DISCRETE MATHEMATICS 1

EXERCISES

PART 1. COUNTING.

1. How many different numbers can be formed by various arrangements of the six digits: $1, 1, 1, 1, 2, 3$?
2. How many different positive integers can be obtained as a sum of some or all off the numbers: $1, 3, 5, 10, 25$?
3. How many arrangements of five 0's and ten 1's are there with no consecutive 0's?
4. How many ways are there to distribute 5 (identical) apples, 6 oranges, 4 pineapples among 3 people a) without restriction, b) with each person getting at least one apple.
5. A committee has to be chosen from a set of 7 women and 4 men. How many ways are there to form the committee if
   a) the committee consists of 5 people: 3 women and 2 men,
   b) the committee can be any positive size but must have equal number of women and men,
   c) the committee consists of 4 people and at least 2 of them are women,
   d) the committee consists of 4 people and one of them must be Mr Smith?
6. How many arrangements of six 0's and five 1's are there in which the first 0 precede first 1?
7. a) How many ways are there to assign 100 different diplomats to five different continents? b) How many ways are there if 20 diplomats must be assigned to each continent?
8. How many numbers greater than 3 000 000 can be formed by permutations of $1, 2, 2, 4, 6, 6, 6$?
9. How many ways are there to form unordered collection of four pairs of people chosen from a group of 30 people?
10. How many ways are there to distribute 15 identical objects into four different boxes?
11. How many ways are there to distribute 20 different toys among 5 children a) without restriction, b) with each child getting 4 toys?
12. 6 men are to be seated round a circular table. How many ways are there to achieving this?
13. How many ways are there to choose committee consisting of 5 people chosen from 10 nations, if there must be more than one nation represented in the committee? Assume that two people of the same nation are identical.
14. How many possible results of the throw of 3 dices are there if the dices are a) different, b) identical.
15. How many different sequences of letters can be obtained by permutating letters in words: a) *computer*, b) *mathematics*?