PRESIDENCY UNIVERSITY
BENGALURU

School of Engineering
Mid - Term Examinations - Nov 2024

Semester: 7th   **Date**: 7-11-2024

Course Code: ECE3070   **Time**: 9:30am – 11:00pm

Course Name: AI and Digital Health   **Max Marks**: 50

Program: B. Tech   **Weightage**: 25%

Instructions:

(i) Read all questions carefully and answer accordingly.
(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.   **2Mx5Q=10M**

1	Name two challenges of using AI in healthcare.	2 Marks	L1	CO1
2	How is Information Gain used in Decision Trees? What is Gini Impurity	2 Marks	L1	CO1
3	What is the role of an activation function in a neural network?	2 Marks	L1	CO2
4	What is the difference between supervised and unsupervised learning in the context of neural networks?	2 Marks	L1	CO2
5	What are the challenges of using Big Data in real-time AI applications?	2 Marks	L1	CO1

Part B

Answer ALL Questions. Each question carries 10 marks.   **4QX10M=40M**

6   6a   Based on the probability functions, the Naive Bayes algorithm is used to classify and categorize the datasets. Predict whether the car is stolen based on the attributes given as Red, Domestic and SUV.   10Marks   L3   CO1

Example No.	Color	Type	Origin	Stolen?
1	Red	Sports	Domestic	Yes
2	Red	Sports	Domestic	No
3	Red	Sports	Domestic	Yes
4	Yellow	Sports	Domestic	No
5	Yellow	Sports	Imported	Yes
6	Yellow	SUV	Imported	No
7	Yellow	SUV	Imported	Yes
8	Yellow	SUV	Domestic	No
9	Red	SUV	Imported	No
10	Red	Sports	Imported	Yes

	7a	Describe the various stages involved in the CDM process. Discuss each stage's role in ensuring high-quality clinical trial data.	4Marks	L3	CO1
7					
	7b	Use a step-by-step explanation to calculate the Gini Index for different attributes in a dataset and determine the best split	6Marks	L3	CO1

SAMPLES	FEATURE	CLASS
1	1	A
2	1	A
3	1	A
4	2	B
5	2	B
6	2	A
7	3	B
8	3	B

8		Global Technology Solutions (GTS), a leading provider of IT solutions, is coming to Presidency for hiring. Chandra, a student of PU, wants to find out if he may be offered a job in GTS. His CGPA is quite high. His self-evaluation on the other parameters is as follows: Communication – Bad; Aptitude – High; Programming skills – Bad. Develop a decision tree algorithm to predict whether Chandra will get a job?.	10Marks	L3	CO2

CGPA	Communication	Aptitude	Programming Skill	Job offered?
High	Good	High	Good	Yes
Medium	Good	High	Good	Yes
Low	Bad	Low	Good	No
Low	Good	Low	Bad	No
High	Good	High	Bad	Yes
High	Good	High	Good	Yes
Medium	Bad	Low	Bad	No
Medium	Bad	Low	Good	No
High	Bad	High	Good	Yes
Medium	Good	High	Good	Yes
Low	Bad	High	Bad	No
Low	Bad	High	Bad	No
Medium	Good	High	Bad	Yes
Low	Good	Low	Good	No
High	Bad	Low	Bad	No
Medium	Bad	High	Good	No
High	Bad	Low	Bad	No
Medium	Good	High	Bad	Yes

Or

	9a	Discuss the structure and function of the MCP model, highlighting its importance as the first mathematical model of a neuron and how it paved the way for implementing two input AND gate.	5 Marks	L3	CO2
9					
	9b	Last weekend I was excited to hang out with my friends and watch a movie, but the problem was that it was just too hard to find a good movie. Identify and Illustare a specific ML algorithm to solve the given problem.	5 Marks	L2	CO1

10	10a	Discuss how the FDA evaluates the safety, efficacy, and risk factors of AI-driven medical applications, and highlight key differences in the approval process for AI software compared to conventional medical devices.	5 Marks	L3	CO1
	10b	Explain how Artificial Intelligence (AI) is used to support Precision Medicine. Discuss specific AI techniques and their role in tailoring patient treatments.	5 Marks	L3	CO2

<div align="center">Or</div>

11	Construct a two input OR gate using Frank Rosenblatt model of perceptron. Assume the initials weights and bias function as zero and also the learning rate as '1'	10 Marks	L3	CO2
12	Explore Amazon's use of Narrow AI for personalized recommendations based on user data and purchase history, emphasizing how this improves the customer experience and the limitations in privacy and data use	10 Marks	L3	CO1

<div align="center">Or</div>

13	The purpose of artificial intelligence is to make the machine perform classification, identification and prediction. Categorize the types of learning in Artificial Intelligence with relevant case studies related to health care applications.	10 Marks	L3	CO1