Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2023

Seventh Semester

18CSE491T - MACHINE LEARNING – II

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

Note:

(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

	Marks	BL	CO	PO
1. What is the term for a model that performs well on the data it was trained on but poorly on new, unseen data? (A) Overfitting (B) Underfitting (C) Generalization (D) Bias	1	1	1	1
2. In experimental design, what is randomization primarily used for? (A) To ensure that every treatment group is exactly the same (B) To assign experimental units to treatment groups in a random and unbiased manner (C) To eliminate the need for replication (D) To increase the complexity of the experiment	1	2	1	2
3. Replication in experimental design involves: (A) Repeating the entire experiment with different treatments (B) Repeating the experiment with the same treatment on multiple experimental units (C) Introducing random variation into the data (D) Changing the experimental conditions without repetition	1	1	1	1
4. In k-fold cross-validation, if you choose k to be 5, how many subsets does the dataset get divided into? (A) 2 (B) 3 (C) 4 (D) 5	1	2	1	2
5. In a Bayesian Belief Network, nodes in the graph represent: (A) Independent variables (B) Dependent variables (C) Probability distributions (D) Random numbers	1	1	2	1
6. In a Markov Random Field, what does each node represent? (A) Random data points (B) Independent variables (C) Local regions or pixels in an image (D) Global properties of a dataset	1	2	2	1
7. In a text classification problem, if you have three classes (e.g., sports, politics, and entertainment), how many class-specific conditional probability distributions are there in a standard Naïve Bayes model? (A) 1 (B) 2 (C) 3 (D) 6	1	1	2	2

8. In bagging, what is the typical resampling technique used to create multiple subsets of the training data? 1 2 2 1
   (A) Random oversampling (B) Random undersampling
   (C) Bootstrapping (D) Cross-validation

9. What is the role of the environment in a reinforcement learning problem? 1 2 3 1
   (A) It is the learning algorithm used by the agent (B) It defines the agent's initial state
   (C) It interacts with the agent and provides rewards and state transitions (D) It is not a relevant concept in reinforcement learning

10. Which of the following algorithms is often used to solve the K-Armed Bandit problem by exploring and exploiting bandits optimally? 1 3 2 1
   (A) Greedy algorithm (B) Random selection
   (C) Upper Confidence Bound (UCB) (D) Q-learning

11. The VC dimension represents the largest value of "d" such that the model can shatter: 1 1 3 2
   (A) Any set of "d" data points (B) Every data point in the dataset
   (C) Any set of "d" features (D) Every possible model parameter

12. In PAC learning, what does the term "probably" refer to? 1 3 2 1
   (A) High probability of learning the correct hypothesis (B) A low probability of making a mistake on the training data
   (C) A guaranteed guarantee of accuracy (D) Certainty in the model's predictions

13. What is the primary limitation of McCulloch-Pitts units compared to modern artificial neurons, such as sigmoid neurons? 1 2 4 1
   (A) McCulloch-Pitts units cannot handle binary inputs (B) McCulloch-Pitts units cannot compute continuous-valued outputs
   (C) McCulloch-Pitts units lack the ability to learn from data (D) McCulloch-Pitts units are computationally inefficient

14. In a feedforward neural network, what is the purpose of the input layer? 1 1 4 2
   (A) Compute the final prediction (B) Apply activation functions to the data
   (C) Transmit raw input data to the hidden layers (D) Learn feature representations

15. Which phase of the backpropagation algorithm involves computing the gradients of the loss with respect to the network's parameters? 1 2 4 1
   (A) Forward pass (B) Backward pass
   (C) Initialization phase (D) Training phase

16. In the Adam optimizer, what is the role of the "momentum" term? 1 1 4 2
   (A) It determines the speed of convergence during optimization (B) It controls the decay rate of the learning rate
   (C) It prevents the optimizer from getting stuck in local minima (D) It smoothens the updates to the model's parameters

17.	What is the purpose of an activation function in a neural network? (A) To define the structure and connections of the network (B) To perform the forward pass of data (C) To introduce non-linearity into the network and enable complex mappings (D) To adjust the learning rate during training	1	2	5	1
18.	What is the primary purpose of the fully connected layers in a CNN? (A) Extracting local features and patterns (B) Reducing the dimensionality of the data (C) Capturing global relationships and making predictions (D) Enhancing the contrast of images	1	1	5	2
19.	What is the main advantage of using LSTMs for sequence-to-sequence tasks like language translation? (A) LSTMs require fewer training examples to achieve good performance (B) LSTMs handle sequential data without the need for gates (C) LSTMs can capture long-range dependencies and relationships between distant elements in a sequence (D) LSTMs have a faster inference time compared to other models	1	2	5	1
20.	What type of autoencoder is specifically designed for handling images and convolutional neural networks? (A) Denoising autoencoder (B) Variational autoencoder (C) Convolutional autoencoder (D) Sparse autoencoder	1	1	5	2

PART – B (5 × 4 = 20 Marks)
Answer **ANY FIVE** Questions

		Marks	BL	CO	PO
21.	Explain Basic Probability Theory?	4	2	2	1
22.	Describe about Randomization and Replication?	4	2	1	2
23.	Elaborate the functionality of Bagging?	4	3	2	1
24.	What is the main principle behind gradient boosting in machine learning?	4	4	2	3
25.	In the context of reinforcement learning, what is the fundamental difference between supervised learning, unsupervised learning, and reinforcement learning?	4	4	3	3
26.	Explain in detail about Adam, Adagrad.	4	3	4	3
27.	What is a Recurrent Neural Network (RNN), and what are some of its primary applications in the field of machine learning and natural language processing?	4	3	5	3

PART – C (5 × 12 = 60 Marks)
Answer **ALL** Questions

		Marks	BL	CO	PO
28. a.	How a Classification Algorithm's performance is assessed. Explain in detail?	12	3	1	3

(OR)

b.	Compare any 2 Classification algorithm with respect to multiple datasets.	12	3	1	3
29. a.	Describe Random Forest with proper example.	12	3	2	3
	(OR)				
b.	Explain Application Face recognition using Ensemble techniques.	12	3	2	3
30. a.	Discuss VC dimension with Proper Diagram.	12	3	3	2
	(OR)				
b.	Explain Deterministic and Non-deterministic rewards and actions.	12	3	3	2
31. a.	Explain Multi-layer perceptron and Feed Forward Network in brief.	12	3	4	3
	(OR)				
b.	Explain RMS Prop, Drop out and Batch Normalization with proper example.	12	3	4	3
32. a.	Explain Sentiment analysis with LSTM keras code.	12	4	5	2
	(OR)				
b.	Elaborate Dimensionality reduction using Auto SLO-2 Encoders.	12	4	5	2

* * * * *