1 The equation of an alternating current is $i = 50\sqrt{2} \times \sin 400\pi t$ *ampere* then the frequency and the root mean square of the current are respectively

(a) 200 *Hz*, 50 *amp* (b) 400 π *Hz*, $50\sqrt{2}$ *amp* (c) 200 *Hz*, $50\sqrt{2}$ *amp* (d) 50 *Hz*, 200 *amp*

$i = i_0 \sin \omega t$ $\quad 2\pi f = 400\pi, \; f = 200\ Hz$

$i_{rms} = \frac{i_0}{\sqrt{2}} = \frac{50\sqrt{2}}{\sqrt{2}} = 50$ Amp.

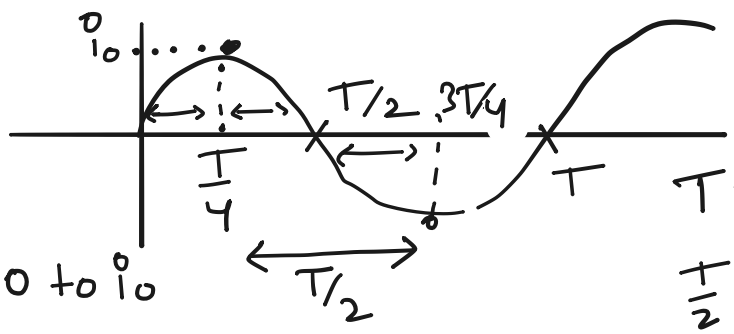
$i_{av} = \frac{2i_0}{\pi} = \frac{2 \times 50\sqrt{2}}{\pi}$ Amp.

2 If the frequency of an alternating current is 50 *Hz* then the time taken for the change from zero to positive peak value and positive peak value to negative peak value of current are respectively

(a) 1/200 *sec*, 1/ 100 *sec* (b) 1/ 100 *sec*, 1/200 *sec* (c) 200 *sec*, 100 *sec*(d)

$f = 50\ Hz$

$T = \frac{1}{50}$ sec.



$T = \frac{1}{50}$ sec

$\frac{T}{4} = t = \frac{1}{200}$ sec $\rightarrow$ 0 to i_0

$\frac{T}{2} = \frac{1}{100}$ sec

What will be the equation of ac of frequency 75 *Hz* if its *r.m.s.* value is 20 *A*

(a) $i = 20 \sin 150\pi t$ (b) $i = 20\sqrt{2} \sin(150\pi t)$ (c) $i = \frac{20}{\sqrt{2}} \sin(150\pi t)$ (d) $i = 20\sqrt{2} \sin(75\pi t)$

$i_{rms} = 20$

$\frac{i_0}{\sqrt{2}} = 20$

$i_0 = 20\sqrt{2}$ Amp.

$i = i_0 \sin \omega t$

$i = 20\sqrt{2} \sin(2\pi f)t$

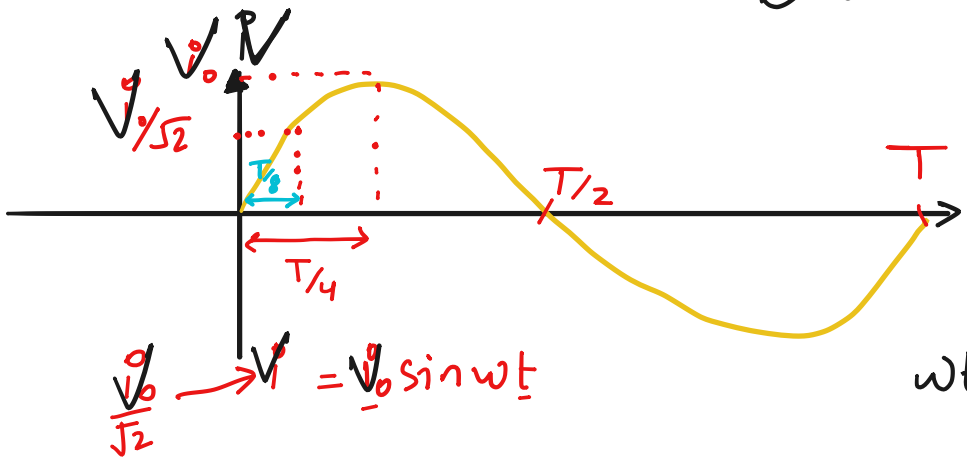
$i = 20\sqrt{2} \sin(150t)$

AC

$\omega = 2\pi f = \frac{2\pi}{T}$

4 At what time (From zero) the alternating voltage becomes $\frac{1}{\sqrt{2}}$ times of it's peak value. Where T is the periodic time

