QB365

Important Questions - Permutation and Combination

11th Standard CBSE

Mathematics Reg.No. : | | | | | |

Time : 01:00:00 Hrs

Total Marks : 50

Section-A

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

2) How many 4-digit numbers are there, when a digit may be repeated any number of times? **2**

3) Out of 6 gentleman and 4 ladies a committee od 5 is to be formed . In how many wys can this be done so as to include atleast on elady in each committee? **2**

4) In an examination, there are three multiple choice questions and each question has 4 choices. Find the number of ways in which a student can fail to get all answer correct. **2**

5) Evaluate the following: $^{14}C_3$ **2**

6) In how many ways can 5 children be arranged in a line such that **2**

(i) two particular children of them are always together?

(ii) two particular children of them are never together?

Section-B

7) Evaluate the following: $^{35}C_{35}$ **3**

8) In how many ways, can 5 sportsmen be selected a group of 10? **3**

9) A code word is to consist of two distinct English alphabets followed by two distinct numbers between 1 and 9. e.g. CA23 is code word. **3**

(i) How many such code words are there ?

(ii) How many of them end with an even integer ?

10) Find the number of different signals that can be generated by arranging atleast 2 flags in order (one below the other) on a vertical staff, if five different flags are vailable. **3**

11) Compute $\frac{(12!)-(10!)}{9!}$. **3**

12) How many chords can be drawn through 21 points on a circle? **3**

Section-C

13) If P(9,r) =3024, find r. **4**

14) Five persons entered in the lift cabin on the ground floor of an 8-floor house. Suppose each of them can leave the cabinindependently at any floor begining with the first. Find the total number of ways in which each of the five persons can leave the cabin **4**

(i) at anyone of the 7 floor.

(ii) at different floors.

15) If $^{28}C_{2r}$: $^{24}C_{2r-4}$ = 225 : 11 , find r **4**

16) A flag is in the form of three blocks, each to be coloured differently . If there are 8 different colours to hoose from , then how many flags are possible? **4**

17) How many 5 digit telephone number can be constructed using the dgits 0to9, if each number starts with 67 (e.g 67125) and no digit appear more than once? **4**

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Section-A

1) **2**

In unit's place number, only one even number (2,4) can be placed in 2 ways and in ten's place, anyone of the given number can be placed.

Ans. 10

2) **2**

0 cannot be placed at thousand's place. So, thousand's place can be filled in 9 ways. Since repitition of digits is allowed, therefore each of the remaining 3 places can be filled in 10 ways.

Ans. 9000

3) 246 **2**

4) **2**

Since, each question can be answered in 4 ways.

So, the total number of ways answering 3 questions is $4\times4\times4$ = 64

Out of these possible answers, only one will be correct and hence the number of ways in which a student can fail to get all correct answer is 64-1=63.

5) $^{14}C_3 = \frac{14!}{3!(14-3)!}$ $\left[\because \quad {}^nC_r = \frac{n!}{r!(n-r)!}\right]$ **2**

$= \frac{14!}{3!(14-3)!} = \frac{14\times13\times12\times11!}{(3\times2\times1)\times11!}$

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= $14\times13\times2$ = 364

6) **2**

(i) Let us take 2 particular children together as one. Now, the remaining 4 (particular children's and other three children's) can be arranged in 4! = 24 ways. Again two particular children taken together can be arranged in 2! = 2 ways.

Hence, there are 24 X 2 = 48 ways of arrangement.

(ii) Clearly, required number of arrangements = Number of permutation of 5 children taken all at a time - Number of permutation of children in which two particular children are together

= 5! - 4! X 2 = 5 X 4! - 4! X 2

= 4! (5-2) = 24 X 3 = 72

Hence, required number of arrangements = 72

Section-B

7) $^{35}C_{35} = 1$ $[\because \quad {}^n\,C_n = 1]$ **3**

8) Required numbers of ways = $^{14}C_3$ $\frac{10\times9\times8\times7\times6}{5\times4\times3\times2\times1} = 2\times3\times7\times6\times = 252$ **3**

9) 3

There are in all 26 English alphabets, we have to choose 2 distinct alphabets.

