

JEE MAIN PERMUTATIONS AND COMBINATIONS — COMBINATIONS AND THEIR PROPERTIES — PYQS

Max. Marks: 36

Questions: 9

Section A (MCQ) — 6 questions

- Q.1** A box contains 5 blue, 6 yellow and 4 red balls. The number of ways, of drawing 8 balls containing at least two balls of each colour, is :

[JEE Main 2026 (Online) 5th April Evening Shift]

- (1) 4100 (2) 4140 (3) 4230 (4) 4290

Scan or tap for the
full solution



- Q.2** Let p_n denote the total number of triangles formed by joining the vertices of an n -side regular polygon. If $p_{n+1} - p_n = 66$, then the sum of all distinct prime divisors of n is :

[JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) 7 (2) 8 (3) 5 (4) 6

Scan or tap for the
full solution



- Q.3** There are 12 points in a plane, no three of which are in the same straight line, except 5 points which are collinear. Then the total number of triangles that can be formed with the vertices at any three of these 12 points is

[JEE Main 2025 (Online) 8th April Evening Shift]

- (1) 230 (2) 210 (3) 200 (4) 220

Scan or tap for the
full solution



- Q.4** From a group of 7 batsmen and 6 bowlers, 10 players are to be chosen for a team, which should include at least 4 batsmen and at least 4 bowlers. One batsman and one bowler who are captain and vice-captain respectively of the team should be included. Then the total number of ways such a selection can be made, is

[JEE Main 2025 (Online) 7th April Morning Shift]

- (1) 145 (2) 165 (3) 155 (4) 135

Scan or tap for the
full solution



- Q.5** Line L_1 of slope 2 and line L_2 of slope $\frac{1}{2}$ intersect at the origin O. In the first quadrant, $P_1, P_2, \dots, P_{12}$ are 12 points on line L_1 and $Q_1, Q_2, \dots, Q_9$ are 9 points on line L_2 . Then the total number of triangles, that can be formed having vertices at three of the 22 points O, $P_1, P_2, \dots, P_{12}, Q_1, Q_2, \dots, Q_9$, is:

[JEE Main 2025 (Online) 3rd April Evening Shift]

- (1) 1026 (2) 1188 (3) 1134 (4) 1080

Scan or tap for the
full solution



- Q.6** Let ${}^nC_{r-1} = 28$, ${}^nC_r = 56$ and ${}^nC_{r+1} = 70$. Let $A(4\cos t, 4\sin t)$, $B(2\sin t, -2\cos t)$ and $C(3r - n, r^2 - n - 1)$ be the vertices of a triangle ABC, where t is a parameter. If $(3x - 1)^2 + (3y)^2 = \alpha$, is the locus of the centroid of triangle ABC, then α equals

[JEE Main 2025 (Online) 28th January Morning Shift]

- (1) 18 (2) 8 (3) 20 (4) 6

Scan or tap for the
full solution



Section B (Numerical) — 3 questions

- Q.7** Two players A and B play a series of games of badminton. The player, who wins 5 games first, wins the series. Assuming that no game ends in a draw, the number of ways, in which player A wins the series is _____.

[JEE Main 2026 (Online) 5th April Morning Shift]

Scan or tap for the
full solution



- Q.8** Let ABC be a triangle. Consider four points p_1, p_2, p_3, p_4 on the side AB, five points p_5, p_6, p_7, p_8, p_9 on the side BC, and four points $p_{10}, p_{11}, p_{12}, p_{13}$ on the side AC. None of these points is a vertex of the triangle ABC. Then the total number of pentagons, that can be formed by taking all the vertices from the points $p_1, p_2, \dots, p_{13}$, is _____

[JEE Main 2026 (Online) 22nd January Morning Shift]

Scan or tap for the
full solution



Q.9 For $n \geq 2$, let S_n denote the set of all subsets of $\{1, 2, \dots, n\}$ with no two consecutive numbers. For example $\{1, 3, 5\} \in S_6$, but $\{1, 2, 4\} \notin S_6$. Then $n(S_5)$ is equal to _____

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the
full solution



ANSWER KEY

Section A (MCQ) — 6 questions

Ques.	1	2	3	4	5	6					
Ans.	1	3	2	3	3	3					

Section B (Numerical) — 3 questions

Ques.	7	8	9				
Ans.	126	660	13				