

**Class 11<sup>th</sup>**  
**NCERT Maths**  
**Chapter 6**  
**PERMUTATIONS**  
**AND**  
**COMBINATIONS**  
**EXERCISE 6.1**

1. How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that

- (i) repetition of the digits is allowed?
- (ii) repetition of the digits is not allowed?

**Solution:**

(i) When repetition of digits is allowed:

No. of ways of choosing first digit = 5

No. of ways of choosing second digit = 5

No. of ways of choosing third digit = 5

By [fundamental counting principle](#),

Total possible number of ways =  $5 \times 5 \times 5 = 125$ .

(ii) When repetition of digits is not allowed:

No. of ways of choosing first digit = 5

No. of ways of choosing second digit = 4

No. of ways of choosing to third digit = 3

By fundamental counting principle,

Total possible number of ways =  $5 \times 4 \times 3 = 60$

2. How many 3-digit even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated?

**Solution:**

For the number to be even the last digit must be 2, 4, or 6.

No. of ways of choosing first digit = 6

No. of ways of choosing second digit = 6

No. of ways of choosing the third digit = 3

By fundamental counting principle,

Therefore, total possible number of ways =  $6 \times 6 \times 3 = 108$

**3. How many 4-letter code can be formed using the first 10 letters of the English alphabet, if no letter can be repeated?**

**Solution:**

When repetition of alphabets is not allowed:

No. of ways of choosing first alphabet = 10

No. of ways of choosing second alphabet = 9

No. of ways of choosing to third alphabet = 8

No. of ways of choosing to fourth alphabet = 7

By fundamental counting principle,

Total possible number of ways =  $10 \times 9 \times 8 \times 7 = 5040$

**4. How many 5-digit telephone numbers can be constructed using the digits 0 to 9 if each number starts with 67 and no digit appears more than once?**

**Solution:**

There are 10 digits from 0 to 9.

In the 5-digit telephone number, the first two digits are 6 and 7. So only the digits from 0 to 9 other than 6 and 7 are available now.

No. of ways of filling third place = 8

No. of ways of filling fourth place = 7

No. of ways of filling fifth place = 6

By [fundamental counting principle](#),

The number of telephone numbers that can be constructed =  $8 \times 7 \times 6 = 336$

**5. A coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there?**

**Solution:**

Given the coin is tossed 3 times. When a coin is tossed there are only 2 possible outcomes (head and tail). Thus,

No. of ways of the first outcome = 2

No. of ways of the second outcome = 2

No. of ways of the third outcome = 2

By fundamental counting principle,

Total possible number of ways =  $2 \times 2 \times 2 = 8$

**6. Given 5 flags of different colours, how many different signals can be generated if each signal requires the use of 2 flags, one below the other?**

**Solution:**

A signal can have only 2 flags. The total number of flags available is 5. So

No. of ways of choosing first flag = 5

No. of ways of choosing the second flag = 4

By fundamental counting principle,

Therefore, total possible number of ways =  $5 \times 4 = 20$