

JEE MAIN PERMUTATIONS AND COMBINATIONS — PYQS

Max. Marks: 140
Questions: 35

Section A (MCQ) — 22 questions

- Q.1** A person has three different bags and four different books. The number of ways, in which he can put these books in the bags so that no bag is empty, is :

[JEE Main 2026 (Online) 8th April Evening Shift]

(1) 18 (2) 36 (3) 39 (4) 72

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- Q.2** The number of 4-letter words, with or without meaning, each consisting of two vowels and two consonants that can be formed from the letters of the word INCONSEQUENTIAL, without repeating any letter, is :

[JEE Main 2026 (Online) 6th April Morning Shift]

(1) 2670 (2) 2840 (3) 2920 (4) 3600

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- Q.3** A building has ground floor and 10 more floors. Nine persons enter in a lift at the ground floor. The lift goes up to the 10th floor. The number of ways, in which any 4 persons exit at a floor and the remaining 5 persons exit at a different floor, if the lift does not stop at the first and the second floors, is equal to :

[JEE Main 2026 (Online) 6th April Evening Shift]

(1) 2184 (2) 3064 (3) 7056 (4) 11340

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- Q.4** 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

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- Q.5** The number of ways, of forming a queue of 4 boys and 3 girls such that all the girls are not together, is :

[JEE Main 2026 (Online) 4th April Morning Shift]

(1) 5040 (2) 3050 (3) 3410 (4) 4320

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- Q.6** Let $A = \{(a, b, c) : a, b, c \text{ are non-negative integers and } a + b + 2c = 22\}$. Then $n(A)$ is equal to :

[JEE Main 2026 (Online) 4th April Evening Shift]

(1) 121 (2) 124 (3) 144 (4) 169

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- Q.7** The number of seven-digit numbers, that can be formed by using the digits 1, 2, 3, 5 and 7 such that each digit is used at least once, is :

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

(1) 15400 (2) 17800 (3) 16800 (4) 29400

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- Q.8** 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

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- Q.9** Let $S = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$. Let x be the number of 9-digit numbers formed using the digits of the set S such that only one digit is repeated and it is repeated exactly twice. Let y be the number of 9-digit numbers formed using the digits of the set S such that only two digits are repeated and each of these is repeated exactly twice. Then,

[JEE Main 2026 (Online) 28th January Morning Shift]

(1) $56x = 9y$ (2) $21x = 4y$
 (3) $45x = 7y$ (4) $29x = 5y$

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- Q.10** The letters of the word "UDAYPUR" are written in all possible ways with or without meaning and these words are arranged as in a dictionary. The rank of the word "UDAYPUR" is

[JEE Main 2026 (Online) 24th January Evening Shift]

(1) 1579 (2) 1578 (3) 1580 (4) 1581

Scan or tap for the full solution



Q.11 The largest value of n , for which 40^n divides $60!$, is

[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) 14 (2) 13 (3) 11 (4) 12

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Q.12 The number of ways, in which 16 oranges can be distributed to four children such that each child gets at least one orange, is

[JEE Main 2026 (Online) 23rd January Evening Shift]

- (1) 384 (2) 403 (3) 429 (4) 455

Scan or tap for the full solution



Q.13 The largest $n \in \mathbb{N}$, for which 7^n divides $101!$, is :

[JEE Main 2026 (Online) 21st January Evening Shift]

- (1) 18 (2) 15 (3) 19 (4) 16

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Q.14 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

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Q.15 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

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Q.16 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

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Q.17 The largest $n \in \mathbb{N}$ such that 3^n divides $50!$ is :

[JEE Main 2025 (Online) 2nd April Morning Shift]

- (1) 22 (2) 20 (3) 21 (4) 23

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Q.18 The number of sequences of ten terms, whose terms are either 0 or 1 or 2, that contain exactly five 1s and exactly three 2s, is equal to :

[JEE Main 2025 (Online) 2nd April Morning Shift]

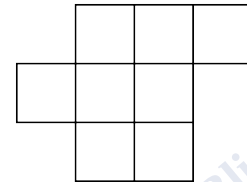
- (1) 360 (2) 2520 (3) 1820 (4) 45

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Q.19 The number of ways, in which the letters A, B, C, D, E can be placed in the 8 boxes of the figure below so that no row remains empty and at most one letter can be placed in a box, is :

