

Easy

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Ports Authority of Gujarat / Assistant Engineer (Electrical)

Consider the following statements regarding electromagnetic induction: 1. Induced EMF depends on rate of change of flux. 2. Lenz's law determines the direction

A

1 only

B

2 only

C

1 and 2 only

Correct

D

1, 2 and 3

Correct Answer: C

Full Detailed Explanation

Correct Answer: C - 1 and 2 only Quick Concept Explanation Faraday's law states that induced EMF is proportional to the time rate of change of flux linkage. Lenz's law supplies the negative sign: the induced current/EMF acts in a direction that opposes the change producing it, consistent with conservation of energy. Key relation: $\mathcal{E} = -N \frac{d\phi}{dt}$. Exam focus: Magnitude comes from Faraday; direction comes from Lenz. Common trap: Lenz's law says oppose the cause/change, not aid it. Statement-wise Verification Statement 1 - Correct. Induced EMF depends on rate of change of flux. Faraday's law states that induced EMF is proportional to the time rate of change of flux linkage. Statement 2 - Correct. Lenz's law determines the direction of induced EMF. Lenz's law supplies the negative sign: the induced current/EMF acts in a direction that opposes the change producing it, consistent with conservation of energy. Statement 3 - Incorrect. Induced EMF always aids the cause. The correct principle is: Faraday's law states that induced EMF is proportional to the time rate of change of flux linkage. Core Concept Faraday's law states that induced EMF is proportional to the time rate of change of flux linkage. Lenz's law supplies the negative sign: the induced current/EMF acts in a direction that opposes the change producing it, consistent with