

Examrace

Competitive Exams: Physics MCQs (Practice_Test 15 of 35)

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1. Maxwell's thermodynamic relations connect coordinate derivatives evaluated at
 - a. two different equilibrium positions along a single reversible path
 - b. two equilibrium positions along two different reversible paths
 - c. a single equilibrium positions along two different reversible paths
 - d. a single equilibrium position along one reversible path
2. The volume of a certain mass of gas at constant pressure is doubled to its value at 0°C. The temperature of the gas will be
 - a. 1000°C
 - b. 1730°C
 - c. 2730°C
 - d. 5460°C
3. The period of oscillations of a galvanometer mirror due to the Brownian motion is 40 s. The moment of inertia of the galvanometer about its suspension axis is 8×10^{-12} kg-m². The root-mean-square of maximum deflection of this mirror at a temperature of 500°C, is
 - a. 2.7×10^{-4} rad
 - b. 2.1×10^{-4} rad
 - c. 1.5×10^{-4} rad
 - d. 0.9×10^{-4} rad
4. In the porous plug experiment, the temperature of the gas increases after throttling. The correct range for the initial temperature of the gas for this to happen is
 - a. boiling temperature to critical temperature
 - b. critical temperature to Boyle's temperature
 - c. Boyle's temperature to inversion temperature
 - d. below inversion temperature

5. If a black body radiation in a spherical cavity of volume V satisfies the relation $PVh = \text{constant}$ during a quasi-static isentropic process, then the numerical value of h should be
- $\frac{7}{5}$
 - $\frac{5}{3}$
 - $\frac{4}{3}$
 - $\frac{3}{2}$
6. A long straight vertical wire carries a current of 10A directed upwards. If the horizontal component of the earth's magnetic field at the plane is $2 \times 10^{-5} \text{ T}$, then the distance of the point from the wire at which the net B is zero, is
- 0.05m
 - 0.10m
 - $(0.05) \text{ pm}$
 - $(0.1) \text{ pm}$
7. A wire bent into the form of an ellipse has semilatus rectum L and eccentricity a . For a current I in the wire, the magnetic field at one of the foci of the ellipse will be
- $\frac{m_0 I}{2L}$
 - $\frac{m_0 I}{L}$
 - $\frac{m_0 a I}{2L}$
 - $\frac{m_0 a I}{L}$
8. If the B - H curves of two samples of P and Q of iron are as shown above, then which one of the following statements is correct?
- Both P and Q are suitable for making permanent magnets
 - P is suitable for making permanent magnets and Q for making electromagnets
 - P is suitable for making electromagnets and Q is suitable for permanent magnets
 - Both P and Q are suitable for making electromagnets
9. One billion electrons are placed on a solid copper sphere. If this system attains equilibrium, then the electrons will be
- uniformly distributed on the surface of the sphere
 - uniformly distributed in the interior of the sphere

- c. concentrated at the centre of the sphere
- d. concentrated at the bottom of the sphere
10. If two infinite oppositely charged plates with surface charge density σ on each plate are kept perpendicular to each other as shown in the above figure, then a charge q at p will experience a force
- $\frac{q\sigma}{20}$ away towards the vertical plate
 - $\frac{q\sigma}{20}$ away from the horizontal plate
 - $\frac{q\sigma}{\sqrt{2}0}$ towards the origin, O
 - $\frac{q\sigma}{\sqrt{2}0}$ making 45° with respect to the vertical direction
11. The above figure shows electric field E at distance r in any direction from the origin O . The electric field E is due to
- a charged hollow metallic sphere of radius OP with centre at O
 - a charged solid metallic sphere of radius OP with centre at O
 - a uniformly charged non-conducting sphere of radius OP with centre at O
 - a uniformly charged non-conducting hollow sphere radius OP with centre at O
12. The capacitance of a parallel plate capacitor is 2×10^{-6} F. It changes to 2×10^{-6} F when a dielectric is inserted between the plates. The relative permittivity of the dielectric is
- 20
 - 2
 - 1
 - $\frac{1}{2}$
13. A parallel plate capacitor has an electric field of 10^5 V/m between the plates. If the charge on the capacitor plate is 1 mC , then the force on each capacitor plate is
- 0.1 N
 - 0.05 N
 - 0.02 N
 - 0.01 N.
14. In the circuit shown in the above figure, the resultant resistance between P and Q is
- 5 W
 - 14W

c. 15W

d. 20W

15. A conductor wire, having 10^{29} free electrons per m^3 carries a current of 20 A. If the cross-section of wire is 1 mm^2 then the drift velocity of electrons will be of the order of

a. 10^{-5} m/s

b. 10^{-3} m/s

c. 10^{-1} m/s

d. 10 ms

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