INDIAN SCHOOL AL WADI AL KABIR
WORKSHEET 2025-26
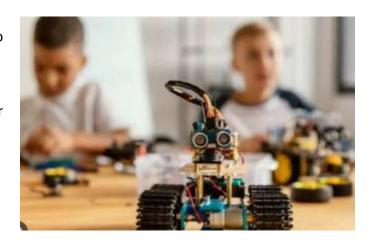
Class XI   PERMUTATIONS AND COMBINATIONS

Q1.   In an examination there are three multiple choice questions and each question has 4 choices. Find the number of ways in which a student can fail to get all answer correct.

A) 24   B) 63   C) 120   D) 60

Q2.   If $^{20}C_r = {}^{20}C_{r-10}$ then $^{18}C_r =$ _____.

A) 715   B) 816   C) 824   D) 716

Q3.   The number of diagonals that can be drawn from one vertex of a polygon of 12 sides is:

A) 9   B) 10   C) 8   D) 1

Q4.   **Assertion (A):** The number of arrangements of the letters of the word **BALLOON** is $\dfrac{7!}{2!2!}$.

Reason (R): The letters L and O each occur twice.

Q5.   **Assertion (A):** $^{10}C_3 = {}^{10}C_7$
Reason (R): $^nC_r = {}^n C_{n-r}$ for any positive integer n.

Q6   A security code is formed by 3 letters followed by 2 digits. The number of such codes possible if repetition of letters and digits is allowed is:

A) $26^3 \times 10^2$ B) $26^3 \times 10$ C) $26^2 \times 10^3$ D) $26^3 \times 10^2$

Q7.   In how many ways can 6 different science books and 4 different literature books be arranged on a shelf so that all science books are together?

Q8.   A die is rolled 3 times. Find the number of possible outcomes in which numbers can repeat at most 2 times.

Q9.   From 6 boys and 5 girls, a team of 3 students is to be formed with at least one girl. Find the number of possible teams.

Q10.   A student is asked to form 3-digit numbers using digits 1 to 5 without repetition. How many such numbers are greater than 300?

Q11.   There are four routes between Delhi and Mumbai. In how many ways can a person go from Delhi to Mumbai and return if for returning (i) any route is taken (ii) the same route is taken (iii) the same route is not taken.

Q12.   A password consists of 4 letters followed by 2 digits. If the first letter must be a vowel and repetition is not allowed, find the number of possible passwords.

Q13.   If the letters of the word **'PRANAV'** are arranged as in dictionary in all possible ways, then what will be 182nd word.

Q14. **CASE STUDY QUESTION**

A school robotics team has 8 members – 3 coders, 3 designers, and 2 testers. They have to form a team to represent their school at a competition.

i. In how many ways can a 4-member team be formed if it must include at least one member from each category?

ii. If the team leader must be a coder, in how many ways can the team be formed?

iii. If the team members are to stand in a line for a group photo, how many possible arrangements exist for one selected team?

Q15. A question paper contains 12 questions divided into 3 parts, part A contains 6 questions while part B and C contain 3 questions each. A candidate is required to attempt 6 questions selecting at least one from each of parts B and C. In how many ways can the candidate select 6 questions?

Q16. Out of 10 distinct points in a plane, no three are collinear.
(a) Find the number of triangles that can be formed.
(b) Find the number of quadrilaterals that can be formed.
(c) If three of the points are always to be included in any figure, how many triangles can be formed?

Q17. For a set of six true or false questions, no student has written all answers and no two students have given the same sequence of answers. What is the maximum number of students in the class for this job to be possible?

Q18. A computer generates 6-digit binary numbers (using only 0s and 1s). Find:
i. Total number of 6-digit binary numbers.
ii. Number of such numbers that begin and end with 1.
iii. Number of numbers that contain exactly three 1's.

Q19. There are two parallel lines l_1 and l_2 in a plane. l_1 contains m different points $A_1, A_2, \ldots, A_m$ and l_2 contains n different points $B_1, B_2, \ldots, B_n$. How many triangles are possible with these vertices?

Q20. In how many ways three girls and nine boys can be seated in two vans, each having numbered seats, 3 in the front and 4 at the back? How many seating arrangements are possible if 3 girls should sit together in a back row on adjacent seats?

ANSWER KEY

Q1	(B) 63	**Q2**	(B) 816	**Q3**	(A) 9	**Q4**	(A)	**Q5**	(A)
Q6	(A) $26^3 \times 10^2$	**Q7**	$6! \times 4! = 17280$	**Q8**	210	**Q9**	95	**Q10**	36
Q11	i. 16 ii. 4 iii. 12	**Q12**	6210000.	**Q13**	PAANVR	**Q14**	i)180 ii)30 iii)8!		
Q15	757	**Q16**	i. 120 ii. 210 iii. 29	**Q17**	63	**Q18**	i. 64 ii. 16 iii. 20		
Q19	$^{m+n}C_3 - {}^mC_3 - {}^nC_3$ or $^mC_2\,{}^nC_1 + {}^mC_1\,{}^nC_2$					**Q20**	$^{14}P_{12}\,2(2 \times 3!)\,{}^{11}P_9$		

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