

[Time : 2 ½ Hours]

[Total Marks: 60]

- N.B:**
- (1) All questions are compulsory.
  - (2) Figures to the **right** indicate full marks.
  - (3) **Assume additional data if necessary** but state the same clearly.
  - (4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.
- Q.1** Attempt any two of the following (12)
- a) Define Machine Learning. Compare between supervised and unsupervised machine learning techniques. 06
  - b) State and explain the challenges of machine learning. 06
  - c) What is reinforced learning technique? Explain with suitable example. 06
  - d) Discuss the ways to measure the performance of the machine learning model. 06
- Q.2** Attempt any two of the following (12)
- a) What kind of problems are suitable for linear regression techniques? Differentiate between Batch Gradient Descent, Stochastic Gradient Descent, and Mini-batch Gradient Descent. 06
  - b) What is the use of Logistic Regression in Machine Learning? Explain its characteristics. 06
  - c) Write a note on Softmax Regression and cross Entropy. 06
  - d) Compare between Lasso and Ridge Regression Techniques. 06
- Q.3** Attempt any two of the following (12)
- a) Write a note on use of support vector machine in linear and non-linear classification. 06
  - b) What are regression Trees? Briefly explain the CART training Algorithm. 06
  - c) Differentiate between 06
    - i. Gini Impurity and Entropy
    - ii. Precision and Recall
    - iii. Feed forward and feed backward network
  - d) Write a detailed note on Regularization Hyperparameters. 06
- Q.4** Attempt any two of the following (12)
- a) Define Deep Learning. What are the benefits and challenges of deep learning? 06
  - b) Explain the architecture of multi-layer perceptron and its use in machine learning applications. 06
  - c) What is the significance of Activation functions in Neural Network? Explain different types of activation functions. 06
  - d) What are Tensors? Briefly describe the Tensorflow framework and its significance in Deep Learning. 06
- Q.5** Attempt any two of the following (12)
- a) Write a note on Multiclass Classification. 06
  - b) Briefly describe Polynomial and Gaussian RBF Kernels used in machine learning. 06
  - c) List and explain any three applications where deep learning is used. 06
  - d) Differentiate between classification and clustering. Give some algorithms used for each of these. 06

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  - (5) Use of non- programmable calculators and statistical tables are allowed. / If required keep it.

- Q.1 Attempt any two of the following (12)
- a) What are the challenges faced in NLP? (06)
  - b) Explain Noisy channel model used for NLP. (06)
  - c) What is smoothing? List types of smoothing. Explain any one of the types for smoothing. (06)
  - d) How is the neural network model implemented in NLP? (06)
- Q.2 Attempt any two of the following (12)
- a) Explain any 6 computations used for processing of words and word forms. (06)
  - b) What is POS tagging? Illustrate the concept of Rule- based POS tagging. (06)
  - c) Define treebank. List and explain different types of treebanks. (06)
  - d) Write and explain algorithm for CKY parsing. (06)
- Q.3 Attempt any two of the following (12)
- a) Discuss the concept of vector semantics. (06)
  - b) Explain Singular Value Decomposition. (06)
  - c) How does Skip- gram work for embedding and prediction of word? (06)
  - d) What is wordnet? Explain the concept of wordnet. (06)
- Q.4 Attempt any two of the following (12)
- a) List and explain the different types supported by machine for translating languages. (06)

- b) Illustrate the application tutoring system. (06)
- c) List out various commercial uses of NLP. Explain sentiment analysis. (06)
- d) How does user interface enhanced with the use of intelligent work processor? (06)

Q.5 Attempt **any two** of the following (12)

- a) What are the applications of natural language processing? (06)
- b) Differentiate between Top- down parsing and Bottom- up parsing. (06)
- c) Write down the advantages and disadvantages of skip- gram. (06)
- d) Explain Bots. (06)

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**Q.1** Attempt any two of the following (12)

- a) Why a transistor should be biased? Explain 06
- b) Explain the construction and working of BJT 06
- c) Describe the STARMAC architecture in detail 06
- d) Write a note on wireless sensor networks(WSN) 06

**Q.2** Attempt any two of the following (12)

- a) What are the basic characteristics of IOT. 06
- b) How is IoT distinct from other peer technologies, i.e. M2M, CPS, and WSNs? 06
- c) Difference between embedded systems and IoT. 06
- d) Write a note on Smart Thing Capabilities 06

**Q.3** Attempt any two of the following (12)

- a) Explain the IoT Gateway functionalities. 06
- b) Write a note on Zigbee. 06
- c) Write a note on Mobile Edge computing. 06
- d) Explain the role of IVC in ITS. 06

**Q.4** Attempt any two of the following (12)

- a) Explain various challenges in IoT security. 06
- b) Explain network layer security in detail for IoT systems. 06
- c) Briefly describe the functionality of three multilayer security attacks. 06
- d) Explain the Smart Thing Relationships in SIoT 06

**Q.5** Attempt any two of the following (12)

- a) How is actors probed as functions in embedded systems. 06
- b) Write a note on IoT cloud. 06
- c) Explain the architecture of IoT-based agricultural system. 06
- d) Explain the slot architecture in detail. 06

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