

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN

--	--	--	--	--	--	--	--	--	--

Course Code

2	1	A	I	6	2
---	---	---	---	---	---

Sixth Semester B.E. Degree Examinations, September/October 2024

MACHINE LEARNING**(Artificial Intelligence & Machine Learning)**

Duration: 3 hrs

Max. Marks: 100

- Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
--------------	-----------------	--------------	---------------------

Module-1

- | | | | | |
|----|----|--|-----------|-------------|
| 1. | a. | What is ML? Explain types of ML algorithms with example. | 10 | (1:1:1.6.1) |
| | b. | Consider the “Japanese Economy Car” concept and instance given in Table 1, Illustrate the hypothesis using Find-S algorithm. | 06 | (3:1:2.1.2) |

Table. 1

Origi	Manufacture	Colour	Decade	Type	Example Type
Japan	Honda	Blue	1980	Economy	Positive
Japan	Toyota	Green	1970	Sports	Negative
Japan	Toyota	Blue	1990	Economy	Positive
USA	Chrysler	Red	1980	Economy	Negative
Japan	Honda	White	1980	Economy	Positive

- | | | | | |
|--|--|--|-----------|-------------|
| | | c. Explain inductive biased hypothesis space and unbiased learner. | 04 | (2:1:1.6.1) |
|--|--|--|-----------|-------------|

(OR)

- | | | | | |
|----|----|--|-----------|-------------|
| 2. | a. | Consider the “Enjoy Sports” concept and instance given in Table 2, Illustrate the hypothesis using Candidate Elimination Learning algorithm. | 08 | (3:1:2.1.2) |
|----|----|--|-----------|-------------|

Table. 2

Example	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	Cold	Change	Yes

- | | | | | |
|--|--|--|-----------|-------------|
| | | b. What are challenges and applications of ML? | 06 | (1:1:1.6.1) |
| | | c. Explain concept learning with example. | 06 | (2:1:1.6.1) |

Module-2

- | | | | | |
|----|----|---|-----------|-------------|
| 3. | a. | Explain the methods adopted for creating a test set? Also explain the problems associated with it and solutions. | 06 | (2:2:2.1.2) |
| | b. | In context to prepare the data for ML algorithm's, write a note on:
(i) Data Cleaning (ii) Handling text and Categorical attributes
(iii) Feature scaling. | 08 | (2:2:2.7.1) |

- c. With code snippet, write a note on (i) Creating Workspace (ii) Frame the Problem. **06** (3:2:2.5.1)

(OR)

4. a. Explain the following with example: **08** (2:2:2.5.1)
 Head(), info(), value_counts(), and Describe()
- b. With code snippet, explain binary classifier and its different types. **06** (2:2:2.8.1)
- c. Using code snippets, outline the concepts involved in **06** (2:2:2.8.1)
 (i) Measuring accuracy using Cross-Validation
 (ii) Confusion Matrix (iii) Precision and Recall

Module-3

5. a. Explain polynomial regression. **06** (2:3:2.7.1)
- b. What is gradient descent algorithm? Discuss its various types. **10** (2:3:2.5.1)
- c. What is learning curves? Explain. **04** (2:3:2.5.1)

(OR)

6. a. What is linear regression? Explain normal equation and computational complexity. **10** (2:3:2.5.1)
- b. In regularized linear models illustrate the three different methods to constrain the weights. **10** (2:3:2.5.2)

Module-4

7. a. With example dataset, explain how decision trees are used in making predictions. **08** (2:4:3.5.1)
- b. In the context of ensemble methods determine the concepts of **08** (2:4:3.5.1)
 (i) Bagging and Pasting (ii) Voting classifiers.
- c. Explain the CART training algorithm. **04** (2:4:2.5.1)

(OR)

8. a. Explain the following boosting methods along with code snippets: **10** (2:4:2.5.1)
 (i) Ada Boost (ii) Gradient Boosting.
- b. Using parents decision dataset, construct a decision tree given in Table 3 using Gini Index. **10** (3:4:3.5.1)

Table. 3

Weekend	Weather	Parent	Money	Decision
1	Sunny	Yes	Rich	Cinema
2	Sunny	No	Rich	Tennis
3	Windy	Yes	Rich	Cinema
4	Rainy	Yes	Poor	Cinema
5	Rainy	No	Rich	Stayin
6	Rainy	Yes	Poor	Cinema
7	Windy	No	Poor	Cinema
8	Windy	No	Rich	Shopping
9	Windy	Yes	Rich	Cinema
10	Sunny	No	Rich	Tennis

Module-5

9. a. Write a note on Gibbs algorithm. **04** (2:5:2.5.1)
b. Consider the dataset about stolen vehicles. Using Naïve Bayes classifier **08** (3:5:2.7.1)
classify the new data {Red, Suv, Domestic}.

Colour	Type	Origin	Stolen?
Red	Sports	Domestic	Yes
Red	Sports	Domestic	No
Red	Sports	Domestic	Yes
Yellow	Sports	Domestic	No
Yellow	Sports	Imported	Yes
Yellow	SUV	Imported	No
Yellow	SUV	Imported	Yes
Yellow	SUV	Domestic	No
Red	SUV	Imported	No
Red	Sports	Imported	Yes

- c. Explain Bayesian belief network with suitable example. **08** (2:5:2.5.1)
(OR)
- 10 a. Describe how SVM makes prediction using **08** (2:5:2.5.1)
(i) Quadratic programming (ii) Kernelized SVM
b. Explain features of Bayesian method. **04** (2:5:2.5.1)
c. Explain the EM algorithm in detail. **08** (2:5:2.5.1)

** ** *