Q. Code: 945209

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Fourth Semester

CS22402 – MACHINE LEARNING TECHNIQUES

(Common to CS and AD)

(Regulation 2022)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	Statements Upon successful completion of the course, the students should be able to	RBT LEVEL
CO 1	Explain basics of machine learning and estimation methods.	**2**
CO 2	Construct supervised learning models.	**3**
CO 3	Construct unsupervised learning models and ensemble models.	**3**
CO 4	Construct complex models with advanced machine learning techniques.	**3**
CO 5	Evaluate and compare the performance of various models.	**4**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Write short notes about Machine Learning.	**1**	**2**
2.	List down the learning types adopted in Machine Learning	**1**	**2**
3.	What are the three things required for concept learning?	**1**	**2**
4.	What is meant by overfitting and underfitting?	**1**	**2**
5.	List the types of Non-Linear activation functions.	**2**	**2**
6.	What is a Perceptron? List down its types.	**2**	**2**
7.	Compare the Classification method with regression technique.	**2**	**2**
8.	What are the advantages and limitations of Naive Bayes classifier.?	**2**	**2**
9.	Define unsupervised learning and provide an example of its application.	**3**	**3**
10.	What is Principal Component Analysis (PCA), and how does it contribute to	**3**	**2**

dimensionality reduction?

11.	Brief about the Ensemble Learning.	**3**	**2**	
12.	What are the differences between bagging and boosting in Machine Learning?	**3**	**2**	
13.	List down the salient features of reinforcement learning.	**4**	**3**	
14.	State the key constituents of reinforcement learning.	**4**	**3**	
15.	Write short notes on 'Q' in Q-learning.	**4**	**2**	
16.	What is the role of activation Functions in Deep learning?	**4**	**2**	
17.	List down the applications of Cross-Validation.	**5**	**3**	
18.	Write short notes on Confusion Matrix.	**5**	**3**	
19.	Brief about the Area Under the ROC curve features.	**5**	**3**	
20.	What are the benefits of K-fold cross validation?	**5**	**2**	

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Illustrate the resampling methods and discuss the working of the model.	**(14)**	**1**	**2**
	(OR)			
(b)	Summarize the applications of machine learning with one example.	**(14)**	**1**	**2**
22. (a)	Elaborate the steps involved in classification Learning? Illustrate the classification concept with examples.	**(14)**	**2**	**3**
	(OR)			
(b)	How does a multi-layer perceptron works? Design an MLP with backpropagation algorithm.	**(14)**	**2**	**3**

23. (a)	How does the K-means algorithm work? Provide a detailed explanation on clustering process using K-means algorithm.	**(14)**	**3**	**3**
	(OR)			
(b)	Develop a dendrogram for the dataset given below {18,22,25,27,42,43}	**(14)**	**3**	**3**

	18	**22**	**25**	**27**	**42**	**43**
18	0	4	7	9	24	25
22	4	0	3	5	20	21
25	7	3	0	2	17	18
27	9	5	2	0	15	16
42	24	20	17	15	0	1
43	25	21	18	16	1	0

24. (a)	Describe how deep learning supports in development of efficient and robust models across the different datasets.	**(14)**	**4**	**3**
	(OR)			
(b)	Illustrate with an example, how does the Temporal method determines the rewards in reinforcement learning.	**(14)**	**4**	**3**
25. (a)	Enumerate any three Performance Metrics for Classification in detail.	**(14)**	**5**	**4**
	(OR)			
(b)	Elucidate about the Classification Algorithm in Machine Learning with suitable example for identifying the spam Email.	**(14)**	**5**	**4**

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	**CO**	**RBT LEVEL**
26.	Consider the following Transition Matrix:	**(10)**	**3**	**5**

	Sunny	**Rainy**	**Cloudy**
Sunny	0.8	0.15	0.05
Rainy	0.38	0.60	0.02

Cloudy	0.75	0.05	0.20

Emission Matrix:

	Shorts	**Coat**	**Umbrella**
Shorts	0.60	0.30	0.10
Coat	0.05	0.30	0.65
Umbrella	0	0.5	0.5

The initial probability state vector is given as {0.7, 0.1,0.2}

Find the probability for the hidden state {coat, coat, umbrella} and {Shorts, Coat, Umbrella}

for the condition states {sunny, rainy, cloudy}

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