

PYQSide

JEE MAIN SEQUENCES AND SERIES — PYQS

Max. Marks: 204

Questions: 51

Section A (MCQ)

- Q.1** Let $\alpha = 3 + 4 + 8 + 9 + 13 + 14 + \dots$ upto 40 terms. If $(\tan \beta)^{\frac{\alpha}{1020}}$ is a root of the equation $x^2 + x - 2 = 0$, $\beta \in (0, \frac{\pi}{2})$, then $\sin^2 \beta + 3\cos^2 \beta$ is equal to :

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

- (1) 2 (2) $\frac{7}{4}$ (3) $\frac{5}{2}$ (4) $\frac{3}{2}$

Scan or tap for the full solution 

- Q.2** The value of $1^3 - 2^3 + 3^3 - \dots + 15^3$ is :

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

- (1) 1706 (2) 1856 (3) 1982 (4) 2403

Scan or tap for the full solution 

- Q.3** The sum of the first ten terms of an A.P. is 160 and the sum of the first two terms of a G.P. is 8. If the first term of the A.P. is equal to the common ratio of the G.P. and the first term of the G.P. is equal to common difference of the A.P., then the sum of all possible values of the first term of the G.P. is :

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

- (1) $\frac{34}{9}$ (2) $\frac{34}{13}$ (3) $\frac{32}{9}$ (4) $\frac{32}{13}$

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- Q.4** Consider the quadratic equation $(n^2 - 2n + 2)x^2 - 3x + (n^2 - 2n + 2)^2 = 0$, $n \in \mathbb{R}$. Let α be the minimum value of the product of its roots and β be the maximum value of the sum of its roots. Then the sum of the first six terms of the G.P., whose first term is α and the common ratio is $\frac{\alpha}{\beta}$, is :

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

- (1) $\frac{61}{37}$ (2) $\frac{121}{81}$ (3) $\frac{364}{243}$ (4) $\frac{1093}{729}$

Scan or tap for the full solution 

- Q.5** The sum $1 + \frac{1}{2}(1^2 + 2^2) + \frac{1}{3}(1^2 + 2^2 + 3^2) + \dots$ upto 10 terms is equal to :

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

- (1) 130 (2) 155 (3) $\frac{315}{2}$ (4) $\frac{325}{2}$

Scan or tap for the full solution 

- Q.6** Let the sum of the first n terms of an A.P. be $3n^2 + 5n$. Then the sum of squares of the first 10 terms of the A.P. is :

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

- (1) 10220 (2) 12860 (3) 15220 (4) 19780

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- Q.7** $\sum_{n=1}^{10} \left(\frac{528}{n(n+1)(n+2)} \right)$ is equal to:

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

- (1) 65 (2) 130 (3) 220 (4) 440

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- Q.8** If the sum of the first 10 terms of the series $\frac{1}{1+1^4 \times 4} + \frac{2}{1+2^4 \times 4} + \frac{3}{1+3^4 \times 4} + \frac{4}{1+4^4 \times 4} + \dots$ is $\frac{m}{n}$, $\gcd(m, n) = 1$, then $m + n$ is equal to :

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

- (1) 256 (2) 264 (3) 276 (4) 284

Scan or tap for the full solution 

- Q.9** Let $A_1, A_2, A_3, \dots, A_{39}$ be 39 arithmetic means between the numbers 59 and 159. Then the mean of A_{25}, A_{28}, A_{31} and A_{36} is equal to :

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

- (1) 129 (2) 136 (3) 131.50 (4) 134

Scan or tap for the full solution 

- Q.10** The first term of an A.P. of 30 non-negative terms is $\frac{10}{3}$. If the sum of this A.P. is the cube of its last term, then its common difference is:

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

(1) $\frac{5}{87}$ (2) $\frac{25}{83}$ (3) $\frac{15}{29}$ (4) $\frac{5}{29}$

Scan or tap for the full solution



Q.11 Let $\alpha = \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots \infty$ and $\beta = \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots \infty$.

Then the value of $(0.2)^{\log_{\sqrt{5}}(\alpha)} + (0.04)^{\log_5(\beta)}$ is equal to :

(1) 4 (2) 5 (3) 8 (4) 25

Scan or tap for the full solution



Q.12 Let A be the set of first 101 terms of an A.P., whose first term is 1 and the common difference is 5 and let B be the set of first 71 terms of an A.P., whose first term is 9 and the common difference is 7. Then the number of elements in $A \cap B$, which are divisible by 3, is :

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

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

Scan or tap for the full solution



Q.13 Let $a_1, a_2, a_3, \dots$ be an A.P. and $g_1 = a_1, g_2, g_3, \dots$ be an increasing G.P. If $a_1 = a_2 + g_2 = 1$ and $a_3 + g_3 = 4$, then $a_{10} + g_5$ is equal to:

