Name and surname: **Date: December 12, 2019**

EXAM 8 (duration: 40 minutes)

DatZ1143: Discrete mathematics for computing
Instructor: Abuzer Yakaryılmaz
Autumn 2019

Questions

(There are 5 questions with total 10 points.)

1) What is the probability that a positive integer not exceeding 100 selected at random is divisible by 4 or 6? (2 points)

2) We have a biased coin such that the probability of getting head is twice of the probability of getting tail. What is the expected number of getting tail if we toss this biased coin five times? (2 points)

3) What is the probability of seeing a number that is prime after rolling a fair dice (2 point)?

In the 4th and 5th questions, bits are independent and a 0 bit and a 1 bit are equally likely when a bit string is randomly generated.

4) Find the probability that a randomly generated bit string of length 7 contains exactly four 0s and three 1s. (2 points)

5) Let E be the event that a randomly generated bit strings of length four contains an odd number of 1s, and let F be the event that the string starts with 1.

5.a) What are the cardinalities (i.e., the number of elements) of E, F, and $E \cap F$? (1 point)

5.b) Show that E and F are independent. (1 point)