(a) $\frac{T}{2} sec$ (b) $\frac{T}{4} sec$ (c) $\frac{T}{8} sec$ (d) $\frac{T}{12} sec$



$V = V_0 \sin\omega t$

$\frac{V_0}{\sqrt{2}} = V_0 \sin\omega t$

$\omega t = \pi/4$, $\frac{2\pi}{T} t = \frac{\pi}{4}$

5 The peak value of an alternating *e.m.f.* E is given by $E = E_0 \cos\omega t$ is 10 *volts* and its frequency is $50 Hz$. At time $t = \frac{1}{600} sec$, the instantaneous *e.m.f.* is

(a) 10 V (b) $5\sqrt{3} V$ (c) 5 V (d) 1V

$E_0 = 10$, $E = 10\cos\omega t = 10\cos 2\pi \times 50 t$

$E = 10\cos 100\pi t$

$E = 10\cos 100\pi \times \frac{1}{600} = 10\cos\frac{\pi}{6}$

$E = 5\sqrt{3} V$

6 The instantaneous value of current in an ac circuit is $i = 2\sin(100\pi t + \pi/3) A$. The current at the beginning $(t = 0)$ will be

(a) $2\sqrt{3} A$ (b) $\sqrt{3} A$ (c) $\frac{\sqrt{3}}{2} A$ (d) Zero

at $t = 0$

$i = 2\sin(100\pi t + \pi/3) = 2\sin\pi/3$

$i = 2\sin 60^\circ = 2 \times \frac{\sqrt{3}}{2} = \sqrt{3} A$

7 The voltage of an ac source varies with time according to the equation $V = 100 \sin(100\pi t)\cos(100\pi t)$ where t is in seconds and V is in *volts*. Then

(a) The peak voltage of the source is 100 *volts* (b) The peak voltage of the source is 50 *volts*

(c) The peak voltage of the source is $100/\sqrt{2}$ *volts* (d) The frequency of the source is 50 *Hz*

$V = 100\sin(100\pi t)\cos(100\pi t)$ $\quad 2\pi f = 200\pi$, $f = 100\,Hz$

$2\sin\theta\cos\theta = \sin 2\theta$

$\sin(100\pi t)\cos(100\pi t) = \frac{1}{2}\sin(200\pi t)$

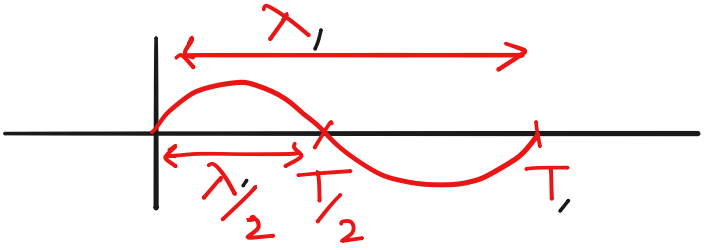
$V = 100 \times \frac{1}{2} \times \sin(200\pi t) = 50\sin(200\pi t)$

8 If the frequency of ac is 60 *Hz* the time difference corresponding to a phase difference of 60° is

(a) 60 *sec* (b) 1*sec* (c) $\frac{1}{60}$ *sec* (d) $\frac{1}{360}$ *sec*

$\Delta\phi = 60^\circ$

$\Delta\phi = \frac{2\pi}{\lambda}\Delta x$



$\frac{\pi}{3} = \frac{2\pi}{\lambda}\Delta x$, $\Delta x = \frac{\lambda}{6}$, $\frac{\lambda}{6} = \frac{T}{6} = \Delta t = \frac{1}{360}$

9 In an ac circuit, V and i are given by $V = 100\sin(100\,t)\,volts$, and $i = 100\sin\left(100\,t + \frac{\pi}{3}\right)mA$. The power dissipated in circuit is

(a) $10^4\,watt$ (b) $10\ watt$ (c) 2.5 *watt* (d) 5 *watt*

Power $= I_{rms}V_{rms}\cos\phi = \frac{100}{\sqrt{2}} \times \frac{0.1}{\sqrt{2}}\cos\left(\frac{\pi}{3}\right) = \frac{100\times 0.1}{2} \times \frac{1}{2}$

$P = \frac{10}{4} = 2.5$ watt

10 In a circuit an alternating current and a direct current are supplied together. The expression of the instantaneous current is given as $i = 3 + 6\sin\omega t$. Then the *r.m.s.* value of the current is

