Assignment 2, PME, 4th Semester, Spring 2022

Deadline: Before PME midterm exam

Assignment should be hand written.
Write your name, registration No. and section; else your assignment may not be marked.
Copying is not allowed.
Write in your own words.
Properly staple your pages (binding is not required).

1. What is the probability that if we roll 2 dice, the sum is 7?
2. A committee of 5 people is to be selected from a group of 6 men and 9 women. What is probability that it consists of 3 men and 2 women?
3. Consider the selection of a set of 4 different letters from the English alphabet.
   Suppose
   David selected A, E, R, T;
   Karen selected D, E, N, Q; and
   John selected R, E, A, T
   Note: David and John selected the same set of letters, even though they selected them in different order. Hence, these 3 people have selected only 2 different sets of 4 letters (not 3 sets!!).

   Question: How many different sets of 4 letters can be selected from the alphabet?

4. A die is tossed twice and the number of dots facing up is counted and noted in the order of occurrence. Let A be the event "number of dots in first toss is not less than number of dots in second toss," and let B be the event "number of dots in first toss is 6." Find $P[A|B]$ and $P[B|A]$.
5. A number x is selected at random in the interval [-1, 2]. Let the events $A = \{x < 0\}$, $B = \{|x - 0.5| < 0.5\}$, and $C = x > 0.75$. Find $P[A|B]$, $P[B|C]$, $P[A|C^c]$ and $P[B|C^c]$.
6. Traffic police checked the CNICs and driving licenses of all the people driving any vehicle on a particular road on a given day. 85% of the drivers were carrying valid CNICs and 75% of the drivers were carrying valid driving licenses. 65% of the drivers were carrying both valid CNICs and driving licenses. What percent of those who were carrying a valid CNIC were also carrying a valid driving license? What percent of those who were carrying a valid driving license were also carrying a valid CNIC?
7. A survey of two new antidandruff shampoos *A* and *B* was conducted by a healthcare organization. 3/4 of the people who bought shampoo *A* got rid of dandruff, whereas the 7/8 of the people who used shampoo *B* were satisfied with the shampoo. Among the surveyed people, 3/4 of them bought shampoo *A* while the rest bought shampoo *B*. What is the probability of people getting rid of dandruff irrespective of which shampoo they used?
8. Three boxes contain red and green balls. Box 1 has 5 red balls and 5 green balls, Box 2 has 7 red balls and 3 green balls, and Box 3 contains 6 red balls and 4 green balls. The probability of choosing Box 1 is 1/4, Box 2 is 1/6, and Box 3 is 1/8. What is the probability that the ball chosen is green? What is the probability that the ball chosen is red?
9. In a university, 80% of the students are studying in various engineering disciplines and the rest are pursuing non-engineering degrees. 60% of the engineering students use IEEExplore for research and 45% of non-engineering students avail the IEEExplore service. A student is randomly selected from the university and asked whether he uses IEEExplore service or not. If the student turns out to be the user of the service, what is the probability that the randomly

selected student is an engineering student? What is the probability that the randomly selected student is a non-engineering student?

10. A computer manufacturer uses chips from three sources. Chips from sources *A*, *B*, and *C* are defective with probabilities .005, .001, and .010, respectively. If a randomly selected chip is found to be defective, find the probability that the manufacturer was *A*; that the manufacturer was *C*. Assume that the proportions of chips from *A*, *B*, and *C* are 0.5, 0.1, and 0.4, respectively.