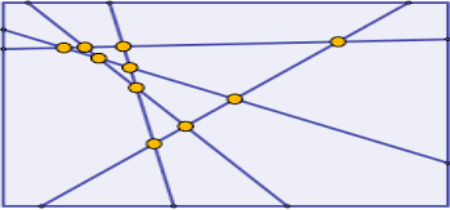


CHAPTER-7
PERMUTATIONS & COMBINATIONS
04 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	The letter of the word 'RANDOM' are written in all possible orders and these words are written out as in a dictionary. Find the rank of the word 'RANDOM'.	4
2.	<p>There are 10 points in a plane, no three of which are in the same straight line, excepting 4 points, which are collinear. Find the (i) number of straight lines obtained from the pairs of these points; (ii) number of triangles that can be formed with the vertices as these points.</p> 	4
3.	<p>Riya and her five friends went for a trip to Shimla. They stayed in a hotel. There were 4 vacant rooms A, B, C & D. Out of these 4 vacant rooms two rooms A & B were double share rooms & Two rooms C & D Can contain one person each.</p> <p>i) Find the number of ways in which room A can be filled.</p> <p>ii) If room A & B are already filled, then find the number of ways in which room C can be filled.</p> <p>iii) If room A is filled with 2 person, then find the number in which rooms C & D can be filled.</p>	4
4.	<p>Sumit works at a book shop, while arranging some books on the book shelf, he observed that there are 5 history books , 3 Maths books & 4 science books which are to be arranged on the shelf.</p> <p>i) In how many ways can he select a history or a math book .</p> <p>ii) If he select 2 history books, 1 math book & 1 science book to arrange them , then find the number of ways in which selection can be made.</p> <p>iii) Find the number of ways , if the book of the same subject are put together.</p>	4
5.	<p>A bag contains six white marbles and five red marbles. Find the number of ways in which four marbles can be drawn from the bag if</p> <p>(a) they can be of any colour.</p> <p>(b) two must be white and two red.</p> <p>(c) they must all be of the same colour.</p>	4
6.	<p>In how many ways can the letters of the word PERMUTATIONS be arranged if the</p> <p>(i) words start with P and end with S,</p> <p>(ii) there are always 4 letters between P and S?</p>	4
7.	<p>In a cinema hall 4 doors to enter and 3 other doors to exit.</p> <p>(a) How many ways a person can enter?</p> <p>(b) How many ways a person can exit?</p> <p>(c) How many ways a person can enter and then exit?</p> <p>(d) How many ways a person can enter and then exit but he can't enter and exit from the same door.</p>	4
8.	A committee of 5 is to be formed out of 6 Gents and 4 ladies. In how many ways this can be	4

	done, when (i) At least two ladies are included? (ii) At most two ladies are included?	
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ANSWERS:

Q. NO	ANSWER	MARKS
1.	<p>In a dictionary the words at each stage are arranged in alphabetical order. In the given problem we must therefore consider the words beginning with A, D, M, N, O, R in order. A will occur in the first place as often as there are ways of arranging the remaining 5 letters all at a time i.e. A will occur $5!$ times. Similarly, D, M, N, O will occur in the first place the same number of times.</p> <p>Number of words starting with A = $5! = 120$ Number of words starting with D = $5! = 120$ Number of words starting with M = $5! = 120$ Number of words starting with N = $5! = 120$ Number of words starting with O = $5! = 120$ Number of words beginning with R is $5!$, but one of these words is the word RANDOM. So, we first find the number of words beginning with RAD and RAM. Now, the words beginning with 'RAN' must follow. There are $3!$ words beginning with RAN One of these words is the word RANDOM itself, No. of words starting with RAD = $3! = 6$ No. of words starting with RAM = $3! = 6$ The first word beginning with RAN is the word RANDMO and the next word is RANDOM Rank of RANDOM = $5 \times 120 + 2 \times 6 + 2 = 614$ ways.</p>	4
2.	<p>(i) Number of straight lines formed joining the 10 points, taking 2 at a time $= {}^{10}C_2 = 45$ ways Number of straight lines formed by joining the four points, taking 2 at a time = ${}^4C_2 = 6$ But, 4 collinear points, when joined pairwise give only one line. Required number of straight lines = $45 - 6 + 1 = 40$.</p> <p>(ii) Number of triangles that can be formed with the vertices as these points Number of triangles formed by joining the points, taking 3 at a time = ${}^{10}C_3 = 120$.</p> <p>Number of triangles formed by joining the 4 points, taken 3 at a time = ${}^4C_3 = {}^4C_1 = 4$. But, 4 collinear points cannot form a triangle when taken 3 at a time. So, Required number of triangles = $120 - 4 = 116$.</p>	4
3.	<p>i) Total numbers = 6 Room A is a double shared room. The number of ways in which room A can be filled = $6C_2 = 15$</p> <p>ii) Now, rooms A and B can be filled with 2 members each and room C can be</p>	4

	<p>filled with 1 person. Required number of ways = $2c_1 = 2$</p> <p>iii) As room A is filled with 2 persons. Now, the remaining persons = 4 Given that room C and D can occupy 1 person each. The number of ways in which rooms C and D can be filled = $4c_1 \times 3c_1 = 12$</p>	
4.	<p>i) A History book can be selected in 5 ways and a Math book can be selected in 3 ways. Required number of ways = $5 + 3 = 8$</p> <p>ii) Now 2 History books can be chosen in $5p_2$ ways, 1 math book can be chosen in $4p_1$ ways. Required number of ways = $5p_2 \times 3p_1 \times 4p_1 = 240$</p> <p>iii) Number of ways of arranging History books = $5!$ Number of ways of arranging Math books = $3!$ Number of ways of arranging Science books = $4!$ Required number of ways if the books of same subject are put together = $3! \cdot 4! \cdot 5!$</p>	4
5.	<p>Total number of marbles = $6 + 5 = 11$</p> <p>(a) Required number of ways = ${}^{11}C_4$</p> <p>(b) Required number of ways = ${}^6C_2 \times {}^5C_2 = 150$</p> <p>(c) Required number of ways = ${}^6C_4 + {}^5C_4 = 20$</p>	4
6.	<p>(i) If P and S are fixed at the extreme ends, then 10 letters are left. In this case Required number of arrangements = $\frac{10!}{2!} = 1814400$</p> <p>(ii) The letters have to arranged in such a way that there are always 4 letters between P and S. So, in a way the places of P and S are fixed. The remaining 10 letters in which there 2 Ts can be arranged in $\frac{10!}{2!}$ ways Also the letters P and S can be placed such that there are 4 letters between them in $2 \times 7 = 14$ ways. Therefore required number of arrangements = $\frac{10!}{2!} \times 14 = 25401600$</p>	4
7.	<p>(a) Number of ways a person can enter = 4 ways</p> <p>(b) Number of ways a person can exit = 3 ways</p> <p>(c) Number of ways a person can enter and exit = $3 \times 4 = 12$</p> <p>(d) ways enter and exit but can not enter and exit from same door = $12 - 8 = 8$</p>	4
8.	<p>(i) The total number of ways of forming the committee = $4c_2 \times 6c_3 + 4c_3 \times 6c_2 + 4c_4 \times 6c_1$ = $120 + 60 + 6 = 186$</p> <p>(ii) Total number of ways of forming the committee = $6c_5 + 6c_4 \times 4c_1 + 6c_3 \times 4c_2$ = $6 + 60 + 120 = 186$.</p>	4