

Units and measurement:-Test-1

Question 1 What are physical quantities? Write about fundamental and derived quantities.

Question 2 What is system of units? Write about different systems of units used in mechanics.

Question 3 Deduce relation between astronomical unit, light year and par sec. Arrange them in descending order of their magnitude.

Question 4 Which type of phenomenon can be used as a measure of time? Give three examples.

Question 5 A calorie is a unit of heat or energy and it equals about 4.2 J where $1\text{J} = 1\text{kg m}^2\text{s}^{-2}$. 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 γ s. Show that a calorie has a magnitude $4.2 \alpha^{-1} \beta^{-2} \gamma^2$ in terms of the new units.

Question 6 A new unit of length is chosen such that the speed of light in vacuum is unity. What is the difference between the sun and the earth in terms of new unit if light takes 8 min and 20 sec to cover this distance?

Question 7 Do AU and \AA represents the same units of length.

Question 8 Why has second been defined in terms of periods of radiations from cesium-133.

Question 9 Which of the following is the most precise device for measuring length?

- a) A Vernier calliper with 2 divisions on sliding scale
- b) A screw gauge of pitch 1mm and 100 divisions on the sliding scale
- c) An optical instrument that can measure length to within a wavelength of light (average wavelength of visible light is of the order of 6000\AA)

Question 10 The radius of atom is of the order of 2\AA and radius of a nucleus is of the order of fermi. How many magnitudes higher is the volume of atom as compared to the volume of nucleus?