(a) 3*A* (b) 6*A* (c) $3\sqrt{2}\ A$ (d) $3\sqrt{3}\ A$

$$i_{rms} = \sqrt{3^2 + \left(6/\sqrt{2}\right)^2} = \sqrt{9 + \frac{36}{2}}$$

$$= \sqrt{9+18}$$

$$= \sqrt{27} = 3\sqrt{3}$$

11 The *r.m.s.* value of the alternating *e.m.f.* $E = (8\sin\omega t + 6\sin 2\omega t)\ V$ is

(a) 7.05 *V* (b) 14.14 *V* (c) 10 *V* (d) 20 *V*

$\cos\omega t$

$$E = 8\sin\omega t + 6\cos\omega t$$

$$E_0 = \sqrt{8^2 + 6^2} = 10$$

$$E_m = \frac{E_0}{\sqrt{2}} = \frac{10}{\sqrt{2}} = 7.05\,V$$

12 Voltage and current in an ac circuit are given by $V = 5\sin\left(100\pi t - \frac{\pi}{6}\right)$ and $i = 4\sin\left(100\pi t + \frac{\pi}{6}\right)$

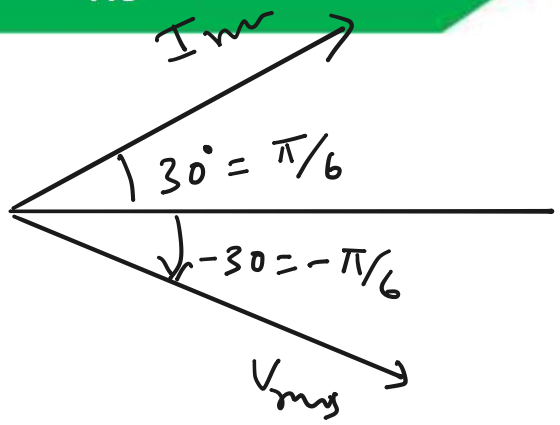
[Kerala (Engg.) 2001]

(a) Voltage leads the current by 30° (b) Current leads the voltage by 30°

(c) Current leads the voltage by 60° (d) Voltage leads the current by 60°

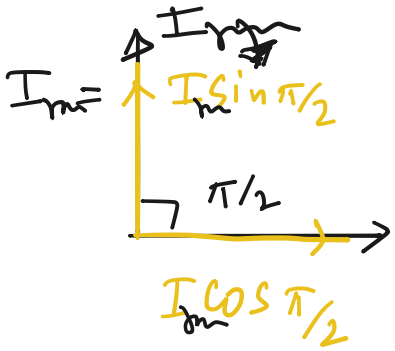
$$V = 5\sin\left(100\pi t - \frac{\pi}{6}\right)$$

$$i = 4\sin\left(100\pi t + \pi/6\right)$$



13 The instantaneous values of current and potential difference in an alternating circuit are $i = \sin \omega t$ and $E = 100 \cos \omega t$ respectively. *r.m.s.* value of wattless current (in *amp*) in the circuit is

(a) 1 (b) $1/\sqrt{2}$ (c) 100 (d) Zero



$P = I_m V_m \cos \frac{\pi}{2} = 0$

$i = \sin \omega t$

$P_0 = 1$, $i_m = 1/\sqrt{2}$.

14 The *r.m.s.* current in an ac circuit is 2 *A*. If the wattless current be $\sqrt{3}A$, what is the power factor

(a) $\frac{1}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

$I_{rms} = 2A$, $I = I_m \sin \phi$

Power factor $= \cos \phi$

$= 1/2$

$\sqrt{3} = 2 \sin \phi$

$\sin \phi = \frac{\sqrt{3}}{2}$, $\phi = 60°$

15 *r.m.s.* value of alternating current in a circuit is 4 *A* and power factor is 0.5. If the power dissipated in the circuit is 100*W*, then the peak value of voltage in the circuit is

(a) 50 *volt* (b) 70 *volt* (c) 35 *volt* (d) 100 *volt*

$P = I_m V_m \cos \phi$

$\frac{V_0}{\sqrt{2}} = V_{rms}$, $V_0 = I_2 V_{rms}$

$100 = 4 \times V_m \times 0.5, \quad V_m = 50$ Volts

$V_0 = 50\sqrt{2} = 70$ volts

$\cos\phi = 0.5, \quad I_m = 4A.$

$P = 100 \text{ watt} = I_m V_m \cos\phi$

$100 = 4 \times V_{rms} \times 0.5$

$V_m = 50, \quad V_0 = 50\sqrt{2}$

$V_0 \simeq 70$ volts.

