

Hall Ticket Number:

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Code No. : 16147 (F) N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade

B.E. VI-Semester Main & Backlog Examinations, May/June-2023

Introduction to Machine Learning (OE-IV)

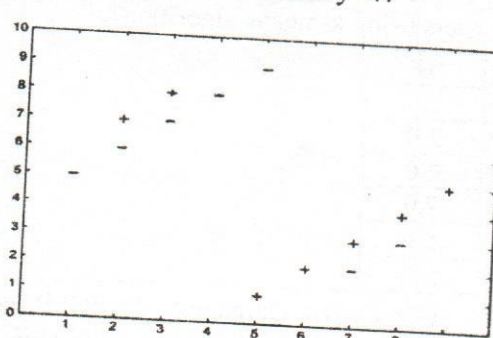
(Common to EEE & ECE)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

| Q. No. | Stem of the question | M | L | CO | PO |
|---|---|---|---|----|----|
| 1. | List sub areas of AI? | 2 | 1 | 1 | 1 |
| 2. | What is a classification problem? | 2 | 2 | 1 | 1 |
| 3. | Explain the difference between the CART and ID3 Algorithms. | 2 | 2 | 2 | 1 |
| 4. | List down the attribute selection measures used by the ID3 algorithm to construct a Decision Tree. | 2 | 1 | 2 | 1 |
| 5. | Define Perceptron. | 2 | 1 | 3 | 1 |
| 6. | What is the drawback of a single layer perceptron? | 2 | 2 | 3 | 1 |
| 7. | What is Support Vector Machine? | 2 | 1 | 4 | 1 |
| 8. | Define Bayes rule. | 2 | 1 | 4 | 1 |
| 9. | List different types of Clustering. | 2 | 1 | 5 | 1 |
| 10. | Differentiate between supervised and unsupervised learning? | 2 | 3 | 5 | 2 |
| Part-B (5 × 8 = 40 Marks) | | | | | |
| 11. a) | What is the difference between Linear and Logistic regression and explain with an example. | 4 | 2 | 1 | 1 |
| b) | Illustrate the significance of NumPy along with an example program. | 4 | 3 | 1 | 2 |
| 12. a) | Explain KNN Algorithm? | 2 | 1 | 2 | 1 |
| b) | Suppose you have given the following 2-class data where "+" represent a positive class and "-" is represent negative class. you are now want to use k-NN(k=3), and predict the class for x=5 and y=4? | 6 | 3 | 2 | 2 |
|  | | | | | |
| 13. a) | What is gradient descent and delta rule? | 2 | 2 | 3 | 1 |
| b) | Describe multilayer neural network. Explain why back propagation algorithm is required. | 6 | 2 | 3 | 2 |

120

2-208

14. a) Explain Naïve Bayes Classification.
 b) For the data below, predict the output for the following new instance using Naïve Bayes algorithm.

X: (Weather =Sunny; Humidity=Normal; Wind= Weak)

| Day | Weather | Humidity | Wind | Play_Tennis? |
|-----|---------|----------|--------|--------------|
| 1 | Sunny | High | Weak | No |
| 2 | Cloudy | High | Weak | Yes |
| 3 | Sunny | Normal | Strong | Yes |
| 4 | Cloudy | High | Strong | Yes |
| 5 | Rainy | High | Strong | No |
| 6 | Rainy | Normal | Strong | No |
| 7 | Rainy | High | Weak | Yes |
| 8 | Sunny | High | Strong | No |
| 9 | Cloudy | Normal | Weak | Yes |
| 10 | Rainy | High | Strong | No |

| | | | |
|---|---|---|---|
| 2 | 2 | 4 | 1 |
| 6 | 4 | 4 | 2 |

15. a) Explain DBSCAN algorithm for density-based clustering.
 b) Apply DBSCAN algorithm on the below dataset to find out clusters by taking $eps = 2$ and $MinPts = 3$.

| Subject | A | B |
|---------|---|----|
| P1 | 2 | 10 |
| P2 | 2 | 5 |
| P3 | 8 | 4 |
| P4 | 5 | 8 |
| P5 | 7 | 5 |
| P6 | 6 | 4 |

| | | | |
|---|---|---|---|
| 2 | 1 | 5 | 1 |
| 6 | 3 | 5 | 2 |

16. a) What is the difference between Supervised and unsupervised leaning, explain with examples? Compare these with Reinforcement learning?

| | | | |
|---|---|---|---|
| 4 | 2 | 1 | 2 |
|---|---|---|---|

- b) Write down Logistic Regression algorithm explaining all the steps.

| | | | |
|---|---|---|---|
| 4 | 2 | 2 | 2 |
|---|---|---|---|

17. Answer any **two** of the following:

- a) Explain the details of Perceptron algorithm and its limitation of XOR problem?

| | | | |
|---|---|---|---|
| 4 | 2 | 3 | 1 |
|---|---|---|---|

- b) Describe the significance of Kernel functions in SVM. List any two kernel functions.

| | | | |
|---|---|---|---|
| 4 | 3 | 4 | 2 |
|---|---|---|---|

- c) Given the following data set consisting of the scores of two variables A & B on each of six individuals: Predict 2 clusters using k-means algorithm?

| | | | |
|---|---|---|---|
| 4 | 4 | 5 | 2 |
|---|---|---|---|

| Subject | A | B |
|---------|-----|-----|
| 1 | 1.0 | 1.0 |
| 2 | 1.5 | 2.0 |
| 3 | 3.0 | 4.0 |
| 4 | 5.0 | 7.0 |
| 5 | 3.5 | 5.0 |
| 6 | 4.5 | 5.0 |

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

| | | |
|------|-------------------------------|-----|
| i) | Blooms Taxonomy Level – 1 | 20% |
| ii) | Blooms Taxonomy Level – 2 | 40% |
| iii) | Blooms Taxonomy Level – 3 & 4 | 40% |
