

Code: 19CS3602

**III B.Tech - II Semester – Regular Examinations – JUNE 2022**

**MACHINE LEARNING  
(COMPUTER SCIENCE & ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

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- Note: 1. This question paper contains two Parts A and B.  
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.  
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.  
4. All parts of Question paper must be answered in one place.
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**PART – A**

1. a) List the basic design issues of machine learning.  
b) Distinguish between overfitting and underfitting.  
c) List any two methods used in the ensemble techniques.  
d) Summarize the silhouette Coefficient in clustering.  
e) List out any two limitations of reinforcement learning.

**PART – B**

**UNIT – I**

2. a) Explain various stages involved in designing a learning system in brief. 6 M  
b) List and elaborate on the issues of machine learning. 6 M

OR

3. Specify the learning task for “A checkers learning problem” 3 M  
Discuss the following with respect to the task “ A checkers learning problem”  
(i). Choosing the training experience 3 M  
(ii). Choosing the target function 3 M  
(iii). Choosing a function approximation algorithm 3 M

## **UNIT – II**

4. Illustrate any four metrics to evaluate the classification model. 12 M

OR

5. a) Elaborate on the Bayes theorem and also give a brief note on the maximum posterior hypothesis. 6 M
- b) Consider a football game between two rival teams: Team-0 and Team-1. Suppose Team-0 wins 95% of the time and Team-1 wins the remaining matches. Among the games won by Team-0, only 30% of them come from playing on Team-1's football field. On the other hand, 75% of the victories for Team-1 are obtained while playing at home. If Team-1 is to host the next match between the two teams, which team will most likely emerge as the winner? 6 M

## **UNIT-III**

6. a) Elaborate on the procedure to perform a classification task on linearly separable data using Support Vector Machine. 6 M
- b) Illustrate the K-Nearest Neighbor learning algorithm with an example. 6 M

OR

7. a) Illustrate case-based learning with an example. 6 M
- b) Give the reasons to use bootstrap aggregating in machine learning in detail. 6 M

## UNIT – IV

8. a) Show the final result of hierarchical clustering with the complete link by drawing a dendrogram. 6 M

|   | A    | B    | C    | D    | E    | F |
|---|------|------|------|------|------|---|
| A | 0    |      |      |      |      |   |
| B | 0.12 | 0    |      |      |      |   |
| C | 0.51 | 0.25 | 0    |      |      |   |
| D | 0.84 | 0.16 | 0.14 | 0    |      |   |
| E | 0.28 | 0.77 | 0.70 | 0.45 | 0    |   |
| F | 0.34 | 0.61 | 0.93 | 0.20 | 0.67 | 0 |

- b) Illustrate the DBSCAN with an example and write the steps involved in the DBSCAN algorithm. 6 M

OR

9. a) Perform three iterations of K-Means Clustering on a two-dimensional dataset containing six data points:  $\{(1,1), (2,1), (1,4), (4,3), (5,4), (6,5)\}$  using  $k = 2$ , Euclidean distance, and the initial cluster centroids are  $c1 = (1,1)$ , and  $c2 = (2,1)$ . 6 M

- b) Apply the Apriori algorithm to the given transactional data and derive strong association rules by assuming minimum support count as 2 and confidence threshold as 50% 6 M

| TID  | Items Purchased           |
|------|---------------------------|
| T101 | Hand Sanitizer, Hand Wash |
| T102 | Hand Wash, Body Soap      |

|      |                                              |
|------|----------------------------------------------|
| T103 | Hand Wash, Mask                              |
| T104 | Hand Sanitizer, Hand Wash, Body Soap         |
| T105 | Hand Sanitizer, Mask                         |
| T106 | Hand Wash, Mask                              |
| T107 | Hand Sanitizer, Mask                         |
| T108 | Hand Sanitizer, Hand Wash, Mask, Face Shield |
| T109 | Hand Sanitizer, Hand Wash, Mask              |

### **UNIT – V**

10. Elaborate the Q function and Q Learning Algorithm by assuming deterministic rewards and actions with example. 12 M

OR

11. a) How the reinforcement learning problem differs from other function approximation tasks? 6 M
- b) Write a short note on Temporal Difference Learning. 6 M