Client-server architecture

- c. Publish-subscribe architecture and Client-server architecture
- d. None of the emntioned

II Attempt any two of the following:

8

- a) Explain the difference between dc load line and ac load line. Give the applications of FET.
- b) Describe the working if I2C communication
- c) Show that if a system $S: A^R \rightarrow B^R$ is strictly causal and memoryless then its output is constant. Constant means that the output $(S(x))(t)$ at time t does not depend on t .
- d) Write a note on BIBO Stable systems. Why they are important?

III Attempt any two of the following:

8

- a) Differentiate between M2M and IoT.
- b) Write an example of an enhanced level and advanced level of smart object classes.
- c) Differentiate among core capabilities, enhanced capabilities, and advanced capabilities of smart things.
- d) Explain IoT Analytics Life Cycle.

IV Attempt any two of the following:

8

- a) Describe the layered architecture of IoT gateway
- b) Explain the concept of IoT edge computing with the help of three different real-life case studies.
- c) What are the requirements of the CoAP Protocol? What are applications of it.
- d) What are the challenges associated with the implementation of an IoT-based healthcare system?

V Attempt any two of the following:

8

- a) State various types IoT Security Attacks Based on Device Category. Explain any one in detail.
 - b) Briefly describe the functionality of three multilayer security attacks.
 - c) What are the advantages of smart thing communication in SIIoT?
 - d) How reference architecture of IoV is different from SIIoV?
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M.Sc (CS) / Sem 2 / QP Code: 94216

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- 1 HITS stands for _____.
- a. Hyper Immunity Technical Score b. Hyperlink-Induced Topic Search
c. Heat Immunity Transfer System d. Heat Invert Technical System
- 2 _____ coupling links papers that cite the same articles.
- a. Co-Citation b. Bibliographic
c. Betweenness d. Importance
- 3 _____ is defined as Important or prominent actors are those that are linked or involved with other actors extensively.
- a. Centrality b. Prestige
c. Uniqueness d. Importance
- 4 _____ measures the control of i over other pairs of actors.
- a. Centrality b. Prestige
c. Betweenness d. Importance
- 5 Select non predictive data mining technique from below
- a. Summarization b. Time Series Analysis
c. Regression d. Classification
- 6 Breadth First Search is implemented with _____.
- a. FIFO b. LIFO
c. Both d. None of These
- 7 Focused Crawler is based on _____.

8. The _____ is defined as closeness or distance of other actors to i.
- a. Supervised Learning
 - b. .Net Framework
 - c. SQL
 - d. Java
9. Preferential Crawler is based on _____.
- a. Proximity
 - b. Prestige
 - c. Betweenness
 - d. Importance
10. Topical Crawler is based on _____.
- a. New Pages
 - b. Importance measure.
 - c. Internet Speed
 - d. No of Advertisements.
11. If papers i and j are both cited by paper k, then they may be related in some sense to one another. This is defined as _____.
- a. Similar Topics
 - b. Management
 - c. Asset
 - d. Book.
12. PageRank is a metric for _____ documents based on their quality.
- a. Co-Citation
 - b. Bibliography
 - c. Betweenness
 - d. Importance
13. Concurrent Crawlers use _____.
- a. Office
 - b. Web Content
 - c. Musical
 - d. Sports
14. Order of the Page visit is determined by _____.
- a. Multiprocessing
 - b. New Page
 - c. One Page at a time
 - d. Random Pages.
15. Focus Crawler is having _____ topics.
- a. Frontier
 - b. User
 - c. Developer
 - d. Bill Manager
16. The _____ generalizes by considering both the actors directly and indirectly linked to actor i.
- a. Multiple
 - b. Single
 - c. No
 - d. Null
17. To retrieve information, we use _____.
- a. Proximity prestige
 - b. Prestige
 - c. Betweenness
 - d. Importance