16 The impedance of an ac circuit is 200 Ω and the phase angle between current and *e.m.f* is 60^o. What is the resistance of the circuit

(a) 50 Ω (b) 100 Ω (c) $100\sqrt{3}\Omega$ (d) 300 Ω

$Z = 200\Omega.$

$= \cos\phi = \cos 60^\circ = \frac{1}{2}$

$\cos\phi = \frac{R}{Z}$

17

17. An ac voltage source of E = 150 sin 100 t is used to run a device which offers a resistance of 20Ω and restricts the flow of current in one direction only. The *r.m.s.* value of current in the circuit will be

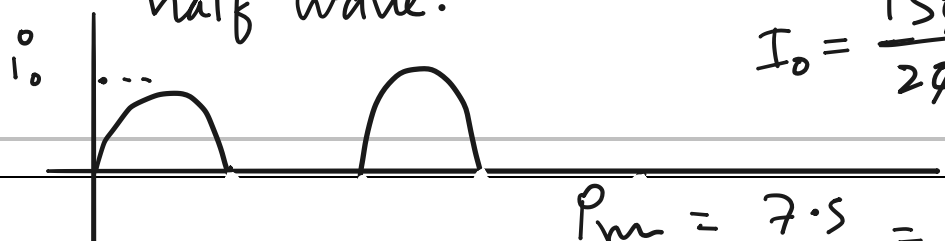
(a) 1.58 *A* (b) 0.98 *A* (c) 3.75 *A* (d) 2.38 *A*

$i_{rms} = \frac{i_0}{2}$

$V_0 = 150$

half wave.

$I_0 = \frac{150}{20} = 7.5$

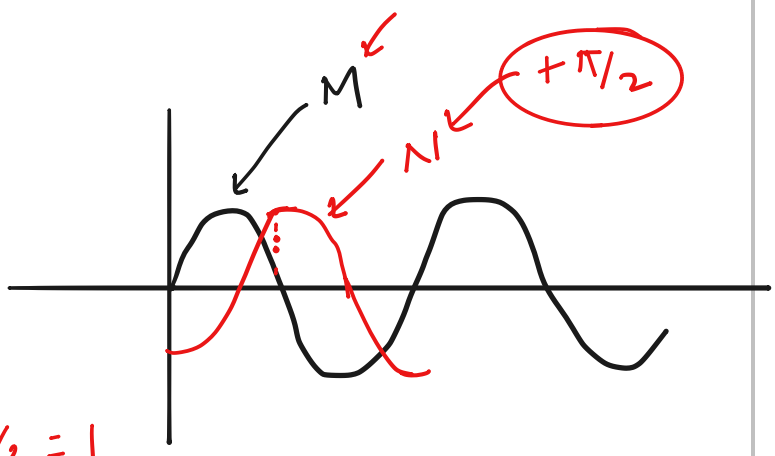


$I_{rms} = 7.5 = 3.75$ Amp.

18. Two sinusoidal voltages of the same frequency are shown in the diagram. What is the

frequency, and the phase relationship between the voltages

Frequency in *Hz*	Phase lead of *N* over *M* in radians
(a) 0.4	$-\pi/4$
(b) 2.5	$-\pi/2$
(c) 2.5	$+\pi/2$
(d) 2.5	$-\pi/4$



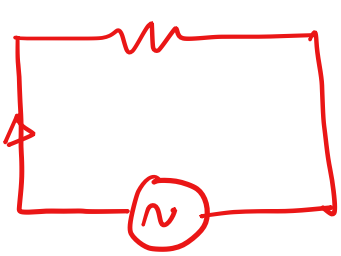
$\sin\theta = \sin\pi/2 = 1$

$\cos\theta = \cos\pi/2 = 0$

19 In a resistive circuit R = 10 Ω and applied alternating voltage V = 100 sin 100 πt. Find the following

(i) Peak current (ii) *r.m.s.* current (iii) Average current (iv)
(v) Time period (vi) Power factor (vii)
(viii) Time difference

R



$R = 10\Omega$

$I = \frac{V}{R} = 10\sin 100\pi t$

$I_0 = 10, \quad I_{rms} = \frac{10}{\sqrt{2}} = 7$ volts.

$V = 100 \sin 100\pi t$

$100\pi = \omega = 2\pi f, \quad f = 50\,Hz, \quad T = \frac{1}{50}$ sec

$i_{av} = \frac{2 i_0}{\pi} = \frac{2\times 10}{\pi}$ Amp

$\cos\phi = \cos 0^\circ = 1$

$P = I_{rms} V_{rms} \cos\phi = \frac{10}{\sqrt{2}} \times \frac{100}{\sqrt{2}} \times 1 = 500$ Watt

20 In a purely inductive circuit if $L = \frac{100}{\pi} \times 10^{-3} H$ and applied alternating voltage is given by V = 100 sin 100 πt. Find the followings

(i) Inductive reactance (ii) Peak value, *r.m.s.* value and average value of current
(iii) Frequency and time period (iv) Power factor and power
(v) Time difference between voltage and current

