

Course: B. Tech.

Semester: VI

Branch: Artificial Intelligence and Data Science Engineering and Allied

Subject Code & Name: BTAIC602 Advanced Machine Learning

Max Marks: 60

Date: 15/06/2024

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. Use of non-programmable scientific calculators is allowed.
3. Assume suitable data wherever necessary and mention it clearly.

Marks

Q.1 Solve Any Two of the following

- A) Apply K means algorithm to find 2 clusters for the given data, consider initial centroids as A (1, 2) and C (8, 1). 6

Point	x-coordinate	y-coordinate
A	1	2
B	5	8
C	8	1
D	1	6

- B) Explain the terms: i) Feature extraction ii) Feature selection iii) Silhouette Coefficient 6
- C) What is hierarchical clustering? Explain Divisive hierarchical approach. 6

Q.2 Solve Any Two of the following.

- A) Compute Support , Lift and confidence on the given transactions (T1 to T5) for mentioned association rules on items A,B,C,D,E 6

Transactions:

T1	A	B	C
T2	A	C	D
T3	B	C	D
T4	A	D	E
T5	B	C	E

Association rules:

- i) A -> D
- ii) C -> A
- iii) A -> C
- iv) B & C -> D

- B) What are recommendation engines and how do they work to provide personalized recommendation to users? 6

- C) Explain memory based and model based collaborative filtering 6

Q.3 Solve any Two of the following.

- A) Define Agent, environment, and policy. 6

Identify agent, environment, state, policy, and reward in reinforcement learning

Scenario: A robot vacuum cleaner is tasked with navigating a room and cleaning all the dirt patches.

- B) Explain exploration and exploitation dilemma 6

- C) Explain Q learning algorithm with example 6

Q.4 Solve the following.

- A) What is time series analysis and why is it important in the context of data science and machine learning 6

- B) Explain key components of a time series- Trend, Seasonal Variation 6

- C) What is AR model and how does it relate to time series? 6

Q.5 Solve Any Two of the following.

- A) Explain different types of boosting algorithm. 6

- B) Explain the following performance metric: 6

i) Precision

ii) Mean squared Error

iii) AUC-ROC

- C) What is cross validation technique? Explain k fold cross validation method. 6

*** End ***