CLASS XI – MATHEMATICS (041)
CHAPTER 6 : PERMUTATIONS AND COMBINATIONS
PRACTICE PAPER (SESSION 2026–27)

Maximum Marks: 40 **Time Allowed: 1½ Hours**

General Instructions:

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 23 questions. All questions are compulsory.
2. This question paper is divided into five Sections – A, B, C, D and E.
3. In Section A, Questions 1 to 12 are Multiple Choice Questions (MCQs) and Questions 13 and 14 are Assertion–Reason based questions of 1 mark each.
4. In Section B, Questions 15 to 18 are Very Short Answer (VSA) type questions, carrying 2 marks each.
5. In Section C, Questions 19 to 21 are Short Answer (SA) type questions, carrying 3 marks each.
6. In Section D, Question 22 is a Long Answer (LA) type question, carrying 5 marks.
7. In Section E, Question 23 is a case study based question, carrying 4 marks.
8. There is no overall choice. However, an internal choice has been provided in 2 questions of Section B (Q17, Q18), 2 questions of Section C (Q20, Q21), in Q22 of Section D and in one sub-part of Q23 of Section E.
9. Draw neat and clean figures wherever required. Use of calculators is not allowed. Leave answers as numbers (not in factorial form) unless stated otherwise.

SECTION – A **(14 × 1 = 14)**

This section comprises of 12 multiple choice questions (Q1–Q12) and 2 assertion–reason based questions (Q13–Q14) of 1 mark each.

No.	Questions	Marks
Q1.	Fig. 1 shows the roads connecting four towns P, Q, R and S. A traveller goes from P to S, passing through Q and R in that order. The number of different ways in which the journey can be made is	**1**

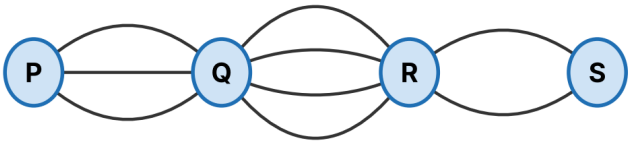
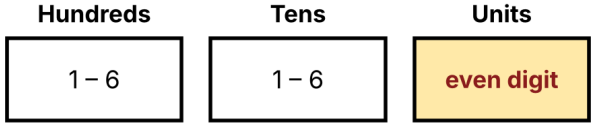


Fig. 1

(A) 9 (B) 24

(C) 12 (D) 14

Q2.	Fig. 2 shows the three places of a 3-digit number, to be filled with the digits 1, 2, 3, 4, 5, 6 (repetition allowed) so that the number is even. The number of such 3-digit numbers is	**1**



Digits 1, 2, 3, 4, 5, 6 may be repeated

Fig. 2

(A) 72 (B) 54

(C) 216 (D) 108

Q3. The value of 9! / (6! · 3!) is **1**

(A) 84 (B) 504

(C) 56 (D) 42

Q4. If ${}^{n}P_{2} = 56$, then n is equal to **1**

(A) 7 (B) 9

(C) 8 (D) 14

Q5. The number of distinct arrangements of the letters of the word BANANA is **1**

(A) 60 (B) 120

(C) 30 (D) 720

Q6. If ${}^{n}C_{2} = 45$, then n is equal to **1**

(A) 9 (B) 11

(C) 10 (D) 12

Q7. If ${}^{10}C_{r} = {}^{10}C_{r+2}$, then r is equal to **1**

(A) 3 (B) 5

(C) 2 (D) 4

Q8. Fig. 3 shows 8 points A, B, C, D, E, F, G, H on a circle. The number of triangles that can be formed with these points as vertices is **1**

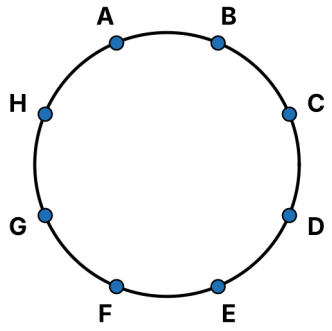


Fig. 3

(A) 28 (B) 56

(C) 336 (D) 8

Q9. The number of 3-digit numbers divisible by 5 that can be formed from the digits 0, 1, 2, 3, 4, 5 if no digit is repeated is **1**

(A) 40 (B) 48

(C) 36 (D) 30

Q10. A committee of 3 persons is to be formed from 4 men and 3 women so that it contains at least one woman. The number of ways of forming it is **1**

(A) 31 (B) 35

(C) 30 (D) 34

Q11. The number of different arrangements of the letters of the word COMMITTEE is **1**

(A) 362880 (B) 90720

(C) 181440 (D) 45360

Q12. The number of 5-digit numbers that can be formed from the digits 1, 2, 3, 4, 5 if the digits may be repeated is **1**

(A) 120 (B) 3125

(C) 625 (D) 15625

Assertion–Reason Based Questions

Directions: Question numbers 13 and 14 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer from the options (A), (B), (C) and (D) as given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

Q13. **Assertion (A):** The number of different arrangements of the letters of the word LEVEL is 30. **1**

Reason (R): The number of permutations of n different objects taken all at a time is n!.

Q14. **Assertion (A):** $^{12}C_9 = {}^{12}C_3$. **1**

Reason (R): $^{n}C_r = {}^{n}C_{n-r}$, for $0 \le r \le n$.

SECTION – B **(4 × 2 = 8)**

This section comprises of 4 very short answer (VSA) type questions of 2 marks each.