$X_L = \omega L = 100\pi \times \frac{100}{\pi} \times 10^{-3} = 10\Omega$

$I_{rms} Z = V_{rms}$

$Z = X_L$

$I_{rms} X_L = V_{rms}$

$I_{rms} = \frac{100}{\sqrt{2}} \times \frac{1}{10} = \frac{10}{\sqrt{2}}$

$i_0 = 10, \quad i_{rms} = \frac{10}{\sqrt{2}}$

$i_{av} = \frac{2 i_0}{\pi} = \frac{20}{\pi}$

$100\pi = \omega = 2\pi f$

$f = 50\,Hz$

$\cos\phi = \frac{R}{Z} = \frac{0}{Z} = 0$

$\Delta\phi = 2\pi \Delta x$

21 An alternating voltage $E = 200\sqrt{2}\sin(100\,t)$ is connected to a 1 *microfaracd* capacitor through an ac ammeter. The reading of the ammeter shall be

(a) 10 *mA* (b) 20 *mA* (c) 40 *mA* (d) 80 *mA*

$C = 1\mu F$, $\omega = 100$, $X_C = \frac{1}{\omega C}$

$$I_{rms} = \frac{V_m}{Z} = \frac{V_m}{X_C} = \frac{200}{1/\omega C} = \frac{200 \times \omega C}{1}$$

$$I_m = 200 \times 100 \times 10^{-6}$$

$$= 2 \times 10^{-2} = 20\,mA$$

22 An 120 *volt* ac source is connected across a pure inductor of inductance 0.70 *henry*. If the frequency of the source is 60 *Hz*, the current passing through the inductor is

(a) 4.55 *amps* (b) 0.355 *amps* (c) 0.455 *amps* (d) 3.55 *amps*

$L = 0.7$ Henry. $f = 60$ Hz., $X_L = \omega L$

$X_L = 2\pi f L$

$X_L = 2\pi \times 60 \times 0.7$

$X_L = 84\pi\ \Omega$

$I_m = \frac{V}{X_L} = \frac{120}{84\pi}$

$I_m = 0.455$ Amp.

23 The frequency for which a $5\,\mu F$ capacitor has a reactance of $\frac{1}{1000}$ *ohm* is given by

(a) $\frac{100}{\pi}$ *MHz* (b) $\frac{1000}{\pi}$ *Hz* (c) $\frac{1}{1000}$ *Hz* (d) 1000 *Hz*

$\frac{1}{\omega C} = X_C = \frac{1}{1000}\ \Omega$m.

$\frac{1}{\omega \times 5 \times 10^{-6}} = \frac{1}{1000}$

$2 \times \pi \times f \times 5 \times 10^{-6} = 1000$, $f = \frac{1000 \times 10^6}{2\pi \times 5}$

$f = \frac{100}{\pi} 10^6 Hz.$

24 Let frequency $\nu = 50\ Hz$, and capacitance $C = 100 \mu F$ in an ac circuit containing a capacitor only. If the peak value of the current in the circuit is 1.57 A. The expression for the instantaneous voltage across the capacitor will be

(a) $E = 50 \sin (100\ \pi t - \frac{\pi}{2})$ (b) $E = 100 \sin (50\ \pi t)$ (c) $E = 50 \sin (100\ \pi t)$ (d)

$V_0 = i_0 Z$

$Z = X_C$

$i_0 = 1.57$, $i_{rms} = \frac{1.57}{\sqrt{2}}$ Amp.

$i_0 = \frac{V_0}{X_C}$

$X_C = \frac{1}{\omega C} = \frac{1}{2\pi f C} = \frac{1}{2\pi \times 50 \times 100 \times 10^{-6}}$

$V_0 = i_0 X_C$

$X_C = \frac{10^4}{100\pi} = \frac{100}{\pi} \Omega$

$V_0 = \frac{1.57 \times 100}{\pi \sqrt{2}} = 500 Volt.$

25 In an LR-circuit, the inductive reactance is equal to the resistance R of the circuit. An $e.m.f.$ $E = E_0 \cos(\omega t)$ is applied to the circuit. The power consumed in the circuit is

(a) $\frac{E_0^2}{R}$ (b) $\frac{E_0^2}{2R}$

(c) $\frac{E_0^2}{4R}$ (d) $\frac{E_0^2}{8R}$

$X_L = R$

$Z = \sqrt{X_L^2 + R^2}$

$Z = \sqrt{2R^2} = R\sqrt{2}$

$V_m = \frac{E_0}{\sqrt{2}}$, $V_m^2 = \frac{E_0^2}{2}$

$Power = I_{rms} V_{rms} \cos\phi$

$= I_{rms} V_{rms} \frac{R}{Z}$

$= \frac{V_{rms}}{Z} \times V_{rms} \times \frac{R}{Z} = \frac{V_{rms}^2 \times R}{Z^2} = \frac{E_0^2}{2} \times \frac{R}{R \times 2}$

