

JEE MAIN UNITS AND MEASUREMENTS — PYQS

Max. Marks: 188

Questions: 47

Section A (MCQ) — 43 questions

- Q.1** A new unit (α) of length is chosen such that it is equal to the speed of light in vacuum. What is the distance between Venus and Earth in terms of α units if light takes 6 min. 40 s to cover this distance?

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

- (1)
- 200α
- (2)
- 400α
- (3)
- 300α
- (4)
- 500α

Scan or tap for the full solution



- Q.2** Consider the equation $H = \frac{x^p \epsilon^q E^r}{t^s}$
Where H = magnetic field intensity; E = electric field, ϵ = permittivity, x = distance, t = time
The values of p , q , r and s respectively are :

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

- (1) 1, 1, 1, 1 (2) -1, 1, 2, 1
-
- (3) 1, -1, -2, 1 (4) -1, -2, -2, 1

Scan or tap for the full solution



- Q.3** 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.4** The potential energy of a particle changes with distance x from a fixed origin as $V = \frac{A\sqrt{x}}{x+B}$, where A and B are constants with appropriate dimensions. The dimensions of AB are _____.

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

- (1)
- $[M^1 L^{5/2} T^{-2}]$
- (2)
- $[M^{3/2} L^{5/2} T^{-2}]$
-
- (3)
- $[M^1 L^2 T^{-2}]$
- (4)
- $[M^1 L^{7/2} T^{-2}]$

Scan or tap for the full solution



- Q.5** 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

Scan or tap for the full solution



- Q.6** Match List-I with List-II.

List-I		List-II	
A.	Boltzmann constant	I.	$[M^{-1} L^3 T^{-2}]$
B.	Stefan's constant	II.	$[ML^2 T^{-1}]$
C.	Planck's constant	III.	$[ML^2 T^{-2} K^{-1}]$
D.	Gravitational constant	IV.	$[ML^0 T^{-3} K^{-4}]$

Choose the correct answer from the options given below : [JEE Main 2026 (Online) 6th April Evening Shift]

- (1) A-I, B-II, C-III, D-IV (2) A-IV, B-III, C-II, D-I
-
- (3) A-III, B-IV, C-II, D-I (4) A-II, B-I, C-IV, D-III

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- Q.7** In a Vernier calipers, when both jaws touch each other, zero of the Vernier scale is shifted to the right of zero of the main scale and 7th Vernier division coincides with a main scale reading. If the value of 1 main scale division is 1 mm and there are 10 Vernier scale divisions, then the Vernier caliper has

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

- (1) 0.07 cm negative zero error
-
- (2) 0.7 cm negative zero error
-
- (3) 0.07 cm positive zero error
-
- (4) 0.7 cm positive zero error

Scan or tap for the full solution



- Q.8** L , C and R represents physical quantities inductance, capacitance and resistance respectively. The dimensional formula $M L^2 T^{-4} A^{-2}$ corresponds to _____.

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

- (1)
- $\frac{R}{\sqrt{LC}}$
- (2)
- $\frac{R}{LC}$
- (3)
- $\frac{C}{\sqrt{LR}}$
- (4)
- $\frac{1}{R} \sqrt{\frac{L}{C}}$

Scan or tap for the full solution



Q.9 Match **List-I** with **List-II**.

where h (Planck's constant), G (gravitational constant) and c (speed of light in vacuum) as fundamental units.

List-I		List-II	
A.	Meter (L)	I.	$\sqrt{\frac{hc}{G}}$
B.	Second (S)	II.	$\sqrt{\frac{Gh}{c^5}}$
C.	Kilogram (M)	III.	$\sqrt{\frac{K^2 L^2 c^3}{Gh}}$
D.	Kelvin (K)	IV.	$\sqrt{\frac{Gh}{c^3}}$

Choose the correct answer from the options given below : [JEE Main 2026 (Online) 5th April Evening Shift]

- (1) A-II, B-IV, C-I, D-III (2) A-IV, B-II, C-I, D-III
(3) A-IV, B-I, C-II, D-III (4) A-III, B-I, C-II, D-IV

Scan or tap for the full solution



Q.10 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

Scan or tap for the full solution



Q.11 In a screw gauge when the circular scale is given five complete rotations it moves linearly by 2.5 mm. If the circular scale has 100 divisions, the least count of screw gauge is _____ mm.

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

- (1) 1×10^{-2} (2) 1×10^{-3} (3) 5×10^{-2} (4) 5×10^{-3}

Scan or tap for the full solution



Q.12 The dimensional formula of $\frac{1}{2}\epsilon_0 E^2$ (ϵ_0 = permittivity of vacuum and E = electric field) is $M^a L^b T^c$. The value of $2a - b + c$ = _____.

