BCM SCHOOL, BASANT AVENUE, DUGRI ROAD, LDH

CLASS - XI

SUBJECT – PHYSICS

(VACATIONS ASSIGNMENT)

PHYSICS

VERY SHORT ANSWER QUESTIONS

1. Name two physical quantities having the dimensions [ML^2T^{-2}].
2. Can a quantity have different dimensions in different system of units ?
3. Write the dimensional formula for coefficient of viscosity and Strain.

4. Write the number of significant figures in each of the following measurement:
(a) 1.67×10^{-27} kg.
(b) 0.0270 cm.
5. Can an object have an eastward velocity while experiencing a westward acceleration?
6. Is it possible for a body to be accelerated without speeding up or slowing down? If so, give an example.
7. Even when rain is falling vertically downwards, the front screen of a moving car gets wet while the back screen remains dry. Why?

SHORT ANSWER QUESTIONS

8. Find the value of 100 J on a system which has 20 cm, 250 g and half minute as fundamental units of length , mass and time.
9. The escape velocity v of a body depends on–
   (i) the acceleration due to gravity 'g' of the planet,
   (ii) the radius R of the planet.
   Establish dimensionally the relation for the escape velocity.
10. If the value of universal gravitational constant in S.I is 6.6×10^{-11} Nm^2kg^{-2}, then find its value in CGS System?
11. Find the dimensions of (a/b) in the equation :

$P = \frac{a - x^2}{bx}$ where P is pressure, x is distance and t is time

12. Given that the period T of oscillation of a gas bubble from an explosion underwater depends on P, d, and E, where the symbols are pressure, density, and total energy of the explosion. Find dimensionally a relation for T.
13. A small steel ball of radius r is allowed to fall under gravity through a column of a viscous liquid of coefficient of viscosity η. After some time, the velocity of the body attains a constant velocity v. The velocity depends on
    (i) weight of the ball mg (ii) coefficient of viscosity η and (iii) radius of ball r. Determine the relation for velocity, using the method of dimensions.

14. A driver take 0.20 second to apply the breaks (reaction time). If he is driving car at a speed of 54 kmh–1 and the breaks cause a deceleration of 6.0 ms–2. Find the distance travelled by car after he sees the need to put the breaks.

15. A ball thrown vertically upwards with a speed of 19.6 ms^{-1} from the top of a tower returns to the earth in 6s. Find the height of the tower ($g = 9.8\ m/s^2$).

16. A ball is thrown vertically upward with a speed of 25.0m/s.

(a) How high does it rise?

(b) How long does it take to reach its highest point?

(c) How long does the ball take to hit the ground after it reaches its highest point?

(d) What is its velocity when it returns to the level from which it started?

17. If units of force, velocity and energy are 100 dyne, 10 cm/sec and 400 ergs , respectively , what will be the unit of mass, length and time ?

18. If the velocity of light c, the constant of gravitation G, and Plank's constant h be chosen as fundamental units, find the value of a gram, a centimeter, and a second in terms of new units of mass, length, and time respectively.

19. The number of particles crossing a unit area perpendicular to X-axis in unit time is given by:

$$n = -D\frac{n2 - n1}{x2 - x1}$$

; where n1 and n2 are number of particles per unit volume for the values of x meant to be x1 and x2. Find the dimensions of diffusion constant D.