

Q1. JEE Main 2026 (21 January Shift 2)

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

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

Q2. JEE Main 2026 (28 January Shift 2)

Match List - I with List - II.

List - I

List - II

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

Choose the correct answer from the options given below :

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

Q3. JEE Main 2026 (22 January Shift 2)

If ϵ , E and t represent the free space permittivity, electric field and time respectively, then the unit of $\frac{\epsilon E}{t}$ will be :

- (1) Am^2 (2) Am (3) A/m^2 (4) A/m

Q4. JEE Main 2026 (22 January Shift 1)

Match the LIST-I with LIST-II

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

Choose the correct answer from the options given below:

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

Q5. JEE Main 2026 (23 January Shift 2)

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 _____.

Q6. JEE Main 2026 (21 January Shift 1)

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.

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

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

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

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

Q7. JEE Main 2026 (24 January Shift 1)

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:

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

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

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

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

ANSWERS AND SOLUTIONS

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

1. (1) When adding measurements, the result must be limited to the least number of decimal places among all quantities.

The measurements are: 52.01 m (2 decimal places), 153.2 m (1 decimal place), and 0.123 m (3 decimal places).

The limiting factor is 1 decimal place.

Calculating the sum: $52.01 + 153.2 + 0.123 = 205.333$ m.

Rounding to 1 decimal place gives 205.3 m, which is option (1).

2. (1) (A) Coefficient of viscosity:

$$\eta = \frac{F \cdot dr}{A \cdot dv} = \frac{[MLT^{-2}][L]}{[L^2][LT^{-1}]} = [ML^{-1}T^{-1}] \rightarrow \text{IV}$$

(B) Surface tension:

$$S = \frac{F}{L} = \frac{[MLT^{-2}]}{[L]} = [MT^{-2}] = [ML^0T^{-2}] \rightarrow \text{III}$$

(C) Pressure:

$$P = \frac{F}{A} = \frac{[MLT^{-2}]}{[L^2]} = [ML^{-1}T^{-2}] \rightarrow \text{I}$$

(D) Surface energy:

$$E = S \times A = [MT^{-2}][L^2] = [ML^2T^{-2}] \rightarrow \text{II}$$

Hence, A-IV, B-III, C-I, D-II.

3. (3) We need to find the unit of $\frac{\epsilon E}{t}$.

From Maxwell's equations, the displacement current density is given by $J_d = \epsilon \frac{\partial E}{\partial t}$.

The term $\frac{\epsilon E}{t}$ has the same dimensions as displacement current density J_d .

Current density J is defined as current per unit area, $J = \frac{I}{A}$.

The SI unit of current I is Ampere (A) and the SI unit of area A is m^2 .

Therefore, the unit of current density is A/m^2 .

Alternatively, using dimensions:

$$[\epsilon] = M^{-1}L^{-3}T^4A^2$$

$$[E] = MLT^{-3}A^{-1}$$

$$[t] = T$$

$$\text{Dimension of } \frac{\epsilon E}{t} = \frac{(M^{-1}L^{-3}T^4A^2)(MLT^{-3}A^{-1})}{T} = L^{-2}A.$$

This corresponds to the unit A/m^2 .

4. (1) A. Spring constant: $F = kx \Rightarrow [k] = MLT^{-2}/L = ML^0T^{-2} \rightarrow \text{II}$

B. Thermal conductivity: $Q/t = KA(dT/dx) \Rightarrow [K] = ML^2T^{-3}/(L^2 \cdot K/L) = MLT^{-3}K^{-1} \rightarrow \text{IV}$

C. Boltzmann constant: $E = k_B T \Rightarrow [k_B] = ML^2T^{-2}K^{-1} \rightarrow \text{I}$

D. Inductive reactance: same dimension as resistance $= ML^2T^{-3}A^{-2} \rightarrow \text{III}$

Matching: A-II, B-IV, C-I, D-III.

5. (1) Using dimensional analysis on $t = A\rho^a r^b \eta^c \sigma^d$:

the dimensions are $[T] = [ML^{-3}]^a [L]^b [ML^{-1}T^{-1}]^c [ML^{-3}]^d$.

Expanding: $[T] = M^{a+c+d} L^{-3a+b-c-3d} T^{-c}$.

Comparing powers: For T: $1 = -c$, giving $c = -1$.

For M: $0 = a + c + d$, so $a + d = 1$.

For L: $0 = -3a + b - c - 3d = -3a + b + 1 - 3d$, giving $b = 3(a + d) - 1 = 3(1) - 1 = 2$.

Therefore $(b + c)/(a + d) = (2 - 1)/1 = 1$.

6. (4) All terms must have dimension of pressure $[ML^{-1}T^{-2}]$.

For $(h + Bt)$: Since ρgh has dimension of pressure, $[h] = [L]$.

For dimensional consistency: $[Bt] = [L]$, so $[B] = [LT^{-1}] = [M^0LT^{-1}]$

For $\frac{A}{Bt^2}$: $\frac{[A]}{[B][T^2]} = [ML^{-1}T^{-2}]$

$[A] = [B][T^2][ML^{-1}T^{-2}] = [LT^{-1}][T^2][ML^{-1}T^{-2}] = [ML^0T^{-1}]$

$[A] = [ML^0T^{-1}]$ and $[B] = [M^0LT^{-1}]$

7. (2) Match physical quantities with dimensional formulas using fundamental principles.

Magnetic Induction (A): From $F = qvB$, $[B] = \frac{MLT^{-2}}{AT \cdot LT^{-1}} = MT^{-2}A^{-1} = \text{III}$

Magnetic Flux (B): $\Phi = BA$, $[\Phi] = MT^{-2}A^{-1} \cdot L^2 = ML^2T^{-2}A^{-1} = \text{IV}$

Magnetic Permeability (C): From $B = \mu H$ with $[H] = ALT^{-1}$, $[\mu] = \frac{MT^{-2}A^{-1}}{AL^{-1}T^{-1}} = MLT^{-2}A^{-2} = \text{I}$

Self Inductance (D): From $\varepsilon = L \frac{dI}{dt}$, $[L] = \frac{ML^2T^{-3}A^{-1}}{AT^{-1}} = ML^2T^{-2}A^{-2} = \text{II}$

Correct matching: A-III, B-IV, C-I, D-II