[JEE Main 2025 (Online) 2nd April Evening Shift]



- (1) 5880 (2) 840 (3) 960 (4) 5760

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Q.20 Let P be the set of seven digit numbers with sum of their digits equal to 11. If the numbers in P are formed by using the digits 1, 2 and 3 only, then the number of elements in the set P is :

[JEE Main 2025 (Online) 29th January Morning Shift]

- (1) 164 (2) 158 (3) 161 (4) 173

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Q.21 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

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Q.22 The number of different 5 digit numbers greater than 50000 that can be formed using the digits 0, 1, 2, 3, 4, 5, 6, 7, such that the sum of their first and last digits should not be more than 8, is

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

- (1) 5720 (2) 5719 (3) 4608 (4) 4607

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Section B (Numerical) — 13 questions

- Q.23** 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]

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- Q.24** Three persons enter in a lift at the ground floor. The lift will go up to 10th floor. The number of ways, in which the three persons can exit the lift at three different floors, if the lift does not stop at first, second and third floors, is equal to _____.

[JEE Main 2026 (Online) 28th January Evening Shift]

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- Q.25** The number of numbers greater than 5000, less than 9000 and divisible by 3, that can be formed using the digits 0, 1, 2, 5, 9, if the repetition of the digits is allowed, is _____.

[JEE Main 2026 (Online) 24th January Morning Shift]

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- Q.26** The number of 4-letter words, with or without meaning, which can be formed using the letters PQRPRSTUVP, is _____.

[JEE Main 2026 (Online) 23rd January Morning Shift]

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- Q.27** Let S denote the set of 4-digit numbers abcd such that $a > b > c > d$ and P denote the set of 5-digit numbers having product of its digits equal to 20. Then $n(S) + n(P)$ is equal to _____.

[JEE Main 2026 (Online) 23rd January Evening Shift]

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- Q.28** 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]

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- Q.29** Let $S = \{(m, n) : m, n \in \{1, 2, 3, \dots, 50\}\}$. If the number of elements (m, n) in S such that $6^m + 9^n$ is a multiple of 5 is p and the number of elements (m, n) in S such that $m + n$ is a square of a prime number is q, then $p + q$ is equal to _____.

[JEE Main 2026 (Online) 21st January Morning Shift]

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- Q.30** 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]

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- Q.31** Let m and n, ($m < n$), be two 2-digit numbers. Then the total number of pairs (m, n) , such that $\gcd(m, n) = 6$, is _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

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- Q.32** All five letter words are made using all the letters A, B, C, D, E and arranged as in an English dictionary with serial numbers. Let the word at serial number n be denoted by W_n . Let the probability $P(W_n)$ of choosing the word W_n satisfy $P(W_n) = 2P(W_{n-1})$, $n > 1$.

If $P(\text{CDBEA}) = \frac{2^\alpha}{2^\beta - 1}$, $\alpha, \beta \in \mathbb{N}$, then $\alpha + \beta$ is equal to _____.

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

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- Q.33** If the number of seven-digit numbers, such that the sum of their digits is even, is $m \cdot n \cdot 10^n$; $m, n \in \{1, 2, 3, \dots, 9\}$, then $m + n$ is equal to _____.

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

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- Q.34** The number of 6-letter words, with or without meaning, that can be formed using the letters of the word MATHS such that any letter that appears in the word must appear at least twice, is _____.

[JEE Main 2025 (Online) 29th January Morning Shift]

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Q.35 The number of natural numbers, between 212 and 999, such that the sum of their digits is 15, is _____.

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

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full solution



ANSWER KEY

Section A (MCQ) — 22 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	2	4	3	1	4	3	3	3	2	3	1
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	4	4	2	3	3	1	2	4	3	3	4

Section B (Numerical) — 13 questions

Ques.	23	24	25	26	27	28	29
Ans.	126	210	42	1422	260	660	1333
Ques.	30	31	32	33	34	35	
Ans.	13	64	183	14	1405	64	