$I_{rms} Z = V_{rms}$

$I_{rms} = \frac{V_{rms}}{Z}$

26 A coil of resistance 300 *ohm* and self inductance 1.5 *henry* is connected to an ac source of frequency $\frac{100}{\pi} Hz$. The phase difference between voltage and current is

(a) 0^o (b) 30^o (c) 45^o (d) 60^o

$\cos\phi = \frac{R}{Z} = \frac{300}{}$, $\phi = 45^\circ$

$f = \frac{100}{\pi}$ Hz. $R = 300\,\Omega$, $L = 1.5$ H, $X_L = \omega L$

$Z = \sqrt{R^2 + X_L^2}$

$Z = \sqrt{300^2 + 300^2} = 300\sqrt{2}\,\Omega$.

$X_L = 2\pi f \times L$

$X_L = 2\pi \times \frac{100}{\pi} \times 1.5$

$X_L = 300\,\Omega$.

27 The current and voltage in an ac circuit are respectively given by $i = \sin 314t$ and $e = 200 \sin(314t + \pi/3)$. If the resistance is 100Ω, then the reactance of the circuit is

(a) $100/\sqrt{3}\Omega$ (b) $100\sqrt{3}\Omega$

(c) 200 Ω (d) $200\sqrt{3}\Omega$

$= \cos\phi = \frac{R}{Z}$

$= \cos\frac{\pi}{3} = \frac{R}{Z} = \frac{1}{2}$, $Z = 2R$

$Z = 200$

$Z = \sqrt{R^2 + X_L^2}$

$(200)^2 = (100)^2 + X_L^2$

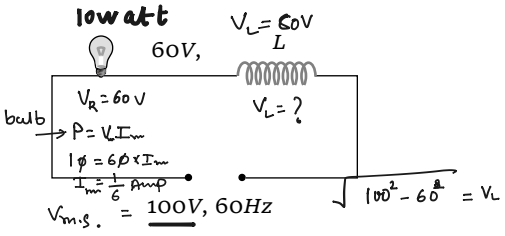
$X_L = \sqrt{(200)^2 - (100)^2} = 100\sqrt{3}\,\Omega$

28 V.IMP.

A bulb of 60 *volt* and 10 *watt* is connected with 100 *volt* of ac source with an inductance coil in series. If bulb illuminates with it's full intensity then value of inductance of coil is (ν= 60 *Hz*)

(a) 1.28 *H* (b) 2.15 *H*

(c) 3.27 *H* (d) 3.89 *H*



$V_{rms} = \sqrt{V_R^2 + V_L^2}$ $10\sqrt{100-36}$ 80V = V_L

$100 = \sqrt{60^2 + V_L^2}$

$V_L = 80V$

$I_m X_L = 80$

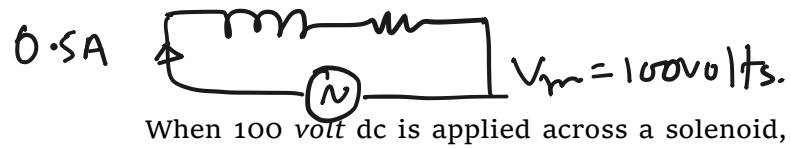
$\frac{1}{\sqrt{2}} \omega L = 80$

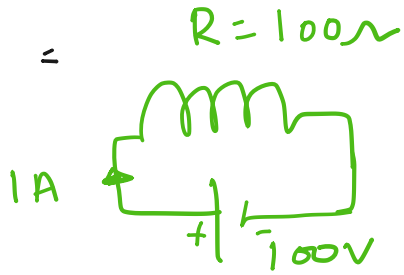
$\frac{1}{6} \times 2\pi f L = 80$

$\frac{\pi}{3} \times 60 \times L = 80$

$L = \frac{24}{6\pi} = \frac{4}{\pi} = \frac{4}{3.14} =$

$Z = 200\,\Omega$





29 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 ac source is 50 *Hz* the impedance and inductance of the solenoid are

