*Total No. of Questions: 6* *Total No. of Printed Pages:3*

**Enrollment No.....**

Faculty of Engineering

End Sem Examination May-2024

EE3CO47 / EX3CO47

Machine Learning for Electrical Engineering

Programme: B.Tech. Branch/Specialisation: EE/EX

**Duration: 3 Hrs.** **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. What is Scikit-learn? **1**

(a) A machine learning library in Python
(b) A video visualization library in Python
(c) A natural language processing library in Python
(d) A web development framework in Python

ii. Which python module is used for plotting? **1**

(a) NumPy (b) SciPy (c) Matplotlib (d) Scikitlearn

iii. Which type of machine learning algorithm falls under the category of supervised learning? **1**

(a) k-Nearest neighbours (b) Clustering
(c) Manifold learning (d) None of these

iv. Identify the type of learning in which labelled training data is used- **1**

(a) Unsupervised learning (b) Supervised learning
(c) Semi unsupervised learning (d) Reinforcement learning

v. For unsupervised learning, the training dataset consists of- **1**

(a) Output labels only (b) Input features only
(c) Input features and output labels (d) None of these

vi. Unsupervised learning algorithm used for dimensionality reduction is- **1**

(a) Principal component analysis (b) Decision tree
(c) Naive bayes (d) Linear regression

vii. Optimized feature selection process enhances the- **1**

(a) Efficiency (b) Losses
(c) False results (d) None of these

viii. In univariate learning number of variables are- **1**
(a) One (b) Two
(c) Three (d) Four

ix. The bag-of-words (BoW) model in text mining represents a document as- **1**
(a) A collection of images
(b) A sequence of sentences
(c) A set of words disregarding grammar and word order
(d) A structured table with rows and columns

x. In sentiment analysis, the goal is to- **1**
(a) Categorize documents into predefined topics
(b) Extract named entities from the text
(c) Determine the sentiment or emotion expressed in the text
(d) Convert text data into numerical vectors

Q.2 i. Explain the meaning of machine learning. **2**
ii. Write about different types of machines leaning methods. **3**
iii. Demonstrate the python package 'Numpy' in detail and with three examples. **5**
OR iv. Demonstrate the python package 'Matplotlib' in detail and with three examples. **5**

Q.3 i. Explain is the meaning of supervised learning with example. **3**
ii. Discuss the K-Nearest Neighbours (KNN) machine learning algorithm in detail with an example. **7**
OR iii. Illustrate the Support Vector Machines (SVM) based machine learning algorithm in detail with an example. **7**

Q.4 i. Describe dimensionality reduction in unsupervised machine learning methods. **3**
ii. Discuss the K-Means clustering unsupervised machine leaning method in detail with an example. **7**
OR iii. Demonstrate the agglomerative clustering method in detail with an example. **7**

Q.5 i. Explain the meaning of categorical variables with an example. **4**
ii. Demonstrate discretization and automatic feature selection processes in machine learning in detail. **6**



OR iii. Discuss the univariate nonlinear transformations in machine leaning in detail with an example. **6**

Q.6 Attempt any two:
i. Discuss about rescaling the data with TF-IDF. **5**
ii. Discuss about representing text data as a Bag of Words. **5**
iii. Discuss about sentiment analysis of movie reviews. **5**

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# Marking Scheme
## Machine Learning for Electrical Engineering(T)- EE3CO47/ EX3CO47(T)

| | | | |
|---|---|---|---|
| Q.1 | i) | What is Scikit-learn?<br>(a) A machine learning library in Python | **1** |
| | ii) | Which python module is used for plotting?<br>(c) Matplotlib | **1** |
| | iii) | Which type of machine learning algorithm falls under the category of supervised learning<br>(a) k-Nearest Neighbours | **1** |
| | iv) | Identify the type of learning in which labelled training data is used.<br>(b) Supervised learning | **1** |
| | v) | For unsupervised learning, the training dataset consists of<br>(b) Input features only | **1** |
| | vi) | Unsupervised learning algorithm used for dimensionality reduction is<br>(a) Principal Component Analysis | **1** |
| | vii) | Optimized Feature selection process enhances the<br>(a) Efficiency | **1** |
| | viii) | In univariate learning number of variables are<br>(a) One | **1** |
| | ix) | The bag-of-words (BoW) model in text mining represents a document as:<br>(c) A set of words disregarding grammar and word order | **1** |
| | x) | In sentiment analysis, the goal is to:<br>(c) Determine the sentiment or emotion expressed in the text | **1** |
| Q.2 | i. | Explain the meaning of machine learning | **2** |
| | ii. | Three types of machine leaning methods. | **1x3** |
| | iii. | ‘Numpy’ in detail , three examples. | **2,3** |
| OR | iv. | ‘Matplotlib’ in detail, three examples. | **2,3** |
| Q.3 | i. | Meaning of supervised learning, an example. | **2, 1** |
| | ii. | KNN algorithm in detail,<br>Diagram, an example. | **3,**<br>**2,2** |
| OR | iii. | SVM algorithm in detail<br>Diagram, an example. | **3,**<br>**2,2** |
| Q.4 | i. | Describe dimensionality reduction in unsupervised machine learning methods. | **3** |
| | ii. | K-Means Clustering in detail<br>Diagram, an example. | **3,**<br>**2,2** |
| OR | iii. | Agglomerative Clustering method in detail<br>Diagram, an example. | **3,**<br>**2,2** |
| Q.5 | i. | Categorical variables, an example | **2,2** |
| | ii. | Discretization, automatic feature selection | **3,3** |
| OR | iii. | univariate nonlinear transformations in detail<br>Diagram, an example. | **2,**<br>**2,2** |
| Q.6 | | Attempt any two: | |
| | i. | rescaling the data with TF-IDF, example/diagram | **3,2** |
| | ii. | Discussion on text data as a Bag of Words, example/diagram | **3,2** |
| | iii. | Sentiment analysis of movie reviews (steps) | **3,2** |

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