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

(1) 81 (2) 76 (3) 62 (4) 55

Scan or tap for the full solution



Q.14 The sum $\frac{1^3}{1} + \frac{1^3+2^3}{1+3} + \frac{1^3+2^3+3^3}{1+3+5} + \dots$ up to 8 terms, is :

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

(1) 70 (2) 71 (3) 72 (4) 73

Scan or tap for the full solution



Q.15 The value of $\sum_{k=1}^{\infty} (-1)^{k+1} \left(\frac{k(k+1)}{k!} \right)$ is

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

(1) $e/2$ (2) $\sqrt{e}$ (3) $2/e$ (4) $1/e$

Scan or tap for the full solution



Q.16 The common difference of the A.P.: $a_1, a_2, \dots, a_m$ is 13 more than the common difference of the A.P.: $b_1, b_2, \dots, b_n$. If $b_{31} = -277$, $b_{43} = -385$ and $a_{78} = 327$, then a_1 is equal to

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

(1) 21 (2) 19 (3) 24 (4) 16

Scan or tap for the full solution



Q.17 $\frac{6}{3^{26}} + \frac{10 \cdot 1}{3^{25}} + \frac{10 \cdot 2}{3^{24}} + \frac{10 \cdot 2^2}{3^{23}} + \dots + \frac{10 \cdot 2^{24}}{3}$ is equal to :

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

(1) 2^{26} (2) 3^{25} (3) 3^{26} (4) 2^{25}

Scan or tap for the full solution



Q.18 Let 729, 81, 9, 1, ... be a sequence and P_n denote the product of the first n terms of this sequence. If $2 \sum_{n=1}^{40} (P_n)^{\frac{1}{n}} = \frac{3^\alpha - 1}{3^\beta}$ and $\gcd(\alpha, \beta) = 1$, then $\alpha + \beta$ is equal to

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

(1) 73 (2) 74 (3) 75 (4) 76

Scan or tap for the full solution



Q.19 Consider an A.P.: $a_1, a_2, \dots, a_n$; $a_1 > 0$. If $a_2 - a_1 = \frac{-3}{4}$, $a_n = \frac{1}{4}a_1$, and $\sum_{i=1}^n a_i = \frac{525}{2}$, then $\sum_{i=1}^{17} a_i$ is equal to

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

(1) 238 (2) 136 (3) 476 (4) 952

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Q.20 Let a_1, a_2, a_3, a_4 be an A.P. of four terms such that each term of the A.P. and its common difference l are integers. If $a_1 + a_2 + a_3 + a_4 = 48$ and $a_1 a_2 a_3 a_4 + l^4 = 361$, then the largest term of the A.P. is equal to

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

(1) 27 (2) 24 (3) 23 (4) 21

Scan or tap for the full solution



Q.21 $\left(\frac{1}{3} + \frac{4}{7}\right) + \left(\frac{1}{3^2} + \frac{1}{3} \times \frac{4}{7} + \frac{4^2}{7^2}\right) + \left(\frac{1}{3^3} + \frac{1}{3^2} \times \frac{4}{7} + \frac{1}{3} \times \frac{4^2}{7^2} + \frac{4^3}{7^3}\right) + \dots$ up to infinite terms, is equal to

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

(1) $\frac{7}{4}$ (2) $\frac{4}{3}$ (3) $\frac{6}{5}$ (4) $\frac{5}{2}$

Scan or tap for the full solution



Q.22 Let $\sum_{k=1}^n a_k = \alpha n^2 + \beta n$. If $a_{10} = 59$ and $a_6 = 7a_1$, then $\alpha + \beta$ is equal to :

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

(1) 3 (2) 5 (3) 7 (4) 12

Scan or tap for the full solution



Q.23 $1 + 3 + 5^2 + 7 + 9^2 + \dots$ up to 40 terms is equal to

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

(1) 40870 (2) 41880 (3) 43890 (4) 33980

Scan or tap for the full solution



- Q.24** If the sum of the first four terms of an A.P. is 6 and the sum of its first six terms is 4, then the sum of its first twelve terms is

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

- (1) -26 (2) -20 (3) -24 (4) -22

Scan or tap for the full solution



- Q.25** Let $a_1, a_2, a_3, \dots$ be a G.P. of increasing positive terms such that $a_2 \cdot a_3 \cdot a_4 = 64$ and $a_1 + a_3 + a_5 = \frac{813}{7}$.

