POORNIMA UNIVERSITY, JAIPUR

END SEMESTER EXAMINATION, 2023-2024 EVEN SEMESTER

Write Roll No Below: _____

BCA (AIDS) II () - IV (Main/Back) End Semester Examination, April 2024

BASCCA4103: Machine Learning

Time: 3 Hours **Total Marks:** 60 **Min. Passing Marks:** 21/24/27 **Question Paper ID:** 001016

Instructions: Attempt all five questions. There is an internal choice either (a or b) in Q1 to Q5. Marks of each question or its parts are indicated against each question/part. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Bloom Level(BL): 1-Remembering, 2-Understanding, 3-Applying, 4-Analysing, 5-Evaluating, 6-Creating

Use of following supporting material is permitted during examination for this subject: Nil

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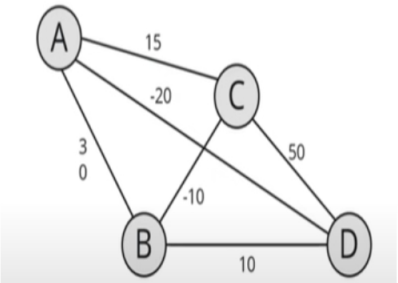
Q1. (a) Demonstrate SARSA Algorithm in Reinforcement Learning. **(12 Marks)** — **Marks 12 BL 2 CO 1**

(OR)

(b) Find the shortest path between A and D with minimum possible cost in below mentioned figure by using MDP learning algorithm process. **(12 Marks)**



Q2. (a) Differentiate (any two): **(12 Marks)** — **Marks 12 BL 3 CO 2**

1. Predictive vs. descriptive models
2. Model underfitting vs. overfitting
3. Cross-validation vs. bootstrapping

(OR)

(b) While predicting malignancy of tumour of a set of patients using a classification model, following are the data recorded: **(12 Marks)**

(i) Correct predictions – 15 malignant, 75 benign

(ii) Incorrect predictions – 3 malignant, 7 benign

Calculate the error rate, Kappa value, sensitivity, precision, and F-measure of the model.

Q3. (a) Compute Entropy , Gini Index , Information Gain of Following attributes and Create a Decision Tree for represent following data set . **(12 Marks)** — **Marks 12 BL 3 CO 3**

(i) Compute the Gini Index for the overall set of training data set where there are 4 possible variables output Cinema, Tennis, stay in and Shopping and the data has 6 instances of Cinema, 2 instance of Tennis, 1 instance for stay in and 1 instance for shopping

(ii) Compute the Gini Index for the Money where there are 7 instances of Rich and 3 instance of Poor.

(iii) Compute the Gini Index for the Parents where there are 5 = YES, 5 = No.

(iv) Compute the Gini Index for the Money where there are 7 instances of Rich and 3 instance of Poor.

(v) Compute the Gini Index for the Weather where there are 3 possible ways for sunny weather, 3 for Rainy weather, 4 for windy weather.

Weekend (Example)	Weather	Parents	Money	Decision (Category)
W1	Sunny	Yes	Rich	Cinema
W2	Sunny	No	Rich	Tennis
W3	Windy	Yes	Rich	Cinema
W4	Rainy	Yes	Poor	Cinema
W5	Rainy	No	Rich	Stay in
W6	Rainy	Yes	Poor	Cinema
W7	Windy	No	Poor	Cinema
W8	Windy	No	Rich	Shopping
W9	Windy	Yes	Rich	Cinema
W10	Sunny	No	Rich	Tennis

(OR)

(b) Explain the working, mathematical notation and splitting criteria of CART Algorithm Techniques? **(12 Marks)**

Q4. **(a)** For the following given transaction data set, generate rules using Apriori Algorithm. Consider the values as Support=22% and Confidence= 70%. **(12 Marks)**

Marks **BL** **CO**
12 **3** **4**

Transaction ID	Items Purchased
1	I1,I2,I5
2	I2,I4
3	I2,I3
4	I1,I2,I4
5	I1,I3
6	I2,I3
7	I1,I3
8	I1,I2,I3,I5
9	I1,I2,I3

(OR)

(b) Demonstrate the working of DBSCAN clustering and BIRCH Clustering Algorithm with neat and clean flowchart and mathematical notation. **(12 Marks)**

Q5. **(a)** Elaborate all Performance metrics for Clustering with mathematical notations. **(12 Marks)**

Marks **BL** **CO**
12 **3** **5**

(OR)

(b) Elaborate all Performance metrics for Classification with mathematical notations. **(12 Marks)**

End of Question Paper