Attempt all questions.

Multiple Choice Questions   [7 × 1 = 7]

1. Which of the following is correct unit of gravitational constant? (a) $m^3kg^{-1}s^{-2}$ (b) $m^3kg^{-2}s^{-1}$ (c) $m^{-3}kg^{-1}s^2$ (d) $m^{-3}kg^2s^{-1}$

2. The dimension $[M^1L^2T^{-2}]$ 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 [F], [L] and [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]

11. (a) Define quantization of charge? [2]

(b) Can a body have a chargeless than 1.6×10^{-19} C? [1]

(c) When an object is rubbed with another object the charge developed on the oject is 32 µC. 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]

m/s²

*Best of Luck *

+ ×d