Continuous Assessment Test (CAT) – I August 2024

Programme	:	B.Tech. (Artificial Intelligence and Robotics)	Semester	:	Fall Semester 24-25
Course Code & Course Title	:	BCSE424L & Machine Learning for Robotics	Class Number	:	CH2024250102596
Faculty	:	N.M.ELANGO	Slot	:	F1
Duration	:	1 Hour 30 Minutes	Max. Mark		50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No 1

Consider the following Sales dataset of medicines a1, a2, a3, a4 and a5.

Medicines	Sales in Lakhs
a1	81
a2	91
a3	99
a4	100
a5	104

A regression model predicts the sales of the new medicine a6 and a7 as per the following table.

Test Items	Actual Value	Predicted Value
a6	82	80
a7	88	83

Compute a.) Mean Absolute Error b.) Mean Squared Error c.) Root Mean Square Error d.)Relative Mean square error.

Q. No 2

The following data set predicts the Gender of a person based on the independent attributes Height, Weight and Foot size. Determine the Gender of a person whose height 6 feet, weight 139 lbs and foot size 8 inches.

Height(feet)	Weight (lbs)	Foot size(inches)	Gender
6	180	11	Male
5.5	190	12	Male
5.7	170	11	Male
5.3	164	10	Male
5	110	6	Female
5.8	150	7	Female
5.2	130	8	Female
5.1	151	9	Female

3		The organizers of a competition decide that a winner in the competition gets a prize based on the independent attributes Age , Competition and Type described in the following Table. Construct the root node of the decision tree for the following table using ID3 algorithm.	10

Age	Competition	Type	Won the Match
old	yes	Software	no
old	no	Software	no
old	no	Hardware	no
mid	yes	Software	no
mid	yes	Hardware	no
mid	no	Hardware	yes
mid	no	Software	yes
new	yes	Software	yes
new	no	Hardware	yes
new	no	software	yes

4		Consider the dataset with attributes, Hours Study and Results. a. Find the probability of pass for the student who studied 30 Hours. b. At least how many hours student should study that makes he will pass the course with the probability of more than 90 %. Assume the model log(odds) = - 30+3*hours.	10

Hours Study	Results : Pass-1/Fail-0
28	0
14	0
31	1
29	1
40	1

5		A healthcare company is developing an autonomous robot assistant for hospital environments. The robot needs to navigate through crowded corridors, avoid obstacles, and deliver medical supplies to specified rooms efficiently. The company plans to use machine learning techniques to improve the robot's performance. a. Describe the process of selecting and evaluating a supervised learning model to train the robot to identify different obstacles (like patients and medical equipment) based on sensor data. Include the criteria you would use to choose the best model. **(5 marks)** b. Develop an unsupervised learning approach to categorize different areas of the hospital based on the conditions encountered by the robot during its routes. **(5 marks)**	10

**********All the best **********