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Permutation and Combination Questions for Bank Exams.

Permutation and Combination Quiz 2

Directions: Study the following set of questions carefully and answer the questions given below.

1. In a language, there are six different words. A sentence can be formed by at least 2 words. If order of words is changed in a sentence, we get a different sentence. How many different sentences can be formed in this language?

A. 1870 B. 1970 C. 1950 D. 2190 E. 2280

2. How many 3 - letter words with or without meaning, can be formed out of the letters of the word, 'LOGARITHMS', if repetition of letters is not allowed?

A. 720 B. 420 C. 5040 D. 120 E. None of these

3. There are 2 shirts, 3 jeans, 3 socks and 2 skirts. In how many ways a shopkeeper can arrange these things so that all the socks come together and all the skirts come together?

A. 2520 B. 5040 C. 4690 D. 3260 E. None of these

4. In how many different ways can the letters of the word WINDOW be arranged in such a way that the vowels never come together?

A. 350 B. 250 C. 720 D. 300 E. None of these

5. The number of ways in which 8 different books can be arranged on a shelf so that 3 particular books shall not be together:

A. 11! – 3! B. 361000 C. 8! × 3! – 5! D. 36000 E. None of these

6. In a room everybody shakes hands with everybody else. The total number of hand-shakes is 66. The total number of persons in the room is:

A. 11 B. 14 C. 10 D. 12 E. None of these

7. How many numbers are there in between 100 and 1000 such that exactly one of their digits is 3 if repetition is not allowed?

A. 100 B. 200 C. 300 D. 525 E. None of these

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8. In how many ways a word NEWSPAPER can be arranged so that N, S and W always come together?

A. 1530 B. 1450 C. 1130 D. 1260 E. None of these

9. In how many ways a group of 3 students can be selected from 7 men and 5 women consisting of 1 man and 2 women?

A. 7 B. 110 C. 60 D. 70 E. None of these

10. In an auditorium the chairs were arranged such that the number of rows were 3 more than the number of columns. The chairs are rearranged by removing 3 columns and adding 6 rows without adding or removing any chair. How many people can sit in that auditorium at a time?

A. 124 B. 96 C. 108 D. 98 E. 88

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Correct Answers:

1	2	3	4	5	6	7	8	9	10
C	A	B	D	D	D	B	D	D	C

Explanations:

1. Here, different order gives different sentence. So, permutations are needed to make sentences.
⇒ Different sentences that can be formed = ${}^6P_2 + {}^6P_3 + {}^6P_4 + {}^6P_5 + {}^6P_6 = 30 + 120 + 360 + 720 + 720 = 1950$
Hence, option (C) is correct.

2. The word 'LOGARITHMS'' has 10 different alphabets
Hence, the number of 3-letter words (with or without meaning) formed by using these letters = $({}^{10}P_3)$
$= 10 \times 9 \times 8 = 720$
Therefore, option (A) is correct.

3. We will count 3 socks as 1 socks and 2 skirts as 1 skirt.
Total ways = 7!
$= 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 5040$
Hence, option B is correct.

4. Total ways = $\frac{6!}{2!} = 360$
ways when all the vowels always come together = $\frac{5!}{2!} = 60$
Ways when all the vowels never come together = 360 – 60 = 300
Hence, option D is correct.

5. Number of ways in which 8 books can be arranged = 8!
Number of ways when three particular books are together = 6! X 3!
Therefore Number of ways when three particular books are not together = 8! – 6! X 3!
= 6!(7 x 8 – 3 x 2)
= 6! X 50 = 720 × 50 = 36000
Hence, option D is correct.

6. Let the total number of persons be N.
Given, total number of hand-shakes is 66
For a hand shake we require two people, total number of handshake is ${}^NC_2$
$\therefore {}^NC_2 = 66$
$\therefore \frac{N(N-1)}{2} = 66$
$\Rightarrow N^2 - N = 132$
$\Rightarrow N^2 - N - 132 = 0$

⇒ (N–12)(N+11) = 0
⇒ N = 12 persons
Hence option D is correct.

7. Surely 3 can occur at either hundreds place or tens place or units place. So three cases arise.
a) If 3 occurs at hundredths place then the digit at tens place can be chosen in only nine ways (all ten digits leaving only 3 so we are left with 9 digits) and digit at units place can be chosen in only 8 ways (as 3 and digit at tens place cannot be used again)
So total such numbers = 1×9×8 = 72
b) If 3 occurs at tens place then its hundreds place can be only chosen in only 8 ways (because use of 3 is not allowed and if we use 0 out of the remaining 9 digits it will be a 2-digit number which is not allowed) and unit place can be chosen only in 8 ways (since digit at hundredths place and 3 is not allowed)
So total such numbers = 8 × 1 × 8 = 64
c) If 3 occurs at units place then its hundreds place can be chosen in only 8 ways (because use of 3 is not allowed and if we use 0 out of the remaining 9 digits it will be a 2-digit number which is not allowed) and tens place can be chosen only in 8 ways (since digit at hundredths place and 3 is not allowed)
So total such numbers = 8 × 8 × 1 = 64
Hence total such numbers = 72 + 64 + 64 = 200
Hence, option B is correct.

8. Total Words = NSW, E, P, A, P, E, R = 7
Total ways = 7! ÷ (2! × 2!)
= 7 × 6 × 5 × 4 × 3 × 2 ×1 ÷ 2 ÷ 2
= 1260
Hence, option D is correct.

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9. No. of ways of selecting one man out of 7 women = $^{7}C_{1} = 7$
No of ways of selecting 2 women out of 5 women = $^{5}C_{2} = 10$
Required ways = $^{7}C_{1} \times {}^{5}C_{2} = 7 \times 10 = 70$
Hence, option D is correct.

10. Since no chair was added or removed, the capacity of the auditorium remains constant.
The capacity of the auditorium is the product of the number of rows and number of columns.
Let there be x columns and x + 3 rows, then
$x(x + 3) = (x – 3)(x + 9)$
$\therefore x^2 + 3x = x^2 + 6x – 27$
$\therefore x = 9$
Thus there were 9 columns and 12 rows, i.e., 9 × 12 = 108 people can sit in the auditorium at a time.
Hence, option C is correct.

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