



**INDIAN SCHOOL AL WADI AL KABIR**  
**Class XI, Mathematics**  
**Permutations and Combinations WORKSHEET**

**OBJECTIVE TYPE (1 Mark)**

|                                           |                                                                                                                                                   |                    |          |                  |          |                  |          |       |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|------------------|----------|------------------|----------|-------|
| <b>Q.1.</b>                               | The number of diagonals that can be drawn from one vertex of a polygon of 12 sides is:                                                            |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 9                  | <b>B</b> | 66               | <b>C</b> | 11               | <b>D</b> | 1     |
| <b>Q.2.</b>                               | 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: |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | $26^3 \times 10^2$ | <b>B</b> | $26^3 \times 10$ | <b>C</b> | $26 \times 10^2$ | <b>D</b> | 260   |
| <b>Q.3.</b>                               | If ${}^{20}C_r = {}^{20}C_{r-10}$ then ${}^{18}C_r = \underline{\hspace{1cm}}$                                                                    |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 810                | <b>B</b> | 812              | <b>C</b> | 816              | <b>D</b> | 813   |
| <b>Q.4.</b>                               | Total number of outcome when a die is rolled 3 times is _____                                                                                     |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 36                 | <b>B</b> | 16               | <b>C</b> | 64               | <b>D</b> | $6^3$ |
| <b>Q.5.</b>                               | In how many ways can a committee of 3 be chosen from 6 people?                                                                                    |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 60                 | <b>B</b> | 30               | <b>C</b> | 20               | <b>D</b> | 120   |
| <b>Q.6.</b>                               | If $\binom{25}{r} = \binom{25}{r-5}$ , find $\binom{20}{r}$ .                                                                                     |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 15502              | <b>B</b> | 15503            | <b>C</b> | 15504            | <b>D</b> | 1550  |
| <b>Q.7.</b>                               | How many 3-digit numbers can be formed using the digits 1,2,3,4,5 without repetition?                                                             |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 30                 | <b>B</b> | 60               | <b>C</b> | 120              | <b>D</b> | 36    |
| <b>Q.8.</b>                               | In how many ways can 4 books be arranged on a shelf?                                                                                              |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 12                 | <b>B</b> | 4                | <b>C</b> | 24               | <b>D</b> | 64    |
| <b>Q.9.</b>                               | $\binom{n}{0} + \binom{n}{n}$                                                                                                                     |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 1                  | <b>B</b> | 2                | <b>C</b> | n+1              | <b>D</b> | n     |
| <b>Q.10.</b>                              | How many arrangements of the word "CAT" are possible?                                                                                             |                    |          |                  |          |                  |          |       |
|                                           | <b>A</b>                                                                                                                                          | 6                  | <b>B</b> | 36               | <b>C</b> | 12               | <b>D</b> | 64    |
| <b>ASSERTION AND REASONING</b>            |                                                                                                                                                   |                    |          |                  |          |                  |          |       |
| <b>DIRECTION:</b><br><b>Assertion (A)</b> |                                                                                                                                                   |                    |          |                  |          |                  |          |       |

