MATHEMATICS

| Board – CBSE | Class – 11 | Topic – Permutations and Combinations |

Very Short Answer Type Questions (1 Mark)

1. Using the digits 1, 2, 3, 4, 5 how many 3 digit numbers (without repeating the digits) can be made?

2. In how many ways 7 pictures can be hanged on 9 pegs?

3. Ten buses are plying between two places A and B. In how many ways a person can travel from A to B and come back?

4. There are 10 points on a circle. By joining them how many chords can be drawn?

5. There are 10 non collinear points in a plane. By joining them how many triangles can be made?

6. If find $x \frac{1}{6!} + \frac{1}{8!} = \frac{1}{9!}$ Find x

7. If $^{n}P_4 : ^{n}P_2 = 12$, find n

8. How many different words (with or without meaning) can be made using all the vowels at a time?

9. Using 1, 2, 3, 4, 5 how many numbers greater than 10000 can be made? (Repetition not allowed)

10. If $^{n}C_{12} = ^{n}C_{13}$ then find the value of $^{25}P_n$.

11. In how many ways 4 boys can be chosen from 7 boys to make a committee?

12. How many different words can be formed by using all the letters of word SCHOOL?

13. In how many ways can the letters of the word PENCIL be arranged so that I is always next to L.

Short Answer Type Questions (4 Marks)

14. In how many ways 12 boys can be seated on 10 chairs in a row so that two particular boys always take seat?

15. In how many ways 7 positive and 5 negative signs can be arranged in a row so that no two negative signs occur together?

16. From a group of 7 boys and 5 girls, a team consisting of 4 boys and 2 girls is to be made. In how many different ways it can be done?

17. In how many ways can one select a cricket team of eleven players from 17 players in which only 6 players can bowl and exactly 5 bowlers are to be included in the team?

18. In how many ways 11 players can be chosen from 16 players so that 2 particular players are always excluded?

19. Using the digits 0, 1, 2, 2, 3 how many numbers greater than 20000 can be made?

20. If the letters of the word 'PRANAV' are arranged as in dictionary in all possible ways, then what will be 182nd word.

21. From a class of 15 students, 10 are to chosen for a picnic. There are two students who decide that either both will join or none of them will join. In how many ways can the picnic be organized?

22. Using the letters of the word, 'ARRANGEMENT' how many different words (using all letters at a time) can be made such that both A, both E, both R and both N occur together.

23. A polygon has 35 diagonals. Find the number of its sides.
    [Hint: Number of diagonals of n sided polygon is given by $^{n}C_{2-n}$]

24. How many different products can be obtained by multiplying two or more of the numbers 2, 3, 6, 7, 9?

25. Determine the number of 5 cards combinations out of a pack of 52 cards if atleast 3 out of 5 cards are ace cards?

26. How many words can be formed from the letters of the word 'ORDINATE'

Long Answer Type Questions (6 Marks)

27. Using the digits 0, 1, 2, 3, 4, 5, 6 how many 4 digits even numbers can be made, no digit being repeated?

28. There are 15 points in a plane out of which only 6 are in a straight line, then
    a) How many different straight lines can be made?
    b) How many triangles can be made?

29. If there are 7 boys and 5 girls in a class, then in how many ways they can be seated in a row such that
    i. No two girls sit together?
    ii. All the girls never sit together?

30. Using the letters of the word 'EDUCATION' how many words using 6 letters can be made so that every word contains atleast 4 vowels?

31. What is the number of ways of choosing 4 cards from a deck of 52 cards? In how many of these,
    a) 3 are red and 1 is black.
    b) All 4 cards are from different suits.
    c) Atleast 3 are face cards.
    d) All 4 cards are of the same color.

32. How many 3 letter words can be formed using the letters of the word INEFFECTIVE?

33. How many 5 letter words containing 3 vowels and 2 consonants can be formed using the letters of the word EQUATION so that 3 vowels always occur together?

Answer

1. 60
2. $\dfrac{9!}{2!}$
3. 100
4. 45
5. 120
6. 513
7. n = 6
8. 120
9. 120
10. 1
11. 35
12. 360
13. 120
14. $90 \times {}^{10}P_8$
15. 56
16. 350
17. 2772
18. 364
19. 36
20. PAANVR
21. ${}^{13}C_{10} + {}^{13}C_8$
22. 5040
23. 10
24. 26
25. 4560
26. 576
27. 420

28. a. 91

    b. 435

29. i. $7! \times {}^8P_5$

    ii. $12! - 8! \times 5!$

30. 24480

31. ${}^{52}C_4$

    a) ${}^{26}C_1 \times {}^{26}C_3$

    b) $(13)4$

    c) 9295 (Hint: Face cards: $4J + 4K + 4Q$)

    d) $2 \times {}^{26}C_4$

32. 265 (Hint: make 3 cases i.e.

    i.   All 3 letters are different

    ii. 2 are identical 1 different

    iii. All are identical, then form the words.)

33. 1080