$X_L = 100\sqrt{3}$

$2\pi f L = 100\sqrt{3}$

$100\pi L = 100\sqrt{3}$

$L = \frac{\sqrt{3}}{\pi} = \frac{1.732}{3.14}$

(a) 200 ohms and 0.5 henry

(b) 100 ohms and 0.86 henry

(c) 200 ohms and 1.0 henry

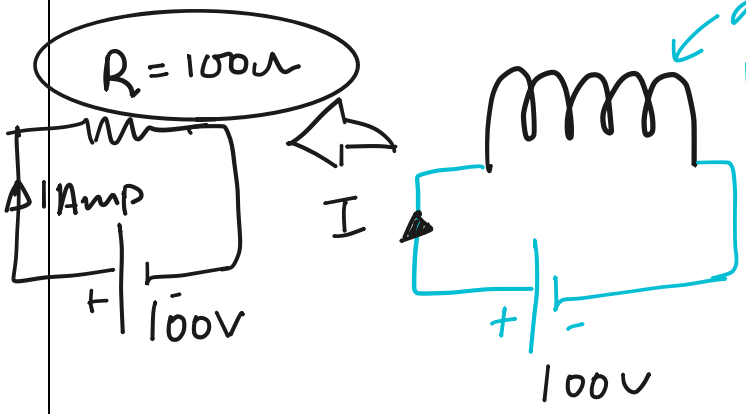
(d) 100 ohms and 0.93 henry

$Z = \sqrt{X_L^2 + R^2}$

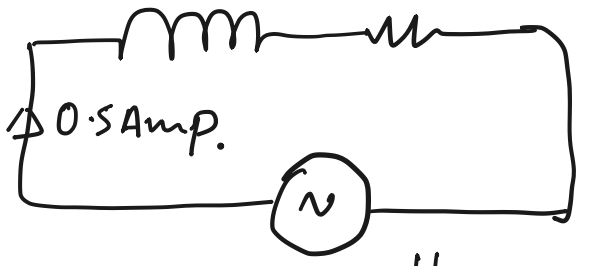
$200^2 = X_L^2 + 100^2$

$X_L = 100\sqrt{3}\,\Omega$

act as wire which has some resistance.



$Z = 200\Omega$



$I_m = \frac{V_m}{Z}$,

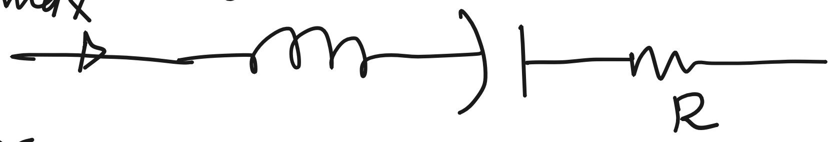
$Z = \frac{V_m}{I_m} = \frac{100}{0.5} = 200\Omega.$

30 In an ac circuit, containing an inductance and a capacitor in series, the current is found to be maximum when the value of inductance is 0.5 henry and a capacitance of 8 μF. The angular frequency of the input ac voltage must be equal to

(a) 500 *rad/sec* (b) 5×10^4 *rad/sec*

(c) 4000 *rad/sec* (d) 5000 *rad/sec*

i_{max} $L = 0.5H$ $C = 8\mu C$.



$\omega = \frac{1}{\sqrt{0.5 \times 8 \times 10^{-6}}}$

angular Freq. $\rightarrow \omega = \frac{1}{\sqrt{LC}}$ at resonance.

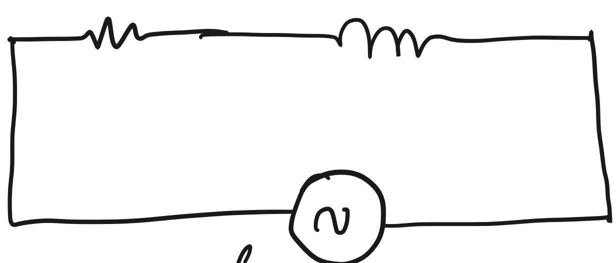
$\omega = \frac{10^3}{\sqrt{4}}$

31 A resistance of 40 *ohm* and an inductance of 95.5 *millihenry* are connected in series in a 50 *cycles/second* ac circuit. The impedance of this combination is very nearly

(a) 30 *ohm* (b) 40*ohm*

(c) 50 *ohm* (d) 60 *ohm*

40Ω $L = 95.5mH$



$f = 50Hz$.

$Z = \sqrt{R^2 + X_L^2}$

$Z = \sqrt{40^2 + (2\pi f L)^2}$

$Z = 50\Omega$.

$X_L = 2\pi f L = 2\pi \times 50 \times 95.5 \times 10^{-3}$

$X_L \approx 30\Omega$

32 $\frac{2.5}{\pi}\mu F$ capacitor and 3000-*ohm* resistance are joined in series to an ac source of 200 *volt* and $50 sec^{-1}$ frequency. The power factor of the circuit and the power dissipated in it will respectively

(a) 0.6, 0.06 *W* (b) 0.06, 0.6 *W*

(c) 0.6, 4.8 *W* (d) 4.8, 0.6 *W*

$P = I_m V_m \cos\phi = \frac{V_m^2 R}{Z^2} =$

$P = \frac{200^2 \times 3000}{5000^2} = 4.8W$

$C = \frac{2.5}{\pi} \times 10^{-6}$, $R = 3000\Omega$, $V_m = 200$ volts.

