NORTHERN UNIVERSITY
NUB
BANGLADESH
Knowledge for Innovation and Change

Department of Computer Science and Engineering

Course code: CSE 4355 Course Title: Artificial Intelligence and Expert Systems

Time: 1 hr. 20 min Mid-Term Exam – Fall 21 Part: B

WRITTEN

(Answer any two from the following questions)

Attributes				Classes
Outlook	Temperature	Humidity	Windy	Play Golf
Rainy	Hot	High	FALSE	No
Rainy	Hot	High	TRUE	No
Overcast	Hot	High	FALSE	Yes
Sunny	Mild	High	FALSE	Yes
Sunny	Cool	Normal	FALSE	Yes
Sunny	Cool	Normal	TRUE	No
Overcast	Cool	Normal	TRUE	Yes
Rainy	Mild	High	FALSE	No
Rainy	Cool	Normal	FALSE	Yes
Sunny	Mild	Normal	FALSE	Yes
Rainy	Mild	Normal	TRUE	Yes
Overcast	Mild	High	TRUE	Yes
Overcast	Hot	Normal	FALSE	Yes
Sunny	Mild	High	TRUE	No

Figure 1: Exercise on Decision Trees

[10+10+10]

1. Define information gain. Find the information gain of (play golf, outlook) from the above figure. i.e. I.G(play golf, outlook) = ?

2. Find the conditional entropy of (play golf, temperature) from the above figure. i.e. H(play golf/temperature) = ?. Briefly differentiate among AI, ML, DL and DS.

3. Define cross validation. Briefly describe overfitting problem. How can we remove overfitting problem?