

CHAPTER-7
PERMUTATIONS & COMBINATIONS
03 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	<p>From a college of 35 students, 15 students are to be chosen for an excursion party. Ravi, shyam and raju are best friends. They decided that either we three of them go or none of them go for excursion. In how many ways can the excursion party be chosen?</p> 	3
2.	<p>In India Pakistan world cup match. BCCI decided to choose 11 players from 14 eligible players in which 5 are bowlers, 4 are batsman. In how many ways a team of 11 may be formed with</p> <p>(a) at least 4 bowlers? (a) Exactly 4 batsman? (b) 3 bowlers and 2 batsman?</p> 	3
3.	<p>In a school group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has</p> <p>(i) No girl? (ii) At least one boy and one girl? (iii) At least three girls?</p> 	3
4.	<p>We wish to select 6 persons from 8 persons, but if the person A is chosen, then B must be chosen in how many ways can selection be made.</p>	3
5.	<p>There are 10 points in a plane of which 4 are collinear. How many different straight lines can be drawn by joining these points?</p>	3
6.	<p>In the debate competition 3 prizes are to be given. Number of participant are 5. Find the number of ways the prizes can be distributed.</p> <p>i) No student gets more than one prize. ii) One student may get any number of prizes.</p>	3

	iii) No students gets all the prizes.	
7.	A sports team of 11 students is to be constituted, choosing at least 5 from Class XI and at least 5 from Class XII. If there are 20 students in each of these classes, in how many ways can the team be constituted?	3
8.	From a class of 25 students, 10 are to be chosen for an excursion party. There are 3 students who decide that either all of them will join or none of them will join. In how many ways can the excursion party be chosen?	3
9.	Find the number of words with or without meaning which can be made using all the letters of the word AGAIN. If these words are written as in a dictionary, what will be the 50 th word?	3
10.	In how many ways can 5 girls and 3 boys be seated in a row so that no two boys have together	3
11.	A convex polygon has 44 diagonals. Find the number of its sides	3
12.	In how many way can one select a cricket team of eleven from 17 players in which only 5 players can bowl, if each cricket team of 11 must include exactly 4 bowler?	3

ANSWERS:

Q. NO	ANSWER	MARKS
1.	There are two cases Case I: when three of them chosen for party Rest students chosen by = ${}^{32}C_{12}$ ways Case II : when three of them not chosen for party Number of ways 15 students chosen = ${}^{32}C_{15}$ Total Number of ways = ${}^{32}C_{12} + {}^{32}C_{15}$ ways	3
2.	(a) Number of ways chosen at least 4 bowlers Given 5 Bowlers 9 other cricketers Case I : 4 bowlers & 7 other = ${}^5C_4 \times {}^9C_7 = 180$ ways Case II: 5 bowlers & 6 other = ${}^5C_5 \times {}^9C_6 = 84$ ways Total number of ways = $180 + 84 = 264$ ways (a) Exactly 4 batsman? Given 4 batsman & 10 others Number of ways = ${}^4C_4 \times {}^{10}C_7 = 120$ ways (b) 3 bowlers and 3 batsman? Number of ways = ${}^5C_3 \times {}^4C_3 \times {}^5C_5 = 40$ ways	3
3.	(i) No girl? Number of ways = ${}^7C_5 = 21$ ways (ii) At least one boy and one girl? Number of ways = ${}^4C_4 \times {}^7C_1 + {}^4C_3 \times {}^7C_2 + {}^4C_2 \times {}^7C_3 + {}^4C_1 \times {}^7C_4 = 441$ ways (iii) At least three girls? Number of ways = ${}^4C_3 \times {}^7C_2 + {}^4C_4 \times {}^7C_1 = 91$ ways	3
4.	Total number of persons = 8 Total number of persons to selected = 6 If A is chosen, then B must be chosen, so there will be two types of combinations. i) When A is chosen, then B must be taken and remaining 4 persons are to be selected from remaining 6 persons. Number of ways = $1 \times 1 \times {}^6C_4 = 15$ ii) If A is not chosen, then there are 7 persons out of which 6 persons are to be selecting. 6 persons = ${}^7C_6 = 7$ TOTAL number of ways = $15 + 7 = 22$	3
5.	A line is formed by joining two points. Number of lines formed from 10 points = ${}^{10}C_2$ From 4 points, number of line formed is 4. But 4 points are collinear, so only one line can be formed by joining them. So no. of lines formed = $({}^4C_2 - 1)$ lines. Total numbers of lines formed = ${}^{10}C_2 - ({}^4C_2 - 1) = 40$	3

