DELHI PUBLIC SCHOOL JAMMU

Physics Assignment

Month : May

Class 11th

1. (a) The earth-moon distance is about 60 earth radius. What will be the diameter of the earth (approximately in degrees) as seen from the moon?
   (b) Moon is seen to be of (½)°diameter from the earth. What must be the relative size compared to the earth?
   (c) From parallax measurement, the sun is found to be at a distance of about 400 times the earth-moon distance. Estimate the ratio of sun-earth diameters.

2. Which of the following time measuring devices is most precise?
   (a) A wall clock.
   (b) A stop watch.
   (c) A digital watch.
   (d) An atomic clock.

3. The distance of a galaxy is of the order of 10^{25} m. Calculate the order of magnitude of time taken by light to reach us from the galaxy.

4. The vernier scale of a travelling microscope has 50 divisions which coincide with 49 main scale divisions. If each main scale division is 0.5 mm, calculate the minimum inaccuracy in the measurement of distance.

5. During a total solar eclipse the moon almost entirely covers the sphere of the sun. Write the relation between the distances and sizes of the sun and moon.

6. If the unit of force is 100 N, unit of length is 10 m and unit of time is 100 s, what is the unit of mass in this system of units?

7. Give an example of
   (a) a physical quantity which has a unit but no dimensions.
   (b) a physical quantity which has neither unit nor dimensions. (c) a constant which has a unit.
   (d) a constant which has no unit.

8. Calculate the length of the arc of a circle of radius 31.0 cm which π/6 subtends an angle of at the centre.

9. Calculate the solid angle subtended by the periphery of an area of 1cm^2 at a point situated symmetrically at a distance of 5 cm from the area.

10. The displacement of a progressive wave is represented by $y = A \sin(wt – kx)$, where x is distance and t is time. Write the dimensional formula of (i) ω and (ii) k.

11. 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?

12. A new system of units is proposed in which unit of mass is α kg, unit of length β m and unit of time γ s. How much will 5 J measure in this new system?

13. The volume of a liquid flowing out per second of a pipe of length l and radius r is written by a student as

where P is the pressure difference between the two ends of the pipe and η is coefficent of viscosity of the liquid having dimensional formula $ML^{-1} T^{-1}$. Check whether the equation is dimensionally correct.

14. A physical quantity X is related to four measurable quantities a, b, c and d as follows:
$X = a^2b^3c^{5/2}d^{-2}$.
The percentage error in the measurement of a, b, c and d are 1%, 2%, 3% and 4%, respectively. What is the percentage error in quantity X ? If the value of X calculated on the basis of the above relation is 2.763, to what value should you round off the result.

15. In the expression $P = E\, l^2 m^{-5} G^{-2}$, E, m, l and G denote energy, mass, angular momentum and gravitational constant, respectively. Show that P is a dimensionless quantity.

16. If velocity of light c, Planck's constant h and gravitational contant G are taken as fundamental quantities then express mass, length and time in terms of dimensions of these quantities.