

JEE MAIN UNITS AND MEASUREMENTS — COMBINATION OF ERRORS — PYQS

Max. Marks: 36
Questions: 9

Section A (MCQ) — 8 questions

- Q.1** The density ρ of a uniform cylinder is determined by measuring its mass m , length l and diameter d . The measured values of m , l and d are 97.42 ± 0.02 g, 8.35 ± 0.05 mm and 20.20 ± 0.02 mm, respectively. Calculated percentage fractional error in ρ is _____.

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

- (1) 0.63% (2) 0.82% (3) 0.72% (4) 0.25%

Scan or tap for the full solution



- Q.2** The percentage error in the calculated volume of a sphere, if there is 2% error in its diameter measurement, is _____.

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

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

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- Q.3** In an experiment to determine the resistance of a given wire using Ohm's law, the voltmeter and ammeter readings are noted as 10 V and 5 A, respectively. The least counts of voltmeter and ammeter are 500 mV and 200 mA, respectively. The estimated error in the resistance measurement is _____ Ω .

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

- (1) 0.25 (2) 2 (3) 2.5 (4) 0.18

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- Q.4** The diameter of a wire measured by a screw gauge of least count 0.001 cm is 0.08 cm. The length measured by a scale of least count 0.1 cm is 150 cm. When a weight of 100 N is applied to the wire, the extension in length is 0.5 cm, measured by a micrometer of least count 0.001 cm. The error in the measured Young's modulus is $\alpha \times 10^9$ N/m². The value of α is _____.

(Ignore the contribution of the load to Young's modulus error calculation)

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

- (1) 1.3 (2) 1.65 (3) 0.13 (4) 0.25

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- Q.5** The time period of a simple harmonic oscillator is $T = 2\pi\sqrt{\frac{m}{k}}$. Measured value of mass (m) of the object is 10 g with an accuracy of 10 mg and time for 50 oscillations of the spring is found to be 60 s using a watch of 2 s resolution. Percentage error in determination of spring constant (k) is _____%.

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

- (1) 3.43 (2) 7.60 (3) 3.35 (4) 6.76

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- Q.6** In an experiment the values of two spring constants were measured as $k_1 = (10 \pm 0.2)$ N/m and $k_2 = (20 \pm 0.3)$ N/m. If these springs are connected in parallel, then the percentage error in equivalent spring constant is :

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

- (1) 1.33% (2) 2.67% (3) 1.67% (4) 2.33%

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- Q.7** A spherical body of radius r and density σ falls freely through a viscous liquid having density ρ and viscosity η and attains a terminal velocity v_0 . Estimated maximum error in the quantity η is : (Ignore errors associated with σ , ρ and g , gravitational acceleration)

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

- (1) $2\left[\frac{\Delta r}{r} - \frac{\Delta v_0}{v_0}\right]$ (2) $2\left[\frac{\Delta r}{r} + \frac{\Delta v_0}{v_0}\right]$
 (3) $\frac{2\Delta r}{r} + \frac{\Delta v_0}{v_0}$ (4) $2\frac{\Delta r}{r} - \frac{\Delta v_0}{v_0}$

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- Q.8** A quantity Q is formulated as $X^{-2}Y^{+3}Z^{-\frac{2}{5}}$. X , Y , and Z are independent parameters which have fractional errors of 0.1, 0.2, and 0.5, respectively in measurement. The maximum fractional error of Q is

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

- (1) 0.6 (2) 0.8 (3) 0.7 (4) 0.1

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Section B (Numerical) — 1 question

- Q.9** A physical quantity C is related to four other quantities p , q , r and s as follows

$$C = \frac{pq^2}{r^3\sqrt{s}}$$

The percentage errors in the measurement of p , q , r and s are 1%, 2%, 3% and 2%, respectively. The percentage error in the measurement of C will be _____ %

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

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full solution

**ANSWER KEY****Section A (MCQ) — 8 questions**

Ques.	1	2	3	4	5	6	7	8			
Ans.	2	3	4	2	4	3	3	3			

Section B (Numerical) — 1 question

Ques.	9										
Ans.	15										