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

- (1) 0 (2) 1 (3) -1 (4) 2

Scan or tap for the full solution



Q.13 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

Scan or tap for the full solution



Q.14 Dimensions of universal gravitational constant (G) in terms of Planck's constant (h), distance (L), mass (M) and time (T) are _____.

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

- (1) $[hTLM^{-2}]$ (2) $[hT^{-1}LM^{-2}]$
(3) $[hTL^2M^{-2}]$ (4) $[h^{-1}T^{-1}LM^{-2}]$

Scan or tap for the full solution



Q.15 In a screw gauge the zero of main scale reference line coincides with the fifth division of the circular scale when two studs are in contact. There are 100 divisions in circular scale and pitch of screw gauge is 0.1 mm. When diameter of a sphere is measured, the reading of main scale is 5 mm and 50th division of circular scale coincides with the reference line of main scale. The diameter of sphere is _____ mm.

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

- (1) 5.045 (2) 5.055 (3) 5.450 (4) 5.550

Scan or tap for the full solution



Q.16 When both jaws of vernier callipers touch each other, zero mark of the vernier scale is right to zero mark of main scale, 4th mark on vernier scale coincides with certain mark on the main scale. While measuring the length of a cylinder, observer observes 15 divisions on main scale and 5th division of vernier scale coincides with a main scale division. Measured length of cylinder is _____ mm. (Least count of Vernier calliper = 0.1 mm)

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

- (1) 15.5 (2) 15.4 (3) 15.9 (4) 15.1

Scan or tap for the full solution



- Q.17** 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

Scan or tap for the full solution



- Q.18** Match List - I with List - II.

List-I		List-II	
A.	Coefficient of viscosity	I.	$[ML^{-1}T^{-2}]$
B.	Surface tension	II.	$[ML^2T^{-2}]$
C.	Pressure	III.	$[ML^0T^{-2}]$
D.	Surface energy	IV.	$[ML^{-1}T^{-1}]$

Choose the **correct** answer from the options given below :

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

- (1) A-I, B-II, C-IV, D-III (2) A-IV, B-III, C-I, D-II
(3) A-IV, B-I, C-II, D-III (4) A-I, B-III, C-II, D-IV

Scan or tap for the full solution



- Q.19** In an experiment, a set of readings are obtained as follows: 1.24 mm, 1.25 mm, 1.23 mm, 1.21 mm. The expected least count of the instrument used in recording these readings is ____ mm.

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

- (1) 0.01 (2) 0.05 (3) 0.001 (4) 0.1

Scan or tap for the full solution



- Q.20** Match the LIST-I with LIST-II

List-I		List-II	
A.	Magnetic induction	I.	$MLT^{-2}A^{-2}$
B.	Magnetic flux	II.	$ML^2T^{-2}A^{-2}$
C.	Magnetic permeability	III.	$ML^0T^{-2}A^{-1}$
D.	Self inductance	IV.	$ML^2T^{-2}A^{-1}$

Choose the correct answer from the options given below:

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

- (1) A-III, B-IV, C-II, D-I (2) A-I, B-III, C-IV, D-II
(3) A-IV, B-III, C-I, D-II (4) A-III, B-IV, C-I, D-II

Scan or tap for the full solution



- Q.21** In a vernier callipers, 50 vernier scale divisions are equal to 48 main scale divisions. If one main scale division = 0.05 mm, then the least count of the vernier callipers is ____ mm.

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

- (1) 0.002 (2) 0.02 (3) 0.05 (4) 0.005

Scan or tap for the full solution



- Q.22** In a screw gauge, the zero of the circular scale lies 3 divisions above the horizontal pitch line when their metallic studs are brought in contact. Using this instrument thickness of a sheet is measured. If pitch scale reading is 1 mm and the circular scale reading is 51 then the correct thickness of the sheet is ____ mm.