Then $a_3 + a_5 + a_7$ is equal to :

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

- (1) 3256 (2) 3252 (3) 3248 (4) 3244

Scan or tap for the full solution



- Q.26** The positive integer n , for which the solutions of the equation

$x(x+2) + (x+2)(x+4) + \dots + (x+2n-2)(x+2n) = \frac{8n}{3}$ are two consecutive even integers, is :

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

- (1) 3 (2) 6 (3) 9 (4) 12

Scan or tap for the full solution



- Q.27** Let $a_1, \frac{a_2}{2}, \frac{a_3}{2^2}, \dots, \frac{a_{10}}{2^9}$ be a G.P. of common ratio $\frac{1}{\sqrt{2}}$. If $a_1 + a_2 + \dots + a_{10} = 62$, then a_1 is equal to:

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

- (1) $\sqrt{2} - 1$ (2) $2(\sqrt{2} - 1)$
(3) $2 - \sqrt{2}$ (4) $2(2 - \sqrt{2})$

Scan or tap for the full solution



- Q.28** If $\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \dots = \frac{\pi^4}{90}$,

$$\frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \dots = \alpha,$$

$$\frac{1}{2^4} + \frac{1}{4^4} + \frac{1}{6^4} + \dots = \beta,$$

then $\frac{\alpha}{\beta}$ is equal to :

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

- (1) 23 (2) 14 (3) 18 (4) 15

Scan or tap for the full solution



- Q.29** Let x_1, x_2, x_3, x_4 be in a geometric progression. If 2, 7, 9, 5 are subtracted respectively from x_1, x_2, x_3, x_4 , then the resulting numbers are in an arithmetic progression. Then the value of $\frac{1}{24}(x_1 x_2 x_3 x_4)$ is:

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

- (1) 18 (2) 216 (3) 36 (4) 72

Scan or tap for the full solution



- Q.30** Let a_n be the n^{th} term of an A.P. If $S_n = a_1 + a_2 + a_3 + \dots + a_n = 700$, $a_6 = 7$ and $S_7 = 7$, then a_n is equal to :

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

- (1) 65 (2) 56 (3) 70 (4) 64

Scan or tap for the full solution



- Q.31** If the sum of the second, fourth and sixth terms of a G.P. of positive terms is 21 and the sum of its eighth, tenth and twelfth terms is 15309, then the sum of its first nine terms is :

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

- (1) 757 (2) 755 (3) 750 (4) 760

Scan or tap for the full solution



- Q.32** If the sum of the first 20 terms of the series $\frac{4 \cdot 1}{4+3 \cdot 1^2+1^4} + \frac{4 \cdot 2}{4+3 \cdot 2^2+2^4} + \frac{4 \cdot 3}{4+3 \cdot 3^2+3^4} + \frac{4 \cdot 4}{4+3 \cdot 4^2+4^4} + \dots$ is $\frac{m}{n}$, where m and n are coprime, then $m + n$ is equal to : [JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 423 (2) 421 (3) 422 (4) 420

Scan or tap for the full solution



- Q.33** Consider two sets A and B, each containing three numbers in A.P. Let the sum and the product of the elements of A be 36 and p respectively and the sum and the product of the elements of B be 36 and q respectively. Let d and D be the common differences of A.P.'s in A and B respectively such that $D = d + 3$, $d > 0$. If $\frac{p+q}{p-q} = \frac{19}{5}$, then $p - q$ is equal to [JEE Main 2025 (Online) 4th April Evening Shift]

- (1) 540 (2) 450 (3) 600 (4) 630

Scan or tap for the full solution



- Q.34** Let $a_1, a_2, a_3, \dots$ be a G.P. of increasing positive numbers. If $a_3 a_5 = 729$ and $a_2 + a_4 = \frac{111}{4}$, then $24(a_1 + a_2 + a_3)$ is equal to

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

- (1) 128 (2) 129 (3) 131 (4) 130

Scan or tap for the full solution



- Q.35** The sum $1 + 3 + 11 + 25 + 45 + 71 + \dots$ upto 20 terms, is equal to

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

- (1) 7240 (2) 8124 (3) 7130 (4) 6982

Scan or tap for the full solution



Q.36 The sum $1 + \frac{1+3}{2!} + \frac{1+3+5}{3!} + \frac{1+3+5+7}{4!} + \dots$ up to ∞ terms, is equal to

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

- (1) $3e$ (2) $2e$ (3) $4e$ (4) $6e$

Scan or tap for the full solution



Q.37 Let $a_1, a_2, a_3, \dots$ be in an A.P. such that $\sum_{k=1}^{12} a_{2k-1} = -\frac{72}{5}a_1, a_1 \neq 0$. If $\sum_{k=1}^n a_k = 0$, then n is :

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

- (1) 18 (2) 17 (3) 11 (4) 10

Scan or tap for the full solution



Q.38 The number of terms of an A.P. is even; the sum of all the odd terms is 24, the sum of all the even terms is 30 and the last term exceeds the first by $\frac{21}{2}$. Then the number of terms which are integers in the A.P. is :

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

- (1) 6 (2) 4 (3) 8 (4) 10

Scan or tap for the full solution



Q.39 Consider an A. P. of positive integers, whose sum of the first three terms is 54 and the sum of the first twenty terms lies between 1600 and 1800. Then its 11th term is :

