

VOLUME-02 Part B and C

MCQs/ Objectives

3. Electromagnetic Theory	1
4. Quantum Mechanics	53

3. Electromagnetic Theory

1. The electric field \vec{E} at the centre of a uniformly charged conductor is:

- a) $\frac{qr}{4\pi \epsilon_0 r^3}$
- b) $\frac{qr}{4\pi \epsilon_0 r^2}$
- c) Zero
- d) $\frac{qr}{4\pi \epsilon_0 R^2}$

2. Larmor formula for the two velocity is:

- a) $P = \frac{2 e^2 a^2}{4 c^2}$
- b) $P = \frac{1}{4\pi \epsilon_0} e^2$
- c) $P = \frac{1}{4\pi \epsilon_0} \frac{2 e^2 a^2}{3 c^3}$
- d) $P = 0$

3. The total energy density is given by:

- a) $\langle u \rangle = \epsilon E_{rms}^2$
- b) $\langle u \rangle = \epsilon E_{rms}$
- c) $\langle u \rangle = \epsilon E_{rms}^3$
- d) $\langle u \rangle = \epsilon E_{rms} / 2$

4. Electrostatic potential is the:

- a) Potential energy per unit time
- b) Potential energy per unit charge
- c) Potential difference per unit time
- d) Potential difference per unit charge.

5. The electric potential due to a lineary quadrapole varies inversely as theof the distance:

- a) Square
- b) Fourth power
- c) Cube
- d) Fifth power

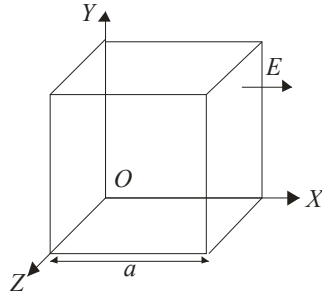
6. A circular loop of radius R carries as current I. What is the magnetic induction at any point on the axis other than then centre?

- a) $\frac{\mu_0}{2\pi} m^2$
- b) $\frac{\mu_0}{2\pi} \frac{m}{x^3}$
- c) $\frac{\mu_0}{4\pi} x$
- d) None of these

7. A rectangle of cross sectional area A is placed in a uniform electric field. The normal to the area of coil makes an angle of 90^0 with the electric field. The electric flux ϕ , through the rectangle is:

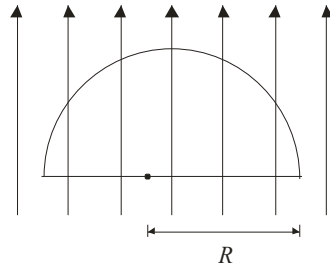
- a) \vec{E}
- b) $\vec{A} \cdot \vec{E}$
- c) $\frac{\vec{A} \cdot \vec{E}}{\sqrt{2}}$
- d) Zero

8. A cube of side a is placed in a uniform electric field $\vec{E} = E_0 \hat{i}$. The total electric flux through the cube is:



- a) Zero
 b) $2a^2 E_0$
 c) $4a^2 E_0$
 d) $6a^2 E_0$

9. The electric flux passing through a hemispherical surface of radius R placed in an electric field \vec{E} with the axis parallel to the field is:



- a) $\pi R^2 E$
 b) $2\pi R^2 E$
 c) $2\pi R E$
 d) $2\pi R^3 E$

10. The energy of e.m. wave in vacuum is given by relation:

- a) $\frac{E^2}{2\epsilon_0} + \frac{B^2}{2\mu_0}$
 b) $\frac{1}{2}\epsilon_0 E^2 + \frac{1}{2}\mu_0 B^2$
 c) $\frac{E^2 + B^2}{c}$
 d) $\frac{1}{2}\epsilon_0 E^2 + \frac{B^2}{2\mu_0}$

11. In electromagnetic wave the phase difference between electric and magnetic field vectors \vec{E} and \vec{B} is:

- a) 0
 b) $\frac{\pi}{2}$
 c) π
 d) $\frac{\pi}{4}$

12. The ratio of electric field vectors \vec{E} and magnetic field vector \vec{H} i.e., $\frac{\vec{E}}{\vec{H}}$ has the dimensions of:

- a) Resistance
 b) Inductance
 c) Capacitance
 d) Product of inductance and capacitance

13. In case of reflection and refraction of light at the dielectric interface:

- a) Tangential components of \vec{D} and \vec{B} are continuous.