9. The _____ function computes distance score by taking network predictions and true targets.
- objective
 - loss
 - hyperparameter
 - scaling
10. A Tensor that contains array of numbers is called as _____.
- Scalar
 - Matrix
 - Vector
 - 0D Tensor
11. A classification system that outputs multiple binary tags is called as _____ classification system.
- multiclass
 - multioutput
 - multilabel
 - multilinear
12. When the hyperparameter $\alpha=0$ then Ridge Regression becomes _____.
- Logistic Regression
 - Polynomial Regression
 - Linear Regression
 - Support Vector Regression
13. If the SVM model is overfitting then regularize hyperparameter C by _____ it.
- increasing
 - stabilizing
 - reducing
 - maintaining
14. Incorrectly classified positives are called as _____.
- false negatives
 - true negatives
 - false positives
 - true positives
15. The ROC curve plots _____.
- specificity versus 1 - sensitivity
 - specificity
 - sensitivity versus 1 - specificity
 - sensitivity
16. The set of features are also called as _____.
- predictors
 - data
 - values
 - responses
17. In the context of Reinforcement Learning, the learning system is known as _____.
- task
 - policy
 - agent
 - reward
18. _____ is used to evaluate the performance of a classifier.
- Cross validation
 - Confusion matrix
 - Confused matrix
 - Prediction
19. The dot tensor operation is also known as _____.
- tensor product
 - tensor shape
 - relu
 - vector
20. _____ class of Scikit-Learn support to Polynomial Regression.
- PolyFeatures
 - Polynomial

- c. PolynomialFeatures d. PolynomialRegression
21. Decision Tree is _____ learning algorithm.
 a. Unsupervised b. Batch
 c. Supervised d. Reinforcement
22. The degree of freedom of _____ model is limited.
 a. nonparametric b. best fit
 c. parametric d. normal fit
23. _____ is used to estimate the probability that an instance belongs to particular class.
 a. Polynomial Regression b. Logistic Regression
 c. Support Vector Regression d. Linear Regression
24. _____ refers to a model that can neither model the training data nor generalize to new data.
 a. Balance fitting b. Underfitting
 c. Good fitting d. Overfitting
25. _____ is one of the algorithms of Association Rule Learning.
 a. K-Means b. SVM
 c. Apriori d. PCA
26. In Decision Tree, _____ parameter determines the minimum number of samples must have to the leaf node.
 a. min_leaf_node b. min_weight_fraction_leaf
 c. min_node d. min_samples_leaf
27. _____ are the data points that lie closest to the decision boundary.
 a. Vectors b. Feature vectors
 c. Standard vectors d. Support vectors
28. _____ is combining existing features to produce more useful features.
 a. Feature Selection b. Feature Extraction
 c. Feature Scaling d. Feature Generation

II Attempt any two of the following:

- a) What is Multiclass Classification? Give any five examples of it.
- b) Consider the classifier's prediction on a test set given below.
 True Positive (TP) = 60
 True Negative (TN) = 15
 False Positive (FP) = 15
 False Negative (FN) = 10
 Calculate Precision and Recall.
- c) What is overfitting? What are the possible solutions to reduce it?

- d) Explain the concept of Supervised Learning. List out some important Supervised Learning Algorithms.

III Attempt any two of the following:

8

- a) What is Lasso Regression?
- b) Write a note on Gradient Descent.
- c) What is Logistic Regression? To what kind of problems, it is useful?
- d) What do you mean by Early Stopping?

IV Attempt any two of the following:

8

- a) What is Gini Impurity? Consider that you have 100 training instances. Out of which 60 are with Positive Trend and 40 are with Negative Trend. Compute Gini Impurity for the same.
- b) What is SVM? Briefly explain the terms support vectors, hyperplane and margin with respect to SVM.
- c) What is regularization? How do you reduce risk of overfitting of Decision Tree?
- d) What is kernel trick? What are different kernel functions available for SVM classifier?

V Attempt any two of the following:

8

- a) Explain the relationship between the network, layers, loss function and optimizer.
 - b) What are activation functions? Why are they necessary?
 - c) Explain Multi-Layer Perceptron.
 - d) What are tensors? Briefly explain the working of Tensorflow and its significance in Deep Learning.
-