

Attempt all questions.

Multiple Choice Questions

[7 × 1 = 7]

1. Which of the following is correct unit of gravitational constant? (a) $\text{m}^3\text{kg}^{-1}\text{s}^{-2}$
(b) $\text{m}^3\text{kg}^{-2}\text{s}^{-1}$ (c) $\text{m}^{-3}\text{kg}^{-1}\text{s}^2$ (d) $\text{m}^{-3}\text{kg}^2\text{s}^{-1}$
- ② The dimension $[\text{M}^1\text{L}^{-2}\text{T}^{-2}]$ refers to a physical quantity that has unit: (a) joule (b) pascal (c) newton (d) watt
3. "Light year" is the unit of: (a) Length (b) Velocity (c) Time (d) Momentum
- ④ Mercury thermometer can be used to measure temperatures up to: (a) 100°C
(b) 212°C (c) 360°C (d) 500°C
5. In the Kelvin scale the correct value of absolute zero temperature is: (a) 0 K
(b) 273 K (c) 237 K (d) 273.15 K
6. The number of electron-taken out from a body to produce 1 coulomb of charge will be: (a) 1.667×10^{19} (b) 6.25×10^{18} (c) 6.023×10^{23} (d) None
7. The sure test for detection of electric charge is: (a) attraction (b) repulsion
(c) friction (d) induction

Short Answer Questions

[5 × 5 = 25]

8. (a) An important milestone in the evolution of the universe just after the Big Bang is the Planck time t_p , the value of which depends on three fundamental constants: (1) the speed of light c (2) Newton's gravitational constant G and (3) Planck's constant h . Based on a dimensional analysis, find the expression of the Planck time. [3]
- (b) Test the correctness of expression $v^2 = u^2 + 2as$ using dimensional method. [2]
9. (a) Write the dimensional formula of universal gravitational constant taking $[\text{F}]$, $[\text{L}]$ and $[\text{T}]$ as fundamental quantity. [2]
- (b) The density of gold is 19.3 gm/cc . Express its value in SI unit. [3]
10. (a) What is thermometry? [1]
- (b) What are the differences between heat and temperature? [2]
- (c) At what temperature will the Kelvin scale reading double the Fahrenheit scale reading? [2]

$\frac{m}{s}$

11. (a) Define quantization of charge? [2]
(b) Can a body have a charge less than $1.6 \times 10^{-19} \text{C}$? [1]
(c) When an object is rubbed with another object the charge developed on the object is $32 \mu\text{C}$. Calculate the no. of electrons transferred. [2]
12. (a) Distinguish between bounded charge and free charge. [2]
(b) How should you charge a body positively by the method of induction. [3]

Long Answer Questions

[8 × 1 = 8]

13. (a) State and explain zeroth law of thermodynamics. [2]
(b) How can you relate the Celsius and Fahrenheit scale? [1]
(c) Convert 35°F into Kelvin and Celsius scale [2]
(d) A centigrade thermometer reads 1°C at the melting point of ice and 99°C at the boiling point of water at normal pressure. What is the correct temperature when it reads 25°C ? [3]

** Best of Luck **

m/s²

4 x d

11/12/21