



INDIAN SCHOOL DARSAIT DEPARTMENT OF PHYSICS



Subject : Physics	Topic : Units and Measurements	Worksheet No. 1
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Name of the Student : _____	Class & Division : XI A/B	Roll Number : __

- 1 What are the dimensions of the following – 1
 - (a) energy
 - (b) energy density (energy per volume)
 - (c) pressure
- 2 Can a quantity have units but still be dimensionless? Give example if applicable. 1
- 3 Round off the following numbers 2.745 and 2.735 to 3 significant figures. 1
- 4 Which of the following is the most precise device for measuring length- 1
 - (a) A vernier caliper with 20 divisions on the sliding scale.
 - (b) A screw gauge of pitch 1 mm and 100 divisions on the circular scale.
 - (c) An optical instrument that can measure length to within a wavelength of light.
- 5 Mention four physical quantities which are dimensionless. 1
- 6 Write the use of dimensional analysis and state its limitations. 2
- 7 Check the consistency of the following equation where height of liquid through a tube is given by, $h = \frac{2\sigma d}{rg \cos \theta}$ 2

where σ is surface tension, d is density, r is radius and g is the acceleration of gravity.

(Dimension of surface tension = $[MT^{-2}]$)
- 8 The diameter of a sphere is 2.78 m. Calculate its volume with due regard to significant figures. 2
- 9 State number of significant figures: 2
 - a) 343.56
 - b) 65000
 - c) 900 kg
 - d) 250.005
 - e) 0.0002350
 - f) 48.9×10^{-5}
- 10 Give an example of the following – 2
 - (a) a physical quantity which has a unit but no dimension.
 - (b) a physical quantity which has neither unit nor dimensions.
 - (c) a constant which has a unit.
 - (d) a constant which has no unit.

- 11 If heat dissipated in a resistance can be determined from the relation: 3

$$H = I^2 R t ,$$

If the maximum error in the measurement of current, resistance and time are 2%, 1%, and 1% respectively, What would be the maximum error in the dissipated heat?

- 12 A body travels uniformly a distance of (13.8 ± 0.2) m in a time (4.0 ± 0.3) s. Calculate its velocity with error limits. What is percentage error in velocity? 3

- 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 3

$$v = \frac{\pi P r^4}{8 \eta \ell}$$

Where P is the pressure difference between the two ends of the pipe and η is coefficient of viscosity of the liquid. Check if equation is dimensionally correct.

(Dimension of coefficient of viscosity = $[ML^{-1} T^{-1}]$)

- 14 The angle subtended by the moon at a point on Earth is $31'$. If the distance of the moon from Earth is 3.84×10^8 m, find the diameter of the moon. 3

- 15 The frequency (ν) of an oscillating drop may depend upon radius (r) of the drop, density (ρ) of liquid and the surface tension (S) of the liquid. Deduce the formula dimensionally. 3

(Dimension of surface tension = $[MT^{-2}]$)