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|                                  | <p><b>Reason (R).</b><br/>Choose the correct option.</p> <p>(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion(A).<br/>(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).<br/>(c) Assertion (A) is true but Reason (R) is false.<br/>(d) Assertion (A) is false but Reason (R) is true.</p> |
| <b>Q.11.</b>                     | <p>Assertion(A): The number of arrangements of the letters of the word <b>BALLOON</b> is <math>\frac{7!}{2!2!}</math><br/>Reason(R): The letters L and O each occur twice.</p>                                                                                                                                                                                                                             |
| <b>Q.12.</b>                     | <p>Assertion(A): <math>{}^{10}C_3 = {}^{10}C_7</math><br/>Reason(R): <math>{}^nC_r = {}^nC_{n-r}</math> for any positive integer <math>n</math>.</p>                                                                                                                                                                                                                                                       |
| <b>Questions of 2 marks each</b> |                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Q.13.</b>                     | 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.                                                                                                                                                                                                                                |
| <b>Q.14.</b>                     | 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.                                                                                                                                                                                                                                                                                   |
| <b>Q.15.</b>                     | Determine $n$ if ${}^{2n}C_4 : {}^nC_4 = 15 : 1$                                                                                                                                                                                                                                                                                                                                                           |
| <b>Q.16.</b>                     | How many chords can be drawn through 22 points on a circle?                                                                                                                                                                                                                                                                                                                                                |
| <b>Questions of 3 marks each</b> |                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Q.17.</b>                     | <p>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</p> <p>(i) any route is taken<br/>(ii) the same route is taken<br/>(iii) the same route is not taken.</p>                                                                                                                                                             |
| <b>Q.18.</b>                     | 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.                                                                                                                                                                                                                                           |
| <b>Q.19.</b>                     | 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?                                                                                                             |
| <b>Questions of 5 marks each</b> |                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Q.20.</b>                     | <p>A computer generates 6-digit binary numbers (using only 0s and 1s). Find:</p> <p>i. Total number of 6-digit binary numbers.<br/>ii. Number of such numbers that begin and end with 1.<br/>iii. Number of numbers that contain exactly three 1's.</p>                                                                                                                                                    |
| <b>Q.21.</b>                     | <p>Out of 10 distinct points in a plane, no three are collinear.</p> <p>(a) Find the number of triangles that can be formed.<br/>(b) Find the number of quadrilaterals that can be formed.</p>                                                                                                                                                                                                             |
| <b>Q.22.</b>                     | If the letters of the word " <b>TRIAL</b> " are arranged in dictionary order, what is the <b>50th</b> word?                                                                                                                                                                                                                                                                                                |

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| Q.23. | 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?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Q.24. | <div data-bbox="191 222 915 871"> <p><b>CASE STUDY QUESTION:</b><br/>A school photography club has 7 members: 3 are skilled in portrait photography, 2 in wildlife photography, and 2 in sports photography. For an upcoming exhibition, they need to select a team of 5 members to represent the club.</p> <ol style="list-style-type: none"> <li>How many teams can be formed if the team must have at least one specialist from each of the three fields?</li> <li>If the team leader must be chosen from the portrait photographers, how many different teams can be formed?</li> <li>If the selected 5 members are to be arranged in a row for a promotional banner, with the team leader fixed at the extreme left position, how many such arrangements are possible for a given team?</li> </ol> </div> <div data-bbox="927 222 1544 730">  </div> |
| Q.25. | <p>A college debating society has 10 members: 4 from the science stream, 3 from commerce, and 3 from arts. For an inter-college competition, they need to form a team of 6 members.</p> <ol style="list-style-type: none"> <li>How many teams can be formed if the team must have at least 2 members from science and at least 1 from each of the other two streams?</li> <li>If the team captain must be from the commerce stream, how many different teams can be selected?</li> <li>If the 6 selected members are to stand in a line for a formal photograph, and all members from the same stream must stand together as a single block, how many different line arrangements are possible for one such team that has exactly 2 from each stream?</li> </ol>                                                                                                                                                                            |
|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

|  | ANSWERS |                            |       |                              |       |              |       |                            |
|--|---------|----------------------------|-------|------------------------------|-------|--------------|-------|----------------------------|
|  | Q.1.    | A                          | Q.2.  | A                            | Q.3.  | C            | Q.4.  | D                          |
|  | Q.5.    | C                          | Q.6.  | C                            | Q.7.  | B            | Q.8.  | C                          |
|  | Q.9.    | B                          | Q.10. | A                            | Q.11. | A            | Q.12. | A                          |
|  | Q.13.   | 63                         | Q.14. | 145                          | Q.15. | 6            | Q.16. | 231                        |
|  | Q.17.   | i. 16<br>ii. 4<br>iii. 12  | Q.18. | 6210000.                     | Q.19. | 757          | Q.20  | i. 64<br>ii. 16<br>iii. 20 |
|  | Q.21.   | i. 120<br>ii. 210          | Q.22. | L A I T R                    | Q.23. | $24^{11}P_9$ |       |                            |
|  | Q.24.   | i. 19<br>ii. 45<br>iii. 24 | Q.25. | i. 171<br>ii. 297<br>iii. 48 |       |              |       |                            |

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