MPVMGG
Physics HHW 2025-26

1. A physical quantity is measured and its value is found to be nu where n= numerical value and u = unit

     (a)$n \propto u^2$ (b) $n \propto u$ (c) $n \propto u^{1/2}$ (d) $n \propto u^{-1}$

2. Parsec is unit of

     (a) time   (b) distance   (c) frequency   (d) linear momentum

3. Which of the following is dimensionless quantity?

     (a) Strain   (b) Stress   (c) Specific heat   (d) Quantity of heat

4. Which pairs do have equal dimension ?

     (a)Force and momentum   (b) force and pressure   (c) Energy and Torque   (d) None of these

5. Which pairs do not have equal dimension ?

     (a)Force and impulse   (b) Elasticity and pressure   (c) work and Torque   (d) None of these

6. The number of significant figure in 43.023 :

   (a) 3   (b) 4   (c) 5   (d) 1

7. A suitable unit for gravitational constant is

   (a) Newton metre kg^{-1} (b) Newton $metre^2$ kg^{-1} (c) Newton $metre^2$ kg^{-} (d) None of these

8. The dimension of physical quantity X in equation force = $\frac{4X}{Density}$ is given by

     (a) $[M^1L^4T^{-2}]$ (b) $[M^2L^2T^{-1}]$ (c)$[M^2L^2T^{-2}]$ (d)$[M^1L^{-2}T^{-1}]$

9. Which of the following pairs have same dimensions ?

      (a) Energy and work   (b) Angular momentum and work

      (c) Energy and Young's modulus   (d) Light year and wavelength

10. Which of the distance measurements is most accurate?

          (1) 4.0 cm   (2)4.00 cm

11. Give the name of two physical quantities whose units are same .

12. Which of the following is the most precise for measuring length :

     (a) a vernier caliper with 10 division on sliding scale .

      (b) a screw gauge of pitch 1mm and 100 divisions on the circular scale .

13. . Write dimension of a,b and c in given equation force = at^2+ b/t+c where t represent time .

14. Find the dimension of α and β in given expression Force = _____α^2_____
                                                                           density + β

15. . Write dimension of a,b and c in given equation force = $at^2 + \frac{b}{t+c}$ where t represent time

16. Check the correctness of given equation $\tan\theta = v^2$ /rg, where v , r and g express velocity, radius and gravitational acceleration.

17. A calorie is a unit of heat or energy and it equals about 4.2 J where 1J = 1 kg m^2 s^{-2} . Suppose we employ a system of units in which the unit of mass equals α kg, the unit of length equals β m, the unit of time is Υ s. Show that a calorie has a magnitude 4.2 α^{-1} , β^{-2} , Υ^2 in terms of the new units.

18. If the velocity of light (c), the constant of gravitation (G) and plank's constant (h) be chosen as the fundamental units, find the dimension of mass new system

19. The equation of state for real gas given by

$$\left(P + \frac{a}{V^2} \right)(V - b) = RT$$

Determine the dimension formula of the constant   a and b .

22.   (a) Mention some application of dimensional analysis
       (b) How can physical quantity be converted from one system of unit to another?
       (c) Convert one newton into dyne .

21. Dimensional analysis of the equation $(velocity)^X = (\ Density)^{-3/2} \times (Pressure\ difference)^{3/2}$. Find the value of x.

22. Check the correctness of given equation :
    (a) $\tan\theta = v^2/rg$,   where v , r and g express velocity, radius and gravitational acceleration.

    (b) $T = 2\pi \sqrt{\dfrac{GM}{R^3}}$

    Where T,G,M and R express time period ,gravitational constant ,mass of earth and radius of earth.

23. Check by the method of dimensions whether the following equations are correct:
    (a) Check the correctness of given equation $\tan\theta = v^2 /rg$, where v , r and g express velocity, radius and gravitational acceleration
    (b) (ii) s = ut + 1/2 at , where v represent initial velocity , u represent final velocity , s represent displacement and t represent time

24. The centripetal force (F) acting on a body may depend upon mass of body (m), radius 0f the circle (r) and frequency of revolution (v). Derive the formula dimensionally.

25. (a) Write merits and demerits of dimension.
    (b) Derive an expression for time period (T) of a simple pendulum which may depend upon:
    (i) mass of bob (m) ,   (ii) length of pendulum (l)   and (iii) acceleration due to gravity (g) .