BRAC UNIVERSITY

Department of Computer Science and Engineering

CSE422: Artificial Intelligence

[Solve any two of the following problems and submit]

Question 1

Color	*Size*	*Shape*	*Edible*
Yellow	Small	Round	Yes
Yellow	Small	Round	No
Green	Small	Irregular	Yes
Green	Large	Irregular	No
Yellow	Large	Round	Yes
Yellow	Small	Round	Yes
Yellow	Small	Round	Yes
Yellow	Small	Round	Yes
Green	Small	Round	No
Yellow	Large	Round	No
Yellow	Large	Round	Yes
Yellow	Large	Round	No
Yellow	Large	Round	No
Yellow	Large	Round	No
Yellow	Small	Irregular	Yes
Yellow	Large	Irregular	Yes

a) Considering Edible as the class, compute the entropy for the dataset.
b) Between Color, Size, and Shape, which one is the better feature at the root node? Show full calculation and explain.

Question 2

Considering the following table, try to fit the data points using y=wx+b, where you have to find out fitting values for w and b. Assume that the initial values are w = 9 and b = 2.
-Find out the loss value using the squared error loss function.
-Apply one iteration of gradient descent to update the values for w and b. (Learning rate = 0.001)

X	Y
2	12
4	22
6	35

Question 3

Considering the following table, try to fit the data points using y=wx+b, where you have to find out fitting values for w and b. [Apply appropriate non-linearity if applicable]
Assume that the initial values are w = 2 and b = 5.
-Scale the data point feature(s) using a min-max scaler.
-On the scaled data, find out the loss value using the binary cross-entropy loss function.
-Apply one iteration of gradient descent to update the values for w and b. (Learning rate = 0.001)

X	Y
11	No
23	No
32	Yes