Assignment 1

Submission Deadline: 1 March, 2021

1. A committee of 3 members is to be formed consisting of one representative each from labor, management, and the public. If there are 3 possible representatives from labor, 2 from management, and 4 from the public, determine how many different committees can be formed. **[3]**

2. In how many ways can 5 differently colored marbles be arranged in a row? **[2]**

3. How many 4-digit numbers can be formed with the 10 digits $0, 1, 2, 3, ..., 9$ if (a) repetitions are allowed, (b) repetitions are not allowed, (c) the last digit must be zero and repetitions are not allowed? **[3]**

4. In the game of poker 5 cards are drawn from a pack of 52 well-shuffled cards. How many elements does the sample space contain? **[1]**

5. A box contains 7 identical marbles, except for color, of which 4 are red and 3 are green. Two marbles are selected at random (a) one by one with replacement; (b) one by one without replacement; (c) two marbles together.

   Compute the numbers of sample points in all these cases. **[3]**

6. Four different mathematics books, six different physics books, and two different chemistry books are to be arranged on a shelf. How many different arrangements are possible if (a) the books in each particular subject must all stand together, (b) only the mathematics books must stand together? **[5]**

7. Prove the identity: **[2]**

$$\binom{m+n}{k} = \sum_{j=0}^{k} \binom{m}{j}\binom{n}{k-j}.$$