$f = 50Hz$,

$Z = \sqrt{R^2 + X_C^2} = 5000\Omega$.

$\cos\phi = \frac{R}{Z}$

$X_C = \frac{1}{\omega C} = \frac{1}{2 \times \pi \times 50 \times \frac{2.5}{\pi} \times 10^{-6}} = \frac{100000}{25} = 4000\Omega$.

$\cos\phi = \frac{3000}{5000} = 0.6$

33

A telephone wire of length 200 *km* has a capacitance of 0.014 μF per *km*. If it carries an ac of frequency 5 *kHz*, what should be the value of an inductor required to be connected in series so that the impedance of the circuit is minimum

(a) 0.35 *mH* (b) 35 *mH*

(c) 3.5 *mH* (d) Zero

$C = \frac{0.014 \times 200}{1000}\ \mu F = 2.8\ \mu F$

$f = 5000\ Hz$

$Z_{min} = R$ when $X_L = X_C$

$\omega L = \frac{1}{\omega C}$

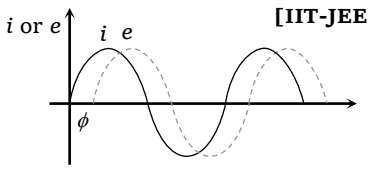
$L = \frac{1}{\omega^2 C}$

$L = \frac{1}{4\pi^2 \times 5000 \times 5000 \times 2.8 \times 10^{-6}} = 0.35\ mH.$

34

When an ac source of e.m.f. $e = E_0 \sin(100\ t)$ is connected across a circuit, the phase difference between the e.m.f. *e* and the current *i* in the circuit is observed to be $\pi/4$, as shown in the diagram. If the circuit consists possibly only of *RC* or *LC* in series, find the relationship between the two elements

[IIT-JEE (Screening) 2003]



(a) $R = 1k\Omega, C = 10\mu F$

(b) $R = 1k\Omega, C = 1\mu F$

(c) $R = 1k\Omega, L = 10H$

(d) $R = 1k\Omega, L = 1H$

$\frac{1}{1000 \times 10 \times 10^{-6}}$

$\phi = \pi/4$

100

$\omega = \frac{1}{RC}$

$\tan\phi = \frac{X}{R}$, $X = R$

$X_L = R$

$X_C = R$

$\frac{1}{\omega C} = R$

35 In a series circuit $R = 300\ \Omega, L = 0.9 H$, $C = 2.0 \mu F$ and $\omega = 1000\ rad/sec.$ The impedance of the circuit is

[MP PMT 1995]

(a) 1300 Ω (b) 900 Ω
(c) 500 Ω (d) 400 Ω

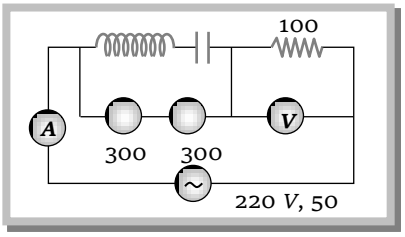
36 In *LCR* circuit, the capacitance is changed from *C* to 4*C*. For the same resonant frequency, the inductance should be changed from *L* to

(a) 2*L* (b) *L*/2 (c) *L*/4 (d) 4*L*

37 An *LCR* series circuit is connected to an external *e.m.f.* $e = 200 \sin 100 \pi t$. The values of the capacitance and resistance in the circuit are $2 \mu F$ and 100Ω respectively. The amplitude of the current in the circuit will be maximum when the inductance is

(a) 100 *Henry* (b) $50/\pi^2$ *Henry*
(c) 100 π *Henry* (d) $100 \times \pi^2$ *Henry*

38 In the circuit shown below, what will be the readings of the voltmeter and ammeter



(a) 800 V, 2A

(b) 300 V, 2A

(c) 220 V, 2.2 A

(d) 100 V, 2A

39 In a series resonant LCR circuit, if L is increased by 25% and C is decreased by 20%, then the resonant frequency will

(a) Increase by 10% (b) Decrease by 10%

(c) Remain unchanged (d)Increase by 2.5 %

40 The self inductance of a choke coil is 10 *mH*. When it is connected with a 10*V* dc source, then the loss of power is 20 *watt*. When it is connected with 10 *volt* ac source loss of power is 10 *watt*. The frequency of ac source will be

(a) 50 *Hz* (b) 60 Hz

(c) 80 *Hz* (d) 100 *Hz*