

Answer on Question #61356-Physics-Electromagnetism

17) An ammeter is suspected of giving inaccurate readings. In order to confirm the readings, the ammeter is connected to a silver voltmeter in series and a steady current is passed for one hour. The ammeter reads 0.56A and 2.0124g of silver is deposited. What is the accurate readings of the ammeter?

- a) 0.06A
- b) 0.11A
- c) 1.1A
- d) 6.0A

Solution

$$m = \frac{Q}{C} \frac{A}{v},$$

where m is the mass of silver, Q is charge transferred, $A = 108 \frac{\text{kg}}{\text{kmol}}$ is atomic weight of silver, $C = 9.65 \cdot 10^7 \frac{\text{C}}{\text{kmol}}$, v is valence.

$$m = \frac{Q}{C} \frac{A}{v} \rightarrow m = \frac{It}{C} \frac{A}{v} \rightarrow 2.0124 \cdot 10^{-3} = \frac{I \cdot 3600}{9.65 \cdot 10^7} \left(\frac{108}{1} \right) \rightarrow I = 0.50A.$$

Answer: 0.50A.

18) The magnetic flux through each loop of a 35-loop coil is given by $(3.6t - 0.71t^3) \cdot 10^{-2} \text{ Tm}^2$, where the time is in seconds. Determine the induced emf at $t=5.0\text{s}$.

- a) 6.17V
- b) 14.43V
- c) 17.49V**
- d) 9.17V

Solution

$$\Phi = (3.6t - 0.71t^3) \cdot 10^{-2}.$$

$$\varepsilon = -N \frac{d\Phi}{dt} = 35(-3.6 + 3(0.71)t^2) \cdot 10^{-2}.$$

$$\varepsilon(5) = 35(-3.6 + 3(0.71)5^2) \cdot 10^{-2} = 17.49V.$$