

- (c) Assertion is true but Reason is false.
 (d) Reason is false but Assertion is also false.

6. **Assertion:** The dimensional formula for product of force and displacement is same as for torque
Reason. Both are dimensionless quantities.
7. **Assertion:** If power of an engine depends on mass, angular speed, torque and angular momentum, then the formula of power is not derived with the help of dimensional method.
Reason: In mechanics, if a particular quantity depends on more than three quantities, then we cannot derive the formula of the quantity by the dimensional method.

Short Answer type Questions.

8. If the unit force is 100N, unit length is 10 m and unit time is 100s, what is the unit of mass in this system of units?
9. In the expression $P = El^2m^{-5}G^{-2}$, E, m, l, and G denote energy, mass, angular momentum and gravitational constant, respectively. Show that P is a dimensionless quantity
10. The position x of a particle at time t is given by $x = \frac{V_0}{a}(1 - e^{-at})$ where V_0 is a constant and $a > 0$. Find the dimensions of V_0 and a .
11. Given: force = $\frac{\alpha}{\text{density} + \beta^3}$. What are the dimensions of α, β ?
12. The density of a material in CGS system of units is 4 g/cm^3 . In a system of units in which unit of length is 10 cm and unit of mass is 100 g, the value of density of material will be ?
13. Find the percentage error in determination of $g = 4\pi^2 \frac{l}{t^2}$, when l and t are measured with $\pm 1\%$ and $\pm 2\%$ errors.
14. Add $6.75 \times 10^3 \text{ cm}$ to $4.52 \times 10^2 \text{ cm}$ using significant figures.
15. Which of the following length measurement is most accurate and why?
 (i) 4.00 cm (ii) 0.004 mm (iii) 40.00 cm.
16. A force of $(2500 \pm 5) \text{ N}$ is applied over an area of $(0.32 \pm 0.02) \text{ m}^2$. Calculate the pressure exerted over the area
17. Measure of two quantities along with the precision of respective measuring instrument is $A = 2.5 \text{ ms}^{-1} \pm 0.5 \text{ ms}^{-1}$ $B = 0.10 \text{ s} \pm 0.01 \text{ s}$. Find the value of AB .
18. You measure two quantities as $A = 1.0 \text{ m} \pm 0.2 \text{ m}$, $B = 2.0 \text{ m} \pm 0.2 \text{ m}$. We should report correct value for \sqrt{AB} as _____
19. Calculate x in the equation : $(\text{velocity})^x = (\text{pressure diff.})^{3/2} \times (\text{density})^{-3/2}$
20. If P, Q, R are physical quantities, having different dimensions, which of the following Combinations can never be a meaningful quantity? Justify.
 (a) $(P - Q)/R$
 (b) $PQ - R$
 (c) PQ/R
 (d) $(PQ - Q^2)/R$ (e) $(R + Q)/P$