**Sub Code: SAI301** **ROLL NO……..……..**

**ODD SEMESTER EXAMINATION, 2023 – 24**

# IInd yr B.Tech. – CS&E/E&CE

# Machine Learning and Pattern recognition

**Duration: 3:00 hrs** **Max Marks: 100**

***Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.***

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| Q 1. | Answer any four parts of the following.<br>a) Explain the difference between Data, Information, Knowledge, and Wisdom with the help of a suitable example in terms of Machine Learning.<br>b) Explain the four types of Machine Learning with suitable examples.<br>c) Explain the Genetic Algorithm and how it helped shape the concept of Machine Learning in the modern world.<br>d) Discuss the difference between Reinforcement Learning and Supervised learning with the help of real-life examples.<br>e) Discuss the difference between Underfitting and overfitting in terms of Machine learning.<br>f) What is Artificial Intelligence? Give an example of where AI is used daily. | 5x4=20 |
| Q 2. | Answer any four parts of the following.<br>a) Explain the components of Learning and also mention the applications of machine learning<br>b) Discuss the importance of Principal Component Analysis in the field of Machine Learning.<br>c) Explain what logic programming is with some suitable examples.<br>d) Explain How is Machine Learning related to Artificial Intelligence?<br>e) Explain the concept of the Bias-Variance tradeoff in Machine Learning.<br>f) Briefly explain the concept of Feature vector and Feature space. | 5x4=20 |
| Q 3. | Answer any two parts of the following.<br>a) Explain the process of analyzing a dataset, stating how it is cleaned (data cleaning) and how plotting of various patterns helps in understanding the dataset.<br>b) Explain the various clustering algorithms and use cases centered around clustering and classification.<br>c) Discuss the process of Knowledge Discovery in a Database with a proper diagram illustrating the whole process. | 10x2= 20 |
| Q 4. | Answer any two parts of the following.<br>a) Discuss the following-<br>i) Support vector machine algorithm<br>ii) Decision function and their implementation<br>b) Explain the following-<br>i) Decision trees | 10x2= 20 |

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| | ii) C-means iterative algorithm<br>c) Explain why the problem of Overfitting occurs in machine learning and suggest some remedies to overcome the problem of overfitting. | |
| Q 5. | Answer any two parts of the following.<br>a) Explain the following:<br>i) Method of feature selection<br>ii) Methods of feature extraction<br>b) Discuss how Pattern classification by statistical function happens with the help of proper example.<br>c) Discuss the following-<br>i) Neural Classifier<br>ii) Bayes belief network | 10x2= 20 |

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