CBSE

ALTERNATING CURRENT WS 2

Class 12 - Physics

1. If an a.c. main supply is given to be 220 V, the average e.m.f. during a positive half cycle will be **[1]**

   a) 240 V

   b) 220 $\sqrt{2}$ V

   c) 220 V

   d) 198 V

2. A small signal voltage V(t) = V_0 sin t is applied across an ideal capacitor C. **[1]**

   a) Current I(t) lags voltage V(t) by 90^o

   b) Current I(t) leads voltage V(t) by 180^o.

   c) Over a full cycle the capacitor C does not consume any energy from the voltage source.

   d) Current I(t) is in phase with voltage V(t)

3. **Assertion:** Faraday's laws are consequences of conservation of energy. **[1]**

   Reason: In a purely resistive AC circuit, the current lags behind the emf in phase.

   a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

   b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

   c) Assertion is correct statement but reason is wrong statement.

   d) Assertion is wrong statement but reason is correct statement.

4. A sinusoidal emf is applied to a circuit containing an inductor only. Show that the current lags behind the voltage by $\frac{\pi}{2}$. Show this phase relationship graphically. **[1]**

5. In a series LCR circuit, the voltage across an inductor, capacitor and resistor are 20 V, 20 V and 40 V respectively. What is the phase difference between the applied voltage and the current in the circuit? **[1]**

6. An athlete peddles a stationary tricycle whose pedals are attached to a coil having 100 turns each of area 0.1 m^2. The coil, lying in XY plane, is rotated in this plane at the rate of 50 rpm, about the z-axis, in a region where a uniform magnetic field $\vec{B} = 0.01\hat{k}$ Tesla is present. Find the: **[1]**

   i. maximum emf generated

   ii. average emf generated in the coil over one complete rotation.

7. Why alternating current cannot be measured by a d.c. ammeter? **[1]**