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Subject Code:- ACSML0401

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - CARRY OVER THEORY EXAMINATION - APRIL 2023

Subject: Machine Learning

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C.** It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A

20

1. Attempt all parts:-

- 1-a. CANDIDATE-ELIMINATION algorithm correctly describes the target concept when: (CO1) 1
- (a) There are no errors in the training examples
 - (b) There is some hypothesis in H that correctly describes the target concept
 - (c) When sufficient training examples have been observed
 - (d) All of the above
- 1-b. The categories in which Machine Learning approaches can be traditionally categorized are - (CO1) 1
- (a) Supervised Learning
 - (b) Unsupervised Learning
 - (c) Reinforcement Learning
 - (d) All of the above
- 1-c. For what Polynomial Regression is used? (CO2) 1
- (a) Handle linear and separable data

- (b) Handle with non-linear and separable data
- (c) Find the best linear line
- (d) Classify binary data
- 1-d. Which one of the statement is true regarding residuals in regression analysis? (CO2) 1
- (a) Mean of residuals is always zero
- (b) Mean of residuals is always less than zero
- (c) Mean of residuals is always greater than zero
- (d) There is no such rule for residuals.
- 1-e. Chance Nodes are represented by _____ (CO3) 1
- (a) Disks
- (b) Squares
- (c) Circles
- (d) Triangles
- 1-f. The minimum time complexity for training an SVM is $O(n^2)$. According to this fact, what sizes of datasets are not best suited for SVM's? (CO3) 1
- (a) Large datasets
- (b) Small datasets
- (c) Medium sized datasets
- (d) Size does not matter
- 1-g. _____ takes a real-valued input and squashes it to range between 0 and 1. (CO4) 1
- (a) Sigmoid
- (b) tanh
- (c) ReLU
- (d) Network
- 1-h. _____ was the first and simplest type of Artificial Neural Network devised. (CO4) 1
- (a) Feed backward neural network
- (b) Feed neutral Neural network
- (c) Feedforward neural network
- (d) None of these
- 1-i. Which algorithm is used in Robotics and Industrial automation? (CO5) 1

- (a) Thompson sampling
- (b) Naive Bayes
- (c) Decision tree
- (d) All of the above

- 1-j. Which of the following is/are Common uses of RNNs? (CO5) 1
- (a) Businesses help, securities traders to generate analytic reports
 - (b) Detect fraudulent credit-card transaction
 - (c) Provide a caption for images
 - (d) All of the above

2. Attempt all parts:-

- 2.a. Define the role of Machine Learning in our daily life. (CO1) 2
- 2.b. What are the assumptions of linear regression? (CO2) 2
- 2.c. Why cannot we use linear regression for dichotomous output? (CO3) 2
- 2.d. How Artificial Neurons learns? (CO4) 2
- 2.e. Give an example of where AI is used on a daily basis. (CO5) 2

SECTION B

30

3. Answer any five of the following:-

- 3-a. Explain in detail how to implement Find S Algorithm. (CO1) 6
- 3-b. How do you design a checkers learning problem? (CO1) 6
- 3-c. In linear regression, what is the value of the sum of the residuals for a given dataset? Explain with proper justification. (CO2) 6
- 3-d. What do you meant by Regression ? Explain with example. (CO2) 6
- 3.e. What do you mean by Gain and Entropy? How is it used to build the Decision tree in algorithm? Illustrate using an example. (CO3) 6
- 3.f. What are the conditions in which Gradient Descent is applied? (CO4) 6
- 3.g. What is Semi-Supervised learning ? (CO5) 6

SECTION C

50

4. Answer any one of the following:-

- 4-a. What do you mean by a Well-Posed learning problem? Explain the important features that are required to well-define a learning problem. (CO1) 10
- 4-b. Discuss the difference between Data Science and Machine Learning. Write some disadvantages of Machine Learning. (CO1) 10

5. Answer any one of the following:-

- 5-a. How to choose an appropriate algorithm to create a Machine Learning Model? (CO2) 10
- 5-b. How would linear regression be described in layman's terms? (CO2) 10
- 6. Answer any one of the following:-**
- 6-a. What is the procedure of building Decision tree using ID3 with Gain and Entropy. Illustrate with example. (CO3) 10
- 6-b. Discuss Inductive Bias in Decision Tree Learning. Differentiate between two types of biases. Why prefer Short Hypotheses? (CO3) 10
- 7. Answer any one of the following:-**
- 7-a. Derive the Backpropagation rule considering the training rule for Output Unit weights and Training Rule for Hidden Unit weights. (CO4) 10
- 7-b. Explain Hebb learning with suitable example. (CO4) 10
- 8. Answer any one of the following:-**
- 8-a. What are the steps involved in a typical Reinforcement Learning algorithm? Explain. (CO5) 10
- 8-b. Explain the role of Discount Factor in Reinforcement Learning? (CO5) 10