

Model Question paper - 1
Nature of the Physical World and Measurement 1

11th Standard

Physics

Reg.No. :

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Answer all the Questions

Time : 01:00:00 Hrs

Total Marks : 40

5 x 1 = 5

Part - A

- 1) The force acting on a particle is found to be proportional to velocity. The constant of proportionality is measured in terms of _____.
(a) kg s^{-1} (b) kg s (c) kg m s^{-1} (d) kg m s^{-2}
- 2) The number of significant digits in 0.0006032 is _____.
(a) 8 (b) 7 (c) 4 (d) 2
- 3) The length of a body is measured as 3.51 m. If the accuracy is 0.01 m, then the percentage error in the measurement is _____.
(a) 351% (b) 1% (c) 0.28% (d) 0.035%
- 4) The dimensional formula for gravitational constant is _____.
(a) $\text{M}^1\text{L}^3\text{T}^{-2}$ (b) $\text{M}^{-1}\text{L}^3\text{T}^{-2}$ (c) $\text{M}^{-1}\text{L}^{-3}\text{T}^{-2}$ (d) $\text{M}^1\text{L}^{-3}\text{T}^2$
- 5) The velocity of a body is expressed as $v = (x/t) + yt$. The dimensional formula for x is _____.
(a) ML^0T^0 (b) M^0LT^0 (c) $\text{M}^0\text{L}^0\text{T}$ (d) MLT^0

Part - B

5 x 2 = 10

- 6) What is the role of physics in technology?
- 7) Why is SI system considered superior to other system?
- 8) Obtain by dimensional analysis an expression for the surface tension of a liquid rising in a capillary tube. Assume that the surface tension T depends on mass m of the liquid, pressure P of the liquid and radius r of the capillary tube (Take the constant $k = \frac{1}{2}$).
- 9) What is the need for measurement of physical quantities?
- 10) You are given a wire and a meter scale. How will you estimate the diameter of the wire?

Part - C

5 x 3 = 15

- 11) How many astronomical units are there in 1 metre?
- 12) If mass of an electron is 9.11×10^{-31} kg how many electrons would weigh 1 kg?
- 13) In a submarine with a SONAR, the delay between generation of a signal and reception of its echo after reflection from an ship is observed to be 73.0 seconds. If the speed of sound in water is 1450 ms^{-1} , then calculate the distance of the enemy ship.
- 14) State the number of significant figure in the following
 - (i) 600900
 - (ii) 5212.0
 - (iii) 6.323
 - (iv) 0.0631
 - (v) 2.64×10^{24}
- 15) Find the value of π^2 correct to significant, if $\pi = 3.14$

Part - D

2 x 5 = 10

- 16) The velocity of sound in water is 1480 ms^{-1} . Find the frequency of sound wave such that its wavelength in water is the same as the wavelength in air of a sound wave of frequency 1000 Hz. (The velocity of sound in air is 340 ms^{-1}).
Give data
Velocity of sound in water (v_1) = 1480 ms^{-1}
Frequency of sound wave in air (n) = 1000 Hz
Velocity of sound in air (v) = 340 ms^{-1}
Wavelength of sound wave of frequency 1000 Hz in air (λ) = Wavelength of sound in water (λ_1)
- 17) The equation of a progressive wave travelling along the X-axis is given by $y = 10 \sin p(2t - 0.01x)$ where y and x are in m and t in s. Calculate (i) amplitude, (ii) frequency and wavelength, (iii) wave velocity.
Given data.
The equation of a progressive wave travelling along X-axis is given by $y = 10 \sin \pi(2t - 0.01x)$
x and y are expressed in metres.
Time in secs.
