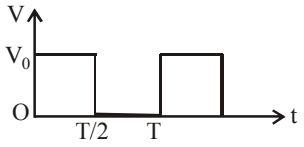
21 Alternating Current

Diagram Based Questions :

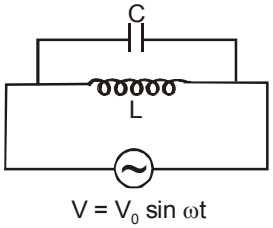
1. The r.m.s. value of potential difference V shown in the figure is



(a) V_0 (b) $V_0/\sqrt{2}$

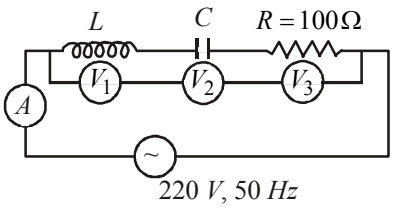
(c) $V_0/2$ (d) $V_0/\sqrt{3}$

2. For the circuit shown in the fig., the current through the inductor is 0.9 A while the current through the condenser is 0.4 A. Then



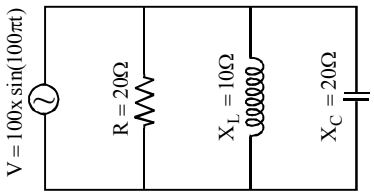
(a) current drawn from source I = 1.13 A
(b) ω = 1/(1.5 LC)
(c) I = 0.5 A
(d) I = 0.6 A

3. In the given circuit the reading of voltmeter V_1 and V_2 are 300 volt each. The reading of the voltmeter V_3 and ammeter A are respectively



(a) 150 V and 2.2 A (b) 220 V and 2.0 A
(c) 220 V and 2.0 A (d) 100 V and 2.0 A

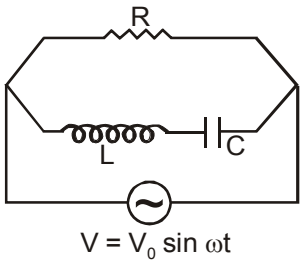
4. In the given circuit, the current drawn from the source is



(a) 20 A (b) 10 A

(c) 5 A (d) $5\sqrt{2}$ A

5. The current in resistance R at resonance is



(a) zero
(b) minimum but finite
(c) maximum but finite
(d) infinite

Solution

1. **(b)** $V_{rms} = \sqrt{\frac{(T/2)V_0^2 + 0}{T}} = \frac{V_0}{\sqrt{2}}$.

2. **(c)** The current drawn by inductor and capacitor will be in opposite phase. Hence net current drawn from generator
$= I_L - I_C = 0.9 - 0.4 = 0.5$ amp.

3. **(b)** As $V_L = V_C = 300\ V$, resonance will take place
$\therefore\ V_R = 220\ V$

Current, $I = \frac{220}{100} = 2.2\,A$

$\therefore$ reading of $V_3 = 220\ V$
and reading of $A = 2.2\ A$

4. **(d)** Current, $I = \frac{V}{Z}$

5. **(c)** At resonance $X_L = X_C \Rightarrow Z = R$ & current is maximum but finite, which is $I_{max} = \frac{E}{R}$, where E is applied voltage.