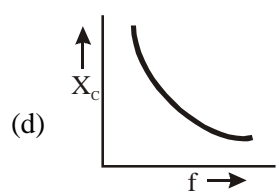
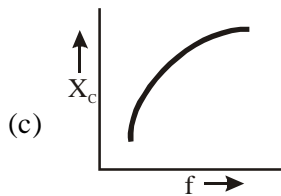
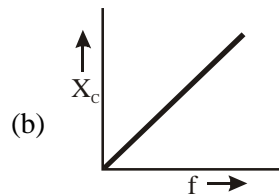
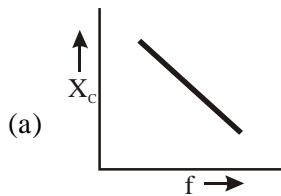


## OBJECTIVE UNSOLVED LEVEL - I

1. If  $E_0$  represents the peak value of the voltage in an ac circuit, the rms of the voltage will be :
- (a)  $E_0 / \pi$  (b)  $2E_0 / \pi$   
 (c)  $E_0 / 2$  (d)  $E_0 / \sqrt{2}$ .
2. In an ac circuit, the rms value of current  $I_{\text{rms}}$  is related to the peak current  $I_0$  by the relation :
- (a)  $I_{\text{rms}} = (1/\pi)I_0$  (b)  $I_{\text{rms}} = (I_0\sqrt{2})$   
 (c)  $I_{\text{rms}} = (\sqrt{2})I_0$  (d)  $I_{\text{rms}} = \pi I_0$ .
3. The reactance of a capacitor  $X_C$  in an ac circuit varies with frequency  $f$  of the source voltage. Which one of the following represents this variation correctly ?



4. A sinusoidal voltage  $V_0 \sin \omega t$  is applied across a series combination of resistance  $R$  and capacitance  $C$ . The amplitude of the current in this circuit is :

(a)  $\frac{V_0}{\sqrt{R^2 + \omega^2 C^2}}$

(b)  $\frac{V_0}{\sqrt{R^2 - C^2 \omega^2}}$

(c)  $\frac{V_0}{(R + C\omega)}$

(d)  $\frac{V_0}{\sqrt{R^2 + \frac{1}{\omega^2 C^2}}}$ .

5. A coil having an inductance of  $\frac{1}{\pi}$  henry is connected in series with a resistance of  $300 \Omega$ . If 20 volt from a 200 cycle source are impressed across the combination, the value of the phase angle between the voltage and the current is :

- (a)  $\tan^{-1} \frac{5}{4}$  (b)  $\tan^{-1} \frac{4}{5}$   
(c)  $\tan^{-1} \frac{3}{4}$  (d)  $\tan^{-1} \frac{4}{3}$ .

6. A coil of resistance R and inductance L is connected to a battery of E volt emf. The final current flowing in the coil is :

- (a) E/R (b) E/L  
(c)  $E/(R^2 + \omega^2 L^2)^{1/2}$  (d)  $EL(R^2 + L^2)^{1/2}$ .

7. The ratio of mean value over half cycle to rms value of AC is :

- (a) 2 :  $\pi$  (b)  $2\sqrt{2} : \pi$   
(c)  $\sqrt{2} : \pi$  (d)  $\sqrt{2} : 1$ .

8. A step up transformer of turns ratio 2 : 1 has 50 Hz. AC voltage applied to primary. The frequency of AC output voltage across secondary is :

- (a) zero (b) 25 Hz  
(c) 50 Hz (d) 100 Hz.

9. The average power lost per cycle of AC is given by :

- (a)  $\frac{1}{2} E_0 i_0 \sin \phi$  (b)  $\frac{1}{2} E_0 i_0 \cos \phi$   
(c)  $\frac{1}{2} E_0 i_0 \tan \phi$  (d)  $\frac{1}{2} E_0 i_0 \phi$ .

10. If in a series L-C-R circuit, the voltage across R, L and C are  $V_R$ ,  $V_L$  and  $V_C$  respectively, then the voltage of applied AC source must be :

- (a)  $V_R + V_L + V_C$  (b)  $\sqrt{[(V_R)^2 + (V_L - V_C)^2]}$   
(c)  $V_R + V_C - V_L$  (d)  $[(V_R + V_L)^2 + V_C^2]^{1/2}$ .

## OBJECTIVE UNSOLVED LEVEL - II

- An inductive circuit contains a resistance of  $10\ \Omega$  and an inductance of 2 H. If an ac voltage of 120 V and frequency 60 Hz is applied to this circuit, the current would be nearly:  
(a) 0.72 A (b) 0.16 A  
(c) 0.48 A (d) 0.80 A.
- An alternating voltage  $E$  (in volt) =  $200\sqrt{2}\sin(100t)$  is connected to a  $1\ \mu\text{F}$  capacitor through an ac ammeter. The reading of the ammeter shall be :  
(a) 10 mA (b) 20 mA  
(c) 40 mA (d) 80 mA.
- The power factor of a series LCR circuit when at resonance is :  
(a) zero (b) 0.5  
(c) depends on the values of L, C and R (d) one.
- A  $10\ \Omega$  resistance, 5 mH coil and  $10\ \mu\text{F}$  capacitor are joined in series. When a variable frequency alternating current source is joined to this combination, the circuit resonates. If the resistance is halved, the resonance frequency :  
(a) is halved (b) is doubled  
(c) remains unchanged (d) is quadrupled.
- In a LR circuit the A.C. source has voltage 220 V and the potential difference across the inductance is 176 V. The potential difference across the resistance will be :  
(a) 44 V (b) 396 V  
(c) 132 V (d)  $\sqrt{[(250 \times 176)]}\text{V}$ .
- The electric current in a circuit is given by  $i = i_0 t / \tau$  for some time. What is the the rms current for the period  $t = 0$  to  $t = \tau$  ?  
(a)  $i_0$  (b)  $i_0 / \sqrt{3}$   
(c)  $i_0 / \sqrt{2}$  (d)  $i_0 / 4$ .
- A group of electric lamps having a total power rating of 1000 watt is supplied by an AC voltage  $E = 200\sin(310t + 60^\circ)$ . Then the rms value of the circuit current is  
(a) 10 amp (b)  $10\sqrt{2}$  amp  
(c) 20 amp (d)  $20\sqrt{2}$  amp.
- An AC of frequency  $f$  is flowing in a circuit containing only a choke coil L. If  $E_0$  and  $i_0$  represent peak value of the voltage and the current respectively, the average power given by the source to the choke is equal to :

(a)  $\frac{1}{2}i_0E_0$

(b)  $\frac{1}{2}i_0^2(2\pi fL)$

(c) zero

(d)  $\frac{1}{2}E_0(2\pi fL)$ .

9. An alternating voltage is given by:

$$e = e_1 \sin \omega t + e_2 \cos \omega t$$

Then the root mean square value of voltage is given by:

(a)  $\sqrt{e_1^2 + e_2^2}$

(b)  $\sqrt{e_1 e_2}$

(c)  $\sqrt{\frac{e_1 e_2}{2}}$

(d)  $\frac{\sqrt{e_1^2 + e_2^2}}{2}$ .

10. When 100 volt DC is applied across a solenoid, a current of 1.0 amp flows in it. When 100 volt AC is applied across the same coil, the current drops to 0.5 amp. If the frequency of the AC source is 50 Hz, the impedance and inductance of the solenoid are

(a) 200 ohm and 0.55 henry

(b) 100 ohm and 0.86 henry

(c) 100 ohm and 1.0 henry

(d) 100 ohm and 0.93 henry.