Probability and Statistics
HW#1
Due 31.10.2023

-The students are obligated to do the homework themselves.
-The copied homework will not be considered or graded.
-Homework should be ready before 23.00 on the Ninova in electronic form.

1- (a) Given the set A $= \{K, L, M, N, P\}$, determine the number of permutations of the elements of A.
(b) Given the set $B = \{R, R, R, M, M, M, S, S\}$ determine the number of permutations of the elements of B.
(c) How many different groups including 2 K's, 2 C's and 1 P can be obtained using the elements of the set $C = \{K, K, K, K, K, C, C, C, P, P, P\}$?

2- A teacher is asked to select a male or a female student from one of the two N (Noisy) or S (Silent) classes at random. In N, there are 2 female and 3 male students and in class S, there are 3 male and 6 female students. Suppose that the teacher goes to the noisy class (Event N) with probability 2/3.
(a) Find the probability that the teacher selects a female student (Event F).
(b) Find the probability that the teacher goes to the noisy class first and select a female student. And then show that the events N and F are not independent.
(c) Assume, we are given the information that a female student is selected. Find the conditional probability that the teacher had gone to the noisy class.

3- Assume that a fair coin tossed successively four times.
(a) Draw a table containing the elements of the sample space, corresponding probability, and the value of the random variable of the total number of tails.
(b) Determine the distribution function of the total number of tails.

4- There are 5 Red, 3 Green and 2 Black balls in a box. Two balls are selected and removed in succession from the box.
(a) List the elements of the sample space, corresponding probabilities and corresponding values ω of the random variable W, where W is the number of Red balls selected.
(b) Find the distribution function of the random variable W and plot its graph.

The questions will be evaluated as 1(a)- 5pts., 1(b) - 5pts., 1(c) - 5pts., 2(a)-10pts, 2(b)-5pts, 2(c)-5pts, 3(a)-15pts, 3(b)-15pts, 4(a)-15pts, 4(b)-20pts.
D.T.