**Sardar Patel Institute of Technology**
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India
(Autonomous College Affiliated to University of Mumbai)

# End Semester Examination

**Max. Marks: 100**
**Class: B.E.**
**Course Code:EC433**

**Duration: 3 Hr**
**Semester: VII**
**Branch: ETRX &EXTC**

**Name of the Course: Artificial Intelligence and Machine Learning**

**Instruction:**
**(1) All questions are compulsory**
**(2) Draw necessary diagram**

| Q. No. | | Max. Marks | CO | BL |
|---|---|---|---|---|
| Q.1 a) | **Each question of 5 Marks**<br><br>i)Distinguish between supervised learning and Reinforcement learning. Illustrate with an example.<br>ii) Why regularization come into play in Machine Learning?<br>iii)Why do RNNs struggle with long distance dependencies?<br>iv) Give three computer applications for which machine learning approaches seem appropriate and three for which they seem inappropriate. | 20 | CO1, CO3 | 3 |
| Q2a) | Why is Linear Discriminant Analysis important? How do LDAs work? | 10 | CO2 | 3 |
| b) | i)Compare between Regression, classification and clustering<br><br>For the transaction shown in the table compute the following<br><br>i)Entropy of the collection of transaction records of the table w.r.t. classification<br><br>ii)What are the information gain of A1 ,A2 relative to the transaction of the table? | 10 | CO2 | 4 |

| Instance | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| A1 | T | T | T | F | F | F | F | T | F |
| A2 | T | T | F | F | T | T | F | F | T |
| Target class | + | + | - | + | - | - | - | + | - |

**OR**

ii)Can Random Forest Algorithm be used both for Continuous and Categorical Target Variables? What do you mean by Bagging?

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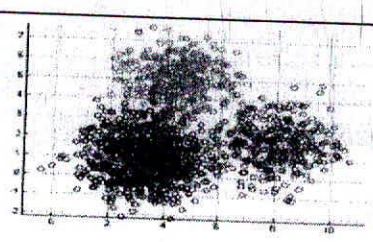
| | | | | |
|---|---|---|---|---|
| Q3a) |  <br>i)K-Means can be used to solve _____ problems.<br>ii)In K-Means, K stands for _____<br>iii)K-means clustering aims to partition n observations into k clusters in which each observation belongs to the cluster with the nearest _____<br>iv)------ algorithm has similarity with K-Means?<br>v) The goal for K-Means cost function is to _____ squared error function where error function represents distance between data points and cluster centroid.<br>ii) How to decide the optimal number of K in the K mean algorithm? | 10 | CO2 | 4 |
| b) | Test your skill about the Ensemble learning in terms of TRUE/False with justification.<br><br>i)Ensemble learning can only be applied to supervised learning methods.<br><br>A. True<br>B. False<br><br>ii) Ensembles will yield bad results when there is significant diversity among the models.<br><br>A.True<br>B. False<br><br>iii)Ensemble of classifiers may or may not be more accurate than any of its individual model.<br><br>A. True<br><br>B. False | 10 | CO2 | 3 |

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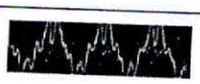
| | | | | |
|---|---|---|---|---|
| | **OR**<br>What is Gaussian Mixture Model and When to use? | | | |
| Q4 a) | Apply the concept of Kernel(3X3), stride, padding to generate feature map of image 5 X 5 for image classification. | 10 | **CO3** | **4** |
| b) | SPEECH RECOGNITION  "I LOVE MY DOG"<br>MUSIC GENERATION o  <br>Identify the suitable neural network for the above applications. Discuss the architecture for the same. | 10 | CO3 | 4 |
| Q5a) | Alexa is built based on natural language processing (NLP), justify with a procedure of converting speech into words, sounds, and ideas.<br>**OR**<br>Why NLP is the Next Frontier in AI for Enterprises | 10 | CO4 | 4 |
| b) | Design the suitable model to predict the word in the following sentence.<br>Komal eats dosa almost everyday it should not be hard to guess that his favorite cousin is ---------. Her sister Lata however is lover of sushi and paratha that means Lata's favorite Cuisine is ---------.<br>Udon noodles | 10 | CO4 | 4 |