**PHIL 1300: Introduction to Logic**

**Problem Set 5 REVISED ANSWER KEY**

**\*\* This problem set was revised on 08 April 2022 from the original issued at the start of the course. Complete this revised problem set for your credit for Problem Set 5 in PHIL 1300**

Each of these five questions will be graded out of 10 marks. The total possible high score for this problem set is 50 marks.

**1) Chapter 8: Question 8.2:**

Pr(S/L) = Pr(L/S) x Pr(S) / [Pr(L/S) x Pr(S)] + [Pr(L/~S) x Pr(~S)]

Pr(S/L) = 0.14 x 0.2 / [0.14 x 0.2] + [0.1 x 0.98]

Pr(S|L)=2/9 ≈ 0.22

**2) Chapter 8: Question 8.6:**

**a)**

Pr(Y) = [Pr(Y/A) x Pr(A)] + [Pr(Y/B) x Pr(B)]

Pr(Y) = [0.3 x 0.8] + [0.8 X 0.2]

Pr(Y) = 2/5 = 0.4

**b)**

Pr(B/Y) = Pr(Y/B) x Pr(B) / Pr(Y)

Pr(B/Y) = [0.8 x 0.2] / 0.4

Pr(B|Y)=2/5=0.4

**3) Chapter 9: Question 9.6:**

The order in which the conditions are given does not matter because each condition can reflect its order of happening.

For example, suppose that if the light was red but now is green, there is a 9/10 probability that it is safe to go. We can have R1 symbolize the proposition “light was first red” and G2 symbolize the proposition “light then became green,” and S symbolize the proposition “it is safe to go.” Then Pr(S|R1G2) is 9/10, and Pr(S|G2R1) is 9/10. The two are equivalent.

Alternatively, suppose that if the light was green but now is red, there is a 1/10 probability that it is safe to go. We can have G1 symbolize the proposition “light was first green,” R2 symbolize the proposition “light then became red,” and keep our previous symbolization S. Now we have Pr(S|G1R2)=1/10 and Pr(S|R2G1)=1/10. Both are equivalent.

**4) Chapter 11: Question 11.4:**

E(G) = [(1/50,0000) x 10,000] - 0.99 =

E(G) = - 0.79

**5) Chapter 11: Question 11.9:**

**a)**

E(T) = [- 1,200 x (1/5)] + 700

E(T)= 460 million

**b)**

E(Tg) = [- 1,200 x (1/10)] + 700

E(Tg)=580 million

**c)**

E(Tb) = [- 1,200 x (2/5)] + 700

E(Tb)=220 million

**d)** No, they won’t. Regardless of whether the study is conducted, the expected value is positive. So if they do choose to conduct the study, they will only lose money in the end.