

4. Which among the following is not a basic unit of measurement?

- a. **Time**
- b. **Temperature**
- c. **Momentum**
- d. **Mass**

9. Identify the dimensionless quantity.

- a. Angle**
- b. Specific gravity**
- c. Strain**
- d. All the above options**

16. Match the physical quantities given in Column 1 with dimensions expressed in terms of mass (M), length (L), time (T), and charge (Q) given in Column II

<u>Column I</u>	<u>Column II</u>
a) Angular momentum	p) ML^2T^{-2}
b) Torque	q) ML^2T^{-1}
c) Inductance	r) $M^{-1}L^{-2}T^2Q^2$
d) Latent heat	s) ML^2Q^{-2}
e) Capacitance	t) $ML^3T^{-1}Q^{-2}$
f) Resistivity	u) L^2T^{-2}

20. A gas bubble, from an explosion under water, oscillates with a period T proportional to $p^a d^b E^c$.

Where P is the static pressure, d is the density of water and E is the total energy of the explosion. Find the values of a, b and c [1981-3 marks]

2.13 On the basis of dimensions, decide which of the following relations for the displacement of a particle undergoing simple harmonic motion is *not* correct:

(a) $y = a \sin 2\pi t / T$

(b) $y = a \sin vt.$

(c) $y = \frac{a}{T} \sin \left(\frac{t}{a} \right)$

(d) $y = a\sqrt{2} \left(\sin \frac{2\pi t}{T} - \cos \frac{2\pi t}{T} \right)$

2.15 Photon is quantum of radiation with energy $E = h\nu$ where ν is frequency and h is Planck's constant. The dimensions of h are the same as that of

- (a) Linear impulse
- (b) Angular impulse
- (c) Linear momentum
- (d) Angular momentum

2.16 If Planck's constant (h) and speed of light in vacuum (c) are taken as two fundamental quantities, which one of the following can, in addition, be taken to express length, mass and time in terms of the three chosen fundamental quantities?

- (a) Mass of electron (m_e)
- (b) Universal gravitational constant (G)
- (c) Charge of electron (e)
- (d) Mass of proton (m_p)

2.17 Which of the following ratios express pressure?

- (a) Force/ Area
- (b) Energy/ Volume
- (c) Energy/ Area
- (d) Force/ Volume

2.18 Which of the following are *not* a unit of time?

- (a) Second
- (b) Parsec
- (c) Year
- (d) Light year

- 2.34** The displacement of a progressive wave is represented by $y = A \sin(\omega t - k x)$, where x is distance and t is time. Write the dimensional formula of (i) ω and (ii) k .
- 2.35** Time for 20 oscillations of a pendulum is measured as $t_1 = 39.6$ s; $t_2 = 39.9$ s; $t_3 = 39.5$ s. What is the precision in the measurements? What is the accuracy of the measurement?