BRAC UNIVERSITY

Department of Computer Science and Engineering

CSE422: Artificial Intelligence

Question 1

P(Study^Cheat ^Pass)	Study		~Study	
	Cheat	~Cheat	Cheat	~Cheat
Pass	.25	.15	.10	.13
~Pass	.02	.03	.22	.10

Compute whether cheat and pass conditionally independent given study. Show all calculations.

Question 2

P(Cold^Cloudy ^Rain)	Cloudy		~Cloudy	
	Rain	~Rain	Rain	~Rain
Cold	.32	.06	.26	.03
~Cold	.12	.04	.10	.07

a) Compute the marginal probability of ~Cold.

b) Compute the probability of not cloudy given the it is not raining and the weather being not cold

c) Compute the probability of not raining given it is not cloudy.

Question 3

	B		!B	
	C	!C	C	!C
A	Y	.022	.19	.37
!A	.214	.034	.01	X

Considering P(B) = .28, find if A and B are conditionally independent of each other given C. Show full calculation.

Question 4

SL	Outlook	Humidity	Temp	Wind	Play Tennis
1	Overcast	Cool	Normal	TRUE	Yes
2	Sunny	Mild	High	FALSE	No
3	Sunny	Cool	Normal	FALSE	Yes
4	Rainy	Mild	Normal	FALSE	Yes
5	Sunny	Mild	High	FALSE	No
6	Overcast	Mild	High	TRUE	Yes
7	Sunny	Hot	High	TRUE	No
8	Sunny	Mild	Normal	TRUE	Yes

a) Is a player going to play tennis given the outlook is Sunny, humidity is Mild, temperature is Normal, and the weather is windy? Apply Naive Bayes and show proper calculations with the learning phase.
b) Is the player going to play tennis if the outlook is overcast, humidity is hot instead? Show full calculation.

Question 5

A patient went to the hospital and diagnosed Covid Positive. The doctors informed him that their test can successfully detect Covid positive 93% of the time and successfully detect Covid negative 94% of the time. If stats say that around 9% people are covid affected globally, what is the actual probability of the patient having no covid?