6.	<p>i) Number of Prizes = 3 Number of Student = 5 Number of ways 3 prizes can be distributed among 5 students so that no student gets more than one prizes = $5 \times 4 \times 3 = 60$</p> <p>ii) First, second and third prize can be distributed in 5 ways each. So number of ways = $5 \times 5 \times 5 = 125$</p> <p>iii) Number of ways in which a student does not get all the prizes = $125 - 5 = 120$</p>	3
7.	<p>A team of 11 students can be constituted in the following two ways</p> <p>(i) 5 students from class XI and 6 students from XII = ${}^{20}C_5 \cdot {}^{20}C_6$</p> <p>(ii) 6 students from class XI and 5 students from XII = ${}^{20}C_6 \cdot {}^{20}C_5$</p> <p>The number ways the team can be constituted = Case(i)+case(ii) = ${}^{20}C_5 \cdot {}^{20}C_6 + {}^{20}C_6 \cdot {}^{20}C_5$ = $2({}^{20}C_5 \cdot {}^{20}C_6)$</p>	3
8.	<p>Excursion party be chosen in the following two ways</p> <p>(i) All the three students join. Then remaining 7 students can be chosen from the remaining 22 students in ${}^{22}C_7$ ways</p> <p>(ii) None of the 3 students join Then 10 students can be chosen from the remaining 22 students in ${}^{22}C_{10}$ ways.</p> <p>Thus Required number of ways of choosing the excursion party = ${}^{22}C_7 + {}^{22}C_7$</p>	3
9.	<p>There are 5 letters in the word AGAIN, in which A appears 2 times. Therefore, the required number of words = $5!/2! = 60$ The number of words starting with A = $4! = 24$ Then, starting with G, the number of words = $4!/2! = 12$ Similarly, starting with I, the number of words = $4!/2! = 12$ Total number of words so far obtained = $24 + 12 + 12 = 48$. The 49th word is NAAGI. The 50th word is NAAIG.</p>	3
10.	<p>Since no two boys are to be together, let us arrange 5 girls as under XG XG XG XG XG Where G denotes the position of a girl and X that of a boy. These girls may be arranged at 5 places in $5!$ ways Now, 3 boys can be seated at 6 places, each marked X. Number of ways of seating 3 boys at 6 places = 6P_3 Required number of ways = $(5!) \times {}^6P_3 = (5!) \times \frac{6!}{3!} = 14400$</p>	3
11.	<p>Let the given convex polygon have n sides. Then, the number of its diagonals (${}^nC_{2-n}$). Now, ${}^nC_{2-n} = 44 \Rightarrow \frac{n(n-1)}{2} - n = 44$ $n^2 - 3n - 88 = 0$ $\Rightarrow (n-11)(n+8) = 0$ $n = 11$ [n ≠ -8]. Hence, the given polygon has 11 sides.</p>	3

12.	Number of ways of selecting 4 bowlers out of 5 $= {}^5C_4 = {}^5C_{(5-4)} = {}^5C_1 = 5$ Number of ways of selecting 7 batsmen out of 12 $= {}^{12}C_7 = {}^{12}C_{12-7} = {}^{12}C_5 = 792.$ Hence, the number of ways of selecting the team $= (5 \times 792) = 3960.$	3
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