Q15. Fig. 4 is a tree diagram that lists all the 3-letter words (with or without meaning) **beginning with A**, formed from the letters A, B, C, D, when no letter is repeated. **2**

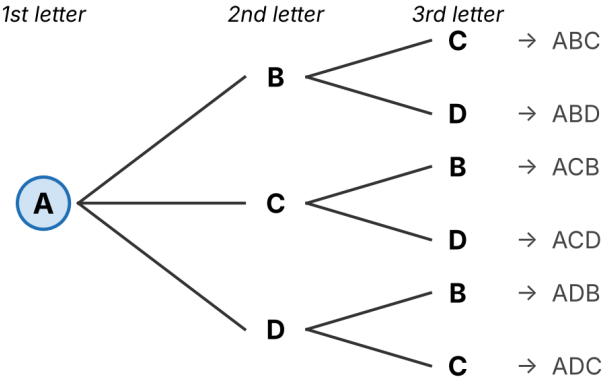


Fig. 4

(i) How many such words begin with A? **[1]**

(ii) Hence, or otherwise, find the total number of 3-letter words that can be formed from the four letters A, B, C, D without repetition. **[1]**

Q16. Find n, if $(n + 1)! / (n - 1)! = 20$. **2**

Q17. **(A)** How many 4-letter words, with or without meaning, can be formed from the letters of the word PRINCE, without repetition of letters, if each word begins with a vowel? **2**

OR

(B) If $^{n}C_{10} = {}^{n}C_{14}$, find the value of $^{n}C_{22}$.

Q18. **(A)** A bag contains 5 red balls and 4 blue balls. In how many ways can 3 red balls and 2 blue balls be selected? **2**

OR

(B) At a meeting, each of 10 persons shakes hands exactly once with every other person. Find the total number of handshakes.

SECTION – C (3 × 3 = 9)

This section comprises of 3 short answer (SA) type questions of 3 marks each.

Q19. Fig. 5 shows a rectangular grid of streets. A cyclist travels from A to B by the shortest routes, moving only one step to the right (R) or one step up (U) at a time. P is a point on the grid. **3**

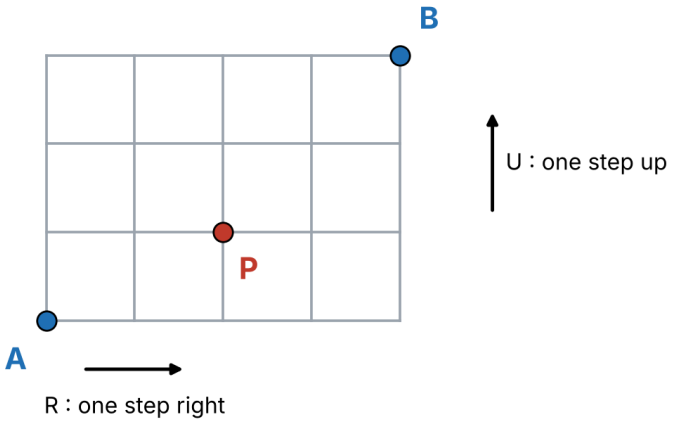


Fig. 5

(i) How many R-steps and how many U-steps does every shortest route from A to B contain? **[1]**

(ii) Find the number of shortest routes from A to B. **[1]**

(iii) Find the number of shortest routes from A to B that pass through P. **[1]**

Q20. **(A)** Find the number of arrangements of the letters of the word ENGINEERING. In how many of these arrangements does the word begin with R and end with G? **3**

OR

(B) A question paper has 10 questions, 5 in Part I and 5 in Part II. A student has to answer 6 questions, choosing at least 2 from each part. In how many ways can the student choose the questions?

Q21. **(A)** In how many ways can 4 men and 3 women be seated in a row so that the women occupy the even places? **3**

OR

(B) The letters of the word SMART are arranged in all possible ways and the words so formed (with or without meaning) are listed in dictionary order. Find the position of the word SMART in this list.

SECTION – D (1 × 5 = 5)

This section comprises of 1 long answer (LA) type question of 5 marks.

Q22. **(A)** Find the number of different 8-letter arrangements of the letters of the word TRIANGLE (each letter used exactly once) in which (i) all the vowels occur together, **[2]** (ii) no two vowels are together, **[2]** (iii) the word begins with T and ends with E. **[1]** **5**

OR

(B) A committee of 6 is to be formed from 7 men and 6 women. In how many ways can this be done if the committee contains (i) exactly 3 women, **[1]** (ii) at least 4 women, **[2]** (iii) at most 2 women? **[2]**

SECTION – E (1 × 4 = 4)

This section comprises of 1 case study based question of 4 marks with sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively.

Q23. **Case Study:** The quiz club of a school has 7 boys and 5 girls, as shown in Fig. 6. The teacher has to select a team of 5 members from the club for an inter-school quiz. **4**

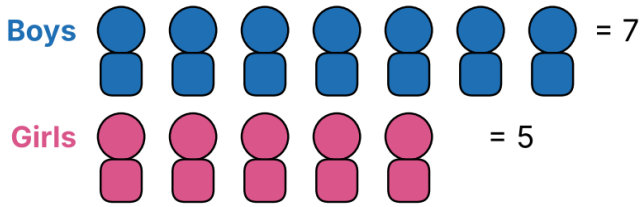


Fig. 6

Based on the given information, answer the following questions:

(i) In how many ways can the team of 5 members be selected from the club? **[1]**

(ii) In how many ways can the team be selected so that it has exactly 3 boys? **[1]**

(iii) **(a)** In how many ways can the team be selected so that it has at least 4 boys? **[2]**

OR

(b) Two particular students, Aman (a boy) and Diya (a girl), refuse to be in the same team. In how many ways can the team be selected? **[2]**

— End of Question Paper —