| Code No.: CS602PC | R20 | H.T.No. | | | 8 | R | | | | | |
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**CMR ENGINEERING COLLEGE: : HYDERABAD**
**UGC AUTONOMOUS**
**III–B.TECH–II–Semester End Examinations (Supply) - December- 2025**
**MACHINE LEARNING**
**(Common for CSE, CSM)**

**[Time: 3 Hours]** **[Max. Marks: 70]**

**Note:** This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART-A** **(20 Marks)**

| | | | |
|---|---|---|---|
| 1. | a) | What are the important objectives of machine learning? | [2M] |
| | b) | What are the basic design issues and approaches to machine learning? | [2M] |
| | c) | Define (i) Preference Bias (ii) Restriction Bias | [2M] |
| | d) | What is Rule Post Pruning? | [2M] |
| | e) | What is a maximum likelihood hypothesis? | [2M] |
| | f) | What do you mean by Gradient Descent? | [2M] |
| | g) | Define Prior Probability. | [2M] |
| | h) | What is conditional Independence? | [2M] |
| | i) | What is Reinforcement Learning? | [2M] |
| | j) | Define the sample error and true error? | [2M] |

**PART-B** **(50 Marks)**

2. Explain how the general-to-specific ordering helps in refining hypotheses in concept learning. Use examples to illustrate your explanation. [10M]

**OR**

3. Write candidate elimination algorithm. Apply the algorithm to obtain the final version spacefor the training example. [10M]

| S.No. | Sky | Air temp. | Humidity | Wind | Water | Forecast | Enjoy sport |
|---|---|---|---|---|---|---|---|
| 1 | Sunny | Warm | Normal | Strong | Warm | Same | Yes |
| 2 | Sunny | Warm | High | Strong | Warm | Same | Yes |
| 3 | Rainy | Cold | High | Strong | Warm | Change | No |
| 4 | Sunny | Warm | High | Strong | Cool | Change | Yes |

4. Draw the perceptron network with the notation. Derive an equation of gradient descent rule to minimize the error. [10M]

**OR**

5. Write an algorithm for Back Propagation algorithm which uses stochastic gradient descent method. Comment on the effect of adding momentum to the network. [10M]

6. Write Bayes theorem. What is the relationship between Bayes theorem and the problem of concept learning? [10M]

**OR**

7. Explain briefly about version space theorem and its application. [10M]

8. Discuss the learning tasks and Q-learning in the context of Reinforcement Learning [10M]

**OR**

9. Describe the representation of hypotheses and Genetic algorithms. [10M]

10. Explain how PROLOG-EBG works in the context of EBL. Provide an example to illustrate how a specific domain theory is used to generalize a training example. [10M]

**OR**

11. Explain the role of prior knowledge in the initial hypothesis generation in inductive-analytical learning. [10M]

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