1. If the error in measurement of the mass of a body is 4% and error in velocity measurement is 6%, the maximum error in estimation of the kinetic energy is likely to be,

a. 5%

b. 10%

c. 8%

d. **16%**

2. The equation of state of real gas is $(P + a/V^2)(V - b) = RT$. The dimension of the constant, a, is

a. **ML^5T^{-2}**

b. L^6

c. ML^6T^{-1}

d. ML^5T^{-1}

3. Two isolated identical conducting spheres having charges +Q and -Q are connected by a heater wire with resistance = R. If the radius of both spares is r, then after reaching the equilibrium total heat energy generated in the heater wire is,

a. **$Q^2/4\pi\varepsilon_0 r$**

b. $Q^2/4\pi\varepsilon_0 R$

c. $Q^2/8\pi\varepsilon_0 r$

d. Zero

4. A point charge q, is placed at the centre of a cube of side L. The electric flux emerging from the cube is

a. $6L^2q/\varepsilon_0$

b. Zero

c. $6L^2q/4\pi\varepsilon_0$

d. **q/ε_0**

5. A beam of monochromatic light is travelling within water. Subsequently, it is incident on the surface of the water, which is open to the air with an incidence angle θ . If the incidence angle is smaller than the critical angle, then there will be,

a. Only reflected ray and no refracted ray.

b. Only refracted ray and no reflected ray.

c. **A reflected and a refracted ray, with the angle between them less than 180 - 2θ.**

d. A reflected and a refracted ray, with the angle between them more than 180 - 2θ.

6. A compass needle which is allowed to move in a horizontal plane is taken to the geomagnetic North Pole. It

a. **Will stay in any position**.

b. Will stay in north-south direction only.

c. Will show no movement.

d. Will stay in east-west direction only.

7. A gas is contained in a metallic cylinder fitted with a piston. The piston is suddenly moved in to compress the gas adiabatically and is maintained at this position. As time passes the pressure of the gas in the cylinder (assume that heat is lost to the surrounding)

a. Increases.

b. **Decreases.**

c. Remains constant.

d. Increases or decreases depending on the nature of the gas.

8. The root mean square velocity of Oxygen molecules in a gas is v. If the temperature is doubled and the Oxygen molecules dissociates to Oxygen atoms, the root mean square speed will become,

a. v

b. $\sqrt{2}.v$

c. **$2v$**

d. $4v$

9. The decay constant of a radioactive sample is λ. The half-life and average life of the sample are:

a. $1/\lambda$ and $(\ln 2)/\lambda$

b. $\lambda.(\ln 2)$ and $1/\lambda$

c. **$(\ln 2)/\lambda$ and $1/\lambda$**

d. $1/[\lambda.(\ln 2)]$ and $(\ln 2)/\lambda$

10. A positively charged particle is projected towards east, gets deflected towards north due to a magnetic field. The direction of the field is,

a. Towards west.
b. Towards south.
c. Upwards.
d. **Downwards**.