

Easy

Deputy Executive Engineer (Electrician)

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Gujarat Public Service Selection Board / Assistant Engineer (Electrical)

Consider the following statements regarding Conductors in Electrostatics: 1. Electric field inside a perfect conductor under electrostatic conditions is zero due to

A

1 and 3 only

B

1 and 4 only

C

2 and 3 only

D

1, 2 and 3 only

Correct

Correct Answer: D

Full Detailed Explanation

Correct Answer: D - 1, 2 and 3 only Quick Concept Explanation In electrostatic equilibrium, free charges in a conductor redistribute until the internal electric field is zero. The conductor is then an equipotential body and excess free charge resides on its surface. Key relation: Inside a perfect conductor at electrostatic equilibrium: $E=0$ and $V=\text{constant}$. Exam focus: Zero internal E and constant potential are two views of the same equilibrium condition. Common trap: The field does not increase with depth inside an ideal conductor. Statement-wise Verification Statement 1 - Correct. Electric field inside a perfect conductor under electrostatic conditions is zero due to free charge redistribution. In electrostatic equilibrium, free charges in a conductor redistribute until the internal electric field is zero. Statement 2 - Correct. Charges in a conductor reside only on the surface in electrostatic equilibrium. In electrostatic equilibrium, free charges in a conductor redistribute until the internal electric field is zero. Statement 3 - Correct. Potential inside a conductor remains constant throughout its volume. Inside a perfect conductor at electrostatic equilibrium: $E=0$ and $V=\text{constant}$. Statement 4 - Incorrect. Electric field inside a conductor increases with depth due to induced charges. The correct principle is: In electrostatic equilibrium, free charges in a conductor redistribute until the internal