

CBSE Class-11 Mathematics
NCERT Solutions
Chapter - 7 Permutations and Combinations
Exercise 7.1

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.

Ans. (i) Given digits are 1, 2, 3, 4, 5 and repetition of digits are allowed.

(D3)	(D2)	(D1)
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First digit (D1) can be arranged in 5 ways

Second digit (D2) can be arranged in 5 ways, because repetition is allowed.

Similarly, Third digit (D3) can be arranged in 5 ways

∴ Total number of three digit numbers $5 \times 5 \times 5 = 125$

(ii) Given digits are 1, 2, 3, 4, 5 and repetition of digits are not allowed.

(D3)	(D2)	(D1)
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First digit (D1) can be arranged in 5 ways

Second digit (D2) can be arranged in any of the remaining 4 digits because repetition is not allowed. So it can be done in 4 ways.

Similarly, Third digit (D3) can be arranged in 3 ways

∴ Total number of three digit numbers $5 \times 4 \times 3 = 60$

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?

Ans.

Even numbers always end with a digit of 0, 2, 4, 6 or 8.

Given digits are 1, 2, 3, 4, 5, 6 and repetition of digits are allowed.

So unit place (D1) can be arranged by 2, 4 or 6.

(D3)	(D2)	(D1)
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Second digit (D2) can be arranged in 6 ways because repetition is allowed. So it can be done in 6 ways.

Similarly, Third digit (D3) can be arranged in 6 ways

∴ Total number of three digit numbers $3 \times 6 \times 6 = 108$.

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

Ans.

L1	L2	L3	L4
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First letter (L1) can be arranged in 10 ways.

Second letter (L2) can be arranged in 9 ways, because repetition is not allowed.

Similarly, L3 and L4 can be arranged in 8 and 7 ways respectively .

∴ Total number of four letter code is $10 \times 9 \times 8 \times 7 = 5040$

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?

Ans.

6	7	D1	D2	D3
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We need to create a five digit phone numbers which is always start with 67.

First two places have already filled with 67. Rest three places can be filled with digits from 0

to 9 also digits are not allowed to repeat.

Now, D3 can be arranged using digits 0 to 9 except 6 & 7.

Therefore D3 can be arranged in 8 ways.

D2 can be arranged in remaining 7 digits, so it can be done in 7 ways.

D1 can be arranged in remaining 6 digits, so it can be done in 6 ways.

∴ the total number of 5 - digit telephone numbers start with 67 is $8 \times 7 \times 6 = 336$.

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

Ans.



When a coin is tossed, we get two outcomes either head or tail.

In each throw the number of ways of getting different outcome is 2.

Given that the coin is tossed three times,

So, using the multiplication principle, the number of possible outcome = $2 \times 2 \times 2 = 8$.

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?

Ans.

F1	F2
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Given each signal requires the use of two flags namely F1 and F2.

We need to generate different signals, so repetition of flags are not allowed.

F1 can be arranged in 5 ways and F2 can be arranged in 4 ways because repetition of flags are not allowed.

By using multiplication principles, the total number of signals = $5 \times 4 = 20$.