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

- (1) 108 (2) 90 (3) 122 (4) 84

Scan or tap for the full solution



Q.40 The value of $\lim_{n \rightarrow \infty} \left(\sum_{k=1}^n \frac{k^3 + 6k^2 + 11k + 5}{(k+3)!} \right)$ is :

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

- (1) $5/3$ (2) 2 (3) $4/3$ (4) $7/3$

Scan or tap for the full solution



Q.41 Let $\langle a_n \rangle$ be a sequence such that $a_0 = 0, a_1 = \frac{1}{2}$ and $2a_{n+2} = 5a_{n+1} - 3a_n, n = 0, 1, 2, 3, \dots$. Then $\sum_{k=1}^{100} a_k$ is equal to

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

- (1) $3a_{100} + 100$ (2) $3a_{100} - 100$
(3) $3a_{99} - 100$ (4) $3a_{99} + 100$

Scan or tap for the full solution



Q.42 Let T_r be the r^{th} term of an A.P. If for some $m, T_m = \frac{1}{25}, T_{25} = \frac{1}{20}$, and $20 \sum_{r=1}^{25} T_r = 13$, then $5m \sum_{r=m}^{2m} T_r$ is equal to

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

- (1) 98 (2) 126 (3) 112 (4) 142

Scan or tap for the full solution



Q.43 For positive integers n , if $4a_n = (n^2 + 5n + 6)$ and $S_n = \sum_{k=1}^n \left(\frac{1}{a_k} \right)$, then the value of $507S_{2025}$ is :

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

- (1) 540 (2) 675 (3) 1350 (4) 135

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Section B (Numerical)

Q.44 For the functions $f(\theta) = \alpha \tan^2 \theta + \beta \cot^2 \theta$, and $g(\theta) = \alpha \sin^2 \theta + \beta \cos^2 \theta, \alpha > \beta > 0$, let $\min_{0 < \theta < \frac{\pi}{2}} f(\theta) = \max_{0 < \theta < \frac{\pi}{2}} g(\theta)$. If the first term of a G.P. is

$\left(\frac{\alpha}{2\beta} \right)$, its common ratio is $\left(\frac{2\beta}{\alpha} \right)$ and the sum of its first 10 terms is $\frac{m}{n}, \gcd(m, n) = 1$, then $m + n$ is equal to _____.

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

Scan or tap for the full solution



Q.45 If $\sum_{k=1}^n a_k = 6n^3$, then $\sum_{k=1}^6 \left(\frac{a_{k+1} - a_k}{36} \right)^2$ is equal to _____.

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

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Q.46 In a G.P., if the product of the first three terms is 27 and the set of all possible values for the sum of its first three terms is $R - (a, b)$, then $a^2 + b^2$ is equal to _____.

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

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Q.47 If $\sum_{r=1}^{25} \left(\frac{r}{r^4 + r^2 + 1} \right) = \frac{p}{q}$, where p and q are positive integers such that $\gcd(p, q) = 1$, then $p + q$ is equal to _____.

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

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- Q.48** Suppose a, b, c are in A.P. and $a^2, 2b^2, c^2$ are in G.P. If $a < b < c$ and $a + b + c = 1$, then $9(a^2 + b^2 + c^2)$ is equal to _____.

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

Scan or tap for the full solution



- Q.49** Let $a_1 = 1$ and for $n \geq 1$, $a_{n+1} = \frac{1}{2}a_n + \frac{n^2 - 2n - 1}{n^2(n+1)^2}$.

Then $\left| \sum_{n=1}^{\infty} \left(a_n - \frac{2}{n^2} \right) \right|$ is equal to _____.

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

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- Q.50** If the sum of the first 10 terms of the series $\frac{4 \cdot 1}{1 + 4 \cdot 1^4} + \frac{4 \cdot 2}{1 + 4 \cdot 2^4} + \frac{4 \cdot 3}{1 + 4 \cdot 3^4} + \dots$ is $\frac{m}{n}$, where $\gcd(m, n) = 1$, then $m + n$ is equal to _____.

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

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- Q.51** The interior angles of a polygon with n sides are in an A.P. with common difference 6° . If the largest interior angle of the polygon is 219° , then n is equal to _____.

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

Scan or tap for the full solution



ANSWER KEY

Section A (MCQ)

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	2	1	3	3	3	2	3	4	1	3
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	2	4	2	4	2	1	1	1	1	4	2
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	2	4	2	1	2	4	2	4	1	2	1
Ques.	34	35	36	37	38	39	40	41	42	43	
Ans.	2	1	2	3	2	2	1	2	2	2	

Section B (Numerical)

Ques.	44	45	46	47	48	49	50
Ans.	1279	91	90	976	9	2	441
Ques.	51						
Ans.	20						