

CSE 230 Assignment 2

Total Marks: 60

1. **(3 marks)** In CSE230 Section X, there are 12 male students and 10 female students. If 3 students are selected at random from section X, what is the probability that at most 2 females are selected?
2. Two of 10 marbles, labeled from 1 to 10, are picked from a bag without replacement.
 - a. **(2 marks)** Write down the sample space of this experiment using the set builder method.
 - b. **(3 marks)** What is the probability that the number on the second ball is smaller than the number on the first?
 - c. **(3 marks)** What is the probability that the number on one ball is even and the other is odd.
3. Natasha loves to collect marbles of different colors. She has a jar where she stores all her marbles. In that jar she has 5 red marbles, 5 blue marbles and 6 purple marbles. If she pulls 3 marbles, what is the probability:
 - a. **(2 marks)** that the marbles picked, without replacement, are in the order purple, red and blue?
 - b. **(2 marks)** that the marbles picked, with replacement, are all purple in color?

4. **(3 marks)** A Coin is thrown 3 times. What is the probability that at least one head is obtained?
5. **(3 marks)** 9 students are seated at random in 3 rows of 3 desks. Let, $A =$ "Anu and Mumu sit in the same row" and $B =$ "Anu and Mumu sit at one of the four corner desks". Are A and B independent?
6. **(3 marks)** In a room full of 13 people, what is the probability that at least 2 people have the same birthday? Assume that all birthdays are equally likely (uniform distribution) and there are 365 days in the year.
7. **(3 marks)** How many children should a family plan to have so that the probability of having at least one child of each gender is at least 0.86? [Assume that the probabilities of having a male and female child are equal.]
8. In Bangladesh, 40% of male smokers smoked cigars. In a sample of size 20 male smokers, what is the probability that
- (2 mark)** Exactly 2 of the men smoke cigars?
 - (2 marks)** At most 1 smokes cigar?
 - (2 marks)** At least 1 smokes cigar?
 - (3 marks)** What is the Expected value, Variance and Standard Deviation of the above random variable?
9. **(4 marks)** In a recent poll, 23% of the respondents supported candidate A, 19% supported candidate B, 13% supported candidate C, and 45% were undecided. If 7 people are chosen at random, what is the probability that 2 people support candidate A, 2 support candidate B, 1 support candidate C and 2 are undecided?
10. 14% of the vehicles driven on a bridge are SUVs. Richard, a toll collector, counts the number of vehicles until the first SUV crosses him. What is the probability he counts:
- (3 marks)** At most 3 vehicles
 - (3 marks)** At least 4 vehicles

11. Customers arrive at a local store at a rate of 6 per hour.

a. What is the probability that, in any 2.5 hour period, the number of customers arriving is:

(i) **(2 marks)** exactly 7

(ii) **(3 marks)** at least 10

b. **(3 marks)** A customer arrives at the local store at 3:35pm. What is the probability that the next customer arrives before 3:50pm?

12. **(6 marks)** In a sample space of 200 left-handed batsmen (LHB) and 300 right-handed batsmen (RHB), it is assumed that 0.5% of all LHB and 0.4% of all RHB have trouble playing in-swing delivery. What is the probability that exactly 1 batsman in the sample space faces difficulty playing an in-swing?