**WEEK 3 :- PRACTICE QUESTIONS**

**1.** Using the information Gain Calculator, without changing any inputs in the confusion matrix, what is the conditional probability of getting a Positive Test, if you have a defective chip? Use the link below to access the spreadsheet. There is also an [explanation about using the Information Gain Calculator](https://www.coursera.org/learn/analytics-excel/resources/Prtwx) that you may find helpful to review beforehand.

[Information Gain Calculator.xlsx](https://d3c33hcgiwev3.cloudfront.net/_f6f6db4ff17701c688b604c51a9c1159_Information-Gain-Calculator.xlsx?Expires=1590364800&Signature=JiLf0b8S-WTugJHbd4x25wkfAz1HMjde9WjLnnQIU2g14kcc86jj0OnKyK~YT6jO7JrLVYHbGEjwfsKriQhwB3nQJo1MjQvETA-ezrhk6EiuNE2cZqvGw0wcfo1-RNjS5ATiX6d3BbmCxaRvpDfqENFbfiNgSOgE7TzQVu5HlR8_&Key-Pair-Id=APKAJLTNE6QMUY6HBC5A)

***X- The chip is defective ; Y- Getting Positive Test***

***P(Y/X) = P(Y∩X)/P(X) = 0.1(e)/0.2(a) = 0.5 = 50%***

**ANSWER:- 50%**

**2.** The conditional probability of getting a Positive Test if you have a defective chip can be written p(Test POS | "+"). What is this probability called on the Confusion Matrix?

**ANSWER:- True Positive Rate**

**3.** What is the remaining uncertainty or entropy of the test classification if we learn a chip is truly defective?

***H(X- Chip is truly defective) = H(e/a , f/a) = 1.0000***

**ANSWER:- 1 Bit**

**4.** What is the probability that a chip chosen at random from the assembly line is defective?

***This is the condition Incidence P(X)***

**ANSWER:- 0.2; (.2)**

**5.** What is the conditional Probability of Getting a “Negative” Test classification if you have a non-defective chip?

***P(Test NEG/ ‘-‘) = h/b = 0.6/0.8 = 0.75 = 75%***

**ANSWER:- 75%**

**6.** The conditional probability of getting a Negative Test if you have a non-defective chip can be written P(Y = “NEG” | X = “-”). What is this probability called on the Confusion Matrix?

**ANSWER:- True Negative Rate**

**7.** Challenging question: What is the remaining uncertainty, or entropy, of the Test Classification, if we know that a chip is not-defective?

***H(X=’-‘) = H(g/b , h/b) = 0.8113***

**ANSWER:- 0.8113 Bits**

**8.** How frequently will a non-defective chip occur?

**ANSWER:- (b) = 0.8**

**9.** What is the expected, or average, uncertainty or entropy, remaining regarding a Test Outcome, give knowledge of whether or not a chip is defective?

**ANSWER:- H(Y/X) = 0.8490**

**10.** The optical scanner breaks down and begins to classify 30% of all chips as defective completely at random. What is the random test's True Positive Rate and False Positive Rate?

True Positive Rate = e/a = 0.1/0.2

False Positive Rate = g/b = 0.6/0.8