PhysicsByAaryan

CSIR NET . GATE . JEST . BARC - Physics

Electric field in matter - CSIR NET Physics PYQs

Electromagnetism . All PYQs (2015-2025) with answer key

3 questions . Answer key included

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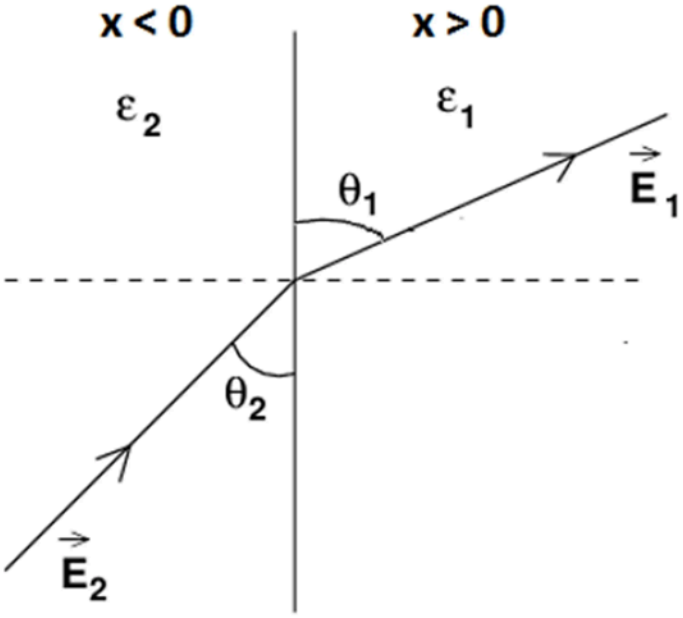
Q1. [June 2016] . 3.5 marks

Electromagnetism > Electric field in matter

CSIR NET	2016 June	3.5M

The half space regions $x > 0$ and $x < 0$ are filled with dielectric media of dielectric constants ϵ_1 and ϵ_2 respectively. There is a uniform electric field in each part. In the right half, the electric field makes an angle θ_1 to the interface. The corresponding angle θ_2 in the left half satisfies

1. $\epsilon_1 \sin\theta_2 = \epsilon_2 \sin\theta_1$
2. $\epsilon_1 \tan\theta_2 = \epsilon_2 \tan\theta_1$
3. $\epsilon_1 \tan\theta_1 = \epsilon_2 \tan\theta_2$
4. $\epsilon_1 \sin\theta_1 = \epsilon_2 \sin\theta_2$

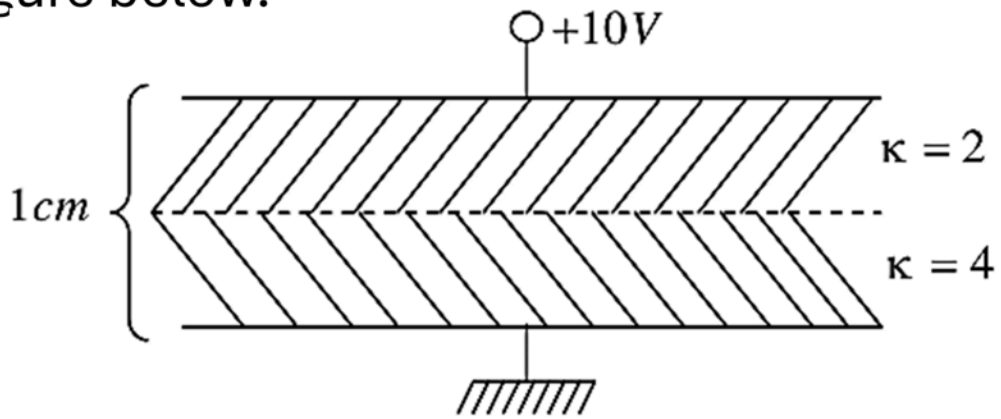


Q2. [Dec 2019] . 5.0 marks

Electromagnetism > Electric field in matter

CSIR NET	2019 Dec	5M

A parallel plate capacitor with 1 cm separation between the plates has two layers of dielectric with dielectric constants $\kappa = 2$ and $\kappa = 4$, as shown in the figure below.



If a potential difference of 10 V is applied between the plates, the magnitude of the bound surface charge density (in units of $\mathrm{C/m^2}$) at the junction of the dielectrics is

1. $250\varepsilon_0$
2. $2000\varepsilon_0/3$
3. $2000\varepsilon_0$
4. $200\varepsilon_0/3$

Q3. [June 2019] . 3.5 marks

Electromagnetism > Electric field in matter

CSIR NET	2019 June	3.5M

Which of the following is not a correct boundary condition at an interface between two homogeneous dielectric media? (In the following $\hat{n}$ is a unit vector normal to the interface, σ and $\vec{j}_s$, are the surface charge and current densities, respectively.)

1. $\hat{n} \times \left(\vec{D}_1 - \vec{D}_2\right) = 0$
2. $\hat{n} \times \left(\vec{H}_1 - \vec{H}_2\right) = \vec{j}_s$
3. $\hat{n} \cdot \left(\vec{D}_1 - \vec{D}_2\right) = \sigma$
4. $\hat{n} \cdot \left(\vec{B}_1 - \vec{B}_2\right) = 0$

Answer Key

3 questions . Subject and topic for quick revision

Q. No	Subject	Topic	Answer
Q1	Electromagnetism	Electric field in matter	**3**
Q2	Electromagnetism	Electric field in matter	**2**
Q3	Electromagnetism	Electric field in matter	**1**

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