[Assume least count is 0.01 mm]

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

- (1) 1.54 (2) 1.50 (3) 1.51 (4) 1.48

Scan or tap for the full solution



- Q.23** Four persons measure the length of a rod as 20.00 cm, 19.75 cm, 17.01 cm and 18.25 cm. The relative error in the measurement of average length of the rod is :

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

- (1) 0.18 (2) 0.24 (3) 0.06 (4) 0.08

Scan or tap for the full solution



- Q.24** Match the LIST-I with LIST-II

List-I		List-II	
A.	Spring constant	I.	$ML^2T^{-2}K^{-1}$
B.	Thermal conductivity	II.	ML^0T^{-2}
C.	Boltzmann constant	III.	$ML^2T^{-3}A^{-2}$
D.	Inductive reactance	IV.	$MLT^{-3}K^{-1}$

Choose the correct answer from the options given below:

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

- (1) A-III, B-II, C-IV, D-I (2) A-I, B-IV, C-II, D-III
(3) A-II, B-I, C-IV, D-III (4) A-II, B-IV, C-I, D-III

Scan or tap for the full solution



- Q.25** In an experiment the values of two spring constants were measured as $k_1 = (10 \pm 0.2) \text{ N/m}$ and $k_2 = (20 \pm 0.3) \text{ N/m}$. 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%

Scan or tap for the full solution



Q.26 Consider a modified Bernoulli equation.

$$\left(P + \frac{A}{Bt^2}\right) + \rho g(h + Bt) + \frac{1}{2}\rho V^2 = \text{constant}$$

If t has the dimension of time then the dimensions of A and B are _____, _____ respectively.

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

- (1) $[ML^0T^{-1}]$ and $[M^0LT]$
- (2) $[ML^0T^{-2}]$ and $[M^0LT^{-1}]$
- (3) $[ML^0T^{-2}]$ and $[M^0LT^{-2}]$
- (4) $[ML^0T^{-1}]$ and $[M^0LT^{-1}]$

Scan or tap for the full solution



Q.27 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) $2\frac{\Delta r}{r} - \frac{\Delta v_0}{v_0}$

Scan or tap for the full solution



Q.28 Keeping the significant figures in view, the sum of the physical quantities 52.01 m, 153.2 m and 0.123 m is :

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

- (1) 205.3 m
- (2) 205 m
- (3) 205.333 m
- (4) 205.33 m

Scan or tap for the full solution



Q.29 A quantity Q is formulated as $X^{-2}Y^{\frac{3}{2}}Z^{-\frac{2}{5}}$. 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

Scan or tap for the full solution



Q.30 The dimension of $\sqrt{\frac{\mu_0}{\epsilon_0}}$ is equal to that of:

(μ_0 = Vacuum permeability and ϵ_0 = Vacuum permittivity)

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

- (1) Voltage
- (2) Inductance
- (3) Resistance
- (4) Capacitance

Scan or tap for the full solution



Q.31 Match List - I with List - II.

List - I		List - II	
A.	Mass density	I.	$[ML^2T^{-3}]$
B.	Impulse	II.	$[MLT^{-1}]$
C.	Power	III.	$[ML^2T^0]$
D.	Moment of inertia	IV.	$[ML^{-3}T^0]$

Choose the **correct** answer from the options given below : [JEE Main 2025 (Online) 7th April Evening Shift]

- (1) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)
- (2) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
- (3) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
- (4) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

Scan or tap for the full solution



Q.32 In an electromagnetic system, the quantity representing the ratio of electric flux and magnetic flux has dimension of $M^PL^QTR^AS$, where value of 'Q' and 'R' are

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

- (1) (3, -5)
- (2) (-2, 1)
- (3) (-2, 2)
- (4) (1, -1)

Scan or tap for the full solution



Q.33 In an electromagnetic system, a quantity defined as the ratio of electric dipole moment and magnetic dipole moment has dimension of $[M^PL^QTR^AS]$. The values of P and Q are :

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

- (1) -1, 0
- (2) 0, -1
- (3) -1, 1
- (4) 1, -1

Scan or tap for the full solution



Q.34 A person measures mass of 3 different particles as 435.42 g, 226.3 g and 0.125 g. According to the rules for arithmetic operations with significant figures, the addition of the masses of 3 particles will be. [JEE Main 2025 (Online) 3rd April Morning Shift]

- (1) 661.845 g
- (2) 661.84 g
- (3) 662 g
- (4) 661.8 g

Scan or tap for the full solution



Q.35 Match the LIST-I with LIST-II

List - I		List - II	
A.	Gravitational constant	I.	$[LT^{-2}]$
B.	Gravitational potential energy	II.	$[L^2T^{-2}]$
C.	Gravitational potential	III.	$[ML^2T^{-2}]$
D.	Acceleration due to gravity	IV.	$[M^{-1}L^3T^{-2}]$

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 3rd April Morning Shift]

