Problem Session 1

EE3713
Chelberg

Tree Diagrams

Before leaving to work, Victor checks the weather report before deciding on carrying an umbrella or not. If the forecast is “rain”, the probability of actually having rain that day is 80%. On the other hand, if the forecast is “no rain” the probability of actually raining is equal to 10%.

During fall and winter the forecast is 70% of the time “rain” and during summer and spring it is 20%.

(a) One day, Victor missed the forecast and it rained. What is the probability that the forecast was “rain” if it was during the winter? What is the probability that the forecast was “rain” if it was during the summer?

(b) The probability of Victor missing the morning forecast is equal to 0.2 on any day in the year. If he misses the forecast, Victor will flip a fair coin to decide on carrying an umbrella or not. On the day he sees the forecast, if it says “rain” he will always carry an umbrella, and if it says “no rain”, he will never carry an umbrella. Are the events “Victor is carrying an umbrella”, and “The forecast is no rain” independent? Does your answer depend on the season?
(c) Victor is carrying an umbrella and it is not raining. What is the probability that he saw the forecast?

Combinations/Permutations/Etc.

How many 3-letter words with or without meaning, can be formed out of the letters of the word, 'LOGARITHMS', if repetition of letters is not allowed?

Problem 2

In how many different ways can the letters of the word 'DETAIL' be arranged such that the vowels must occupy only the odd positions?

Problem 3

Ten different letters of alphabet are given. Words with six letters are formed from these given letters. Find the number of words which have at least one letter repeated.
Problem 4

How many arrangements can be made out of the letters of the word 'ENGINEERING'?