1st alphabet can be selected in 26 ways.

2nd alphabet can be selected in 25 ways.

Again, out of 9 digits (1 to 9),

1st number can be selected in 9 ways.

2nd number can be selected in 8 ways.

Thus, by the fundamental principle of multiplication, the number of distinct codes $= 26 \times 25 \times 9 \times 8 =$ 46800 (ii) As above, two distinct alphabets can be selected in 26×25 ways.

We have, in all 1, 2, 3, 4, 5, 6, 7, 8 and 9 digits, unit place can be filled up in 4 ways (by 2, 4, 6, 8). Ten's place can be filled up in 8 ways.

[since, one of the digits is already used]

Thus, the number of such codes $= 26 \times 25 \times 8 \times 4 = 20800$

10) 3

Here, we have to find number of different signals that can be generated by arranging atleast 2 flags in order.

So a signal can consist of either 2 flags, 3 flags, 4 flags or 5 flags. If a signal consist of 2 flags, then two vacant places are available.

$\therefore$ Number of ways of filling first vacant place = 5

and number of ways of filling second vacant place = 4

Thus, total number of signals consisting 2 flags

$= 5 \times 4 = 20$

Now, if a signal consist of 3 flags, then three vacant places are available.

$\therefore$ Number of ways of filling first vacant olace = 5

number of ways of filling second vacant place = 4

and number of ways of filling third vacant place = 3

Thus, total number of signals consisting 3 flags

$= 5 \times 4 \times 3 = 60$

Similarly, total number of signals consisting 4 flags

$= 5 \times 4 \times 3 \times 2 = 120$

and total number of signals consisting 5 flags

$= 5 \times 4 \times 3 \times 2 \times 1 = 120$

Since, different signals can be generated by arranging either 2 flags or 3 flags or 4 flags or 5 flags.

$\therefore$ Total number of signals = 20 + 60 + 120 + 120 = 320

11) Consider, $\frac{(12!)-(10!)}{9!} = \frac{12\times11\times10!-10!}{9!} = \frac{10!(132-1)}{9!}$ 3

$= \frac{10\times9!\times131}{9!} = 1310$

12) 3

Clearly , number of chords that can be drawn from 21 points ${}^{21}C_2 = \frac{21\times20}{2\times1}$ = 210 Hence , total number of cords that can be drwan through 21 points on a circle is 21

Section-C

13) We have, P(9, r) = 3024 ⇒ ^9P_r =3024 **4**

$\Rightarrow \quad \frac{9!}{(9-r)!} = 3024 \Rightarrow \frac{9!}{(9-r)!} = 9 \times 336$

$\Rightarrow \quad \frac{9!}{(9-r)!} = 9 \times 8 \times 7 \times 6$

$\Rightarrow \quad \frac{9!}{(9-r)!} = \frac{9\times8\times7\times6\times5!}{5!}$

[multiplying numerator and denominator by 5!]

$\Rightarrow \quad \frac{9!}{(9-r)!} = \frac{9!}{5!} = (9-r)! = 5!$

On comparing, we get

$9 - r = 5 \Rightarrow r = 4$

14) **4**

(i) Each person can leave the cabin at anyone of the seven floors. So, each person can leave the cabin in 7 ways.

Ans. 7^5

(ii) First person can leave the cabn at anyone of the seven floors. Second person can leave the cabin at anyone of the remaining 6 floors. Similarly, we can calculate for other.

Ans. 2520

15) Use $^nC_r = \frac{n!}{r!(n-r)!}$ and simplify **4**

Ans. 7

16) Total number of flags possible = $^8P_3$ **4**

17) **4**

In 5 digit telephone number, first two digits are fixed and rest of the three place number appears 8, 7, 6 ways.

∴ Required number of ways = 8 x 7 x 6