- (1) A-IV, B-III, C-II, D-I (2) A-II, B-IV, C-III, D-I
(3) A-I, B-III, C-IV, D-II (4) A-III, B-II, C-I, D-IV

Scan or tap for the full solution



Q.36 Match the **LIST-I** with **LIST-II**

LIST-I		LIST-II	
A.	Boltzmann constant	I.	ML^2T^{-1}
B.	Coefficient of viscosity	II.	$MLT^{-3}K^{-1}$
C.	Planck's constant	III.	$ML^2T^{-2}K^{-1}$
D.	Thermal conductivity	IV.	$ML^{-1}T^{-1}$

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 3rd April Evening Shift]

- (1) A - III, B - IV, C - I, D - II
(2) A - III, B - IV, C - II, D - I
(3) A - III, B - II, C - I, D - IV
(4) A - II, B - III, C - IV, D - I

Scan or tap for the full solution



Q.37 Match **List I** with **List II**.

List - I		List - II	
A.	Coefficient of viscosity	I.	$[ML^0T^{-3}]$
B.	Intensity of wave	II.	$[ML^{-2}T^{-2}]$
C.	Pressure gradient	III.	$[M^{-1}LT^2]$
D.	Compressibility	IV.	$[ML^{-1}T^{-1}]$

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 2nd April Morning Shift]

- (1) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(2) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)
(3) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(4) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)

Scan or tap for the full solution



Q.38 The equation for real gas is given by $\left(P + \frac{a}{V^2}\right)(V - b) = RT$, where P, V, T and R are the pressure, volume, temperature and gas constant, respectively. The dimension of ab^{-2} is equivalent to that of : [JEE Main 2025 (Online) 2nd April Morning Shift]

- (1) Compressibility (2) Planck's constant
(3) Energy density (4) Strain

Scan or tap for the full solution



Q.39 If μ_0 and ϵ_0 are the permeability and permittivity of free space, respectively, then the dimension of $\left(\frac{1}{\mu_0\epsilon_0}\right)$ is :

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

- (1) T^2/L (2) L^2/T^2 (3) T^2/L^2 (4) L/T^2

Scan or tap for the full solution



Q.40 Given a charge q, current I and permeability of vacuum μ_0 . Which of the following quantity has the dimension of momentum ?

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

- (1) qI/μ_0 (2) $q^2\mu_0I$ (3) $q\mu_0I$ (4) $q\mu_0I$

Scan or tap for the full solution



Q.41 The pair of physical quantities not having the same dimensions is :

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

- (1) Angular momentum and Planck's constant
(2) Torque and energy
(3) Surface tension and impulse
(4) Pressure and Young's modulus

Scan or tap for the full solution



Q.42 The expression given below shows the variation of velocity (v) with time (t),

$$v = At^2 + \frac{Bt}{C+t}$$

The dimension of ABC is :

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

- (1) $[M^0L^1T^{-2}]$ (2) $[M^0L^2T^{-3}]$
(3) $[M^0L^2T^{-2}]$ (4) $[M^0L^1T^{-3}]$

Scan or tap for the full solution



Q.43 Match **List - I** with **List - II**.

List - I		List - II	
A.	Angular Impulse	I.	$M^0 L^2 T^{-2}$
B.	Latent Heat	II.	$M L^2 T^{-3} A^{-1}$
C.	Electrical resistivity	III.	$M L^2 T^{-1}$
D.	Electromotive force	IV.	$M L^3 T^{-3} A^{-2}$

Choose the correct answer from the options given below:

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

- (1) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
(2) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)
(3) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(4) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)

Scan or tap for the full solution



Section B (Numerical) — 4 questions

- Q.44** A ball of radius r and density ρ dropped through a viscous liquid of density σ and viscosity η attains its terminal velocity at time t , given by $t = A\rho^a r^b \eta^c \sigma^d$, where A is a constant and a , b , c and d are integers.

The value of $\frac{b+c}{a+d}$ is _____.

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

Scan or tap for the full solution



- Q.45** 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]

Scan or tap for the full solution



- Q.46** In a measurement, it is asked to find modulus of elasticity per unit torque applied on the system. The measured quantity has dimension of $[M^a L^b T^c]$. If $b = -3$, the value of c is _____.

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

Scan or tap for the full solution



- Q.47** A tiny metallic rectangular sheet has length and breadth of 5 mm and 2.5 mm, respectively. Using a specially designed screw gauge which has pitch of 0.75 mm and 15 divisions in the circular scale, you are asked to find the area of the sheet. In this measurement, the maximum fractional error will be $\frac{x}{100}$ where x is _____.

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

Scan or tap for the full solution



ANSWER KEY

Section A (MCQ) — 43 questions

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

Section B (Numerical) — 4 questions

Ques.	44	45	46	47							
Ans.	1	15	0	3							