

Easy

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Consider the following statements regarding Skin Effect: 1. Skin effect causes current to concentrate near surface of conductor at high frequency. 2. Skin depth

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 Skin effect is the tendency of alternating current to crowd toward a conductor surface as frequency rises. Skin depth decreases with frequency and also depends on permeability and conductivity. Key relation:

$\delta = \frac{1}{\sqrt{\pi f \mu \sigma}}$. Exam focus: Higher f → smaller skin depth → higher AC resistance. Common trap: Skin effect is weak at low frequency and stronger at high frequency. Statement-wise Verification Statement 1 - Correct. Skin effect causes current to concentrate near surface of conductor at high frequency. Skin effect is the tendency of alternating current to crowd toward a conductor surface as frequency rises. Statement 2 - Correct. Skin depth decreases with increase in frequency. Skin depth decreases with frequency and also depends on permeability and conductivity. Statement 3 - Correct. Skin effect reduces effective cross-sectional area of conductor. Skin effect is the tendency of alternating current to crowd toward a conductor surface as frequency rises. Statement 4 - Incorrect. Skin effect is significant only at low frequencies. Skin effect becomes more pronounced as frequency increases Core Concept Skin effect is the tendency of alternating current to crowd toward a conductor surface as frequency rises. The effective conducting area falls, causing AC resistance to increase. Skin depth decreases