Sheet # 01

LGS GROUP OF COLLEGES
A PROJECT OF LAHORE GRAMMAR SCHOOL

Name: Zain-ul-Abidin Class: 2nd Year. Roll No.

Subject: PHYSICS. Test No. Date: 20-11-2024.

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	○	○	○	6	○	○	○	○	11	○	○	○	○	16	○	○	○	○
2	○	○	○	○	7	○	○	○	○	12	○	○	○	○	17	○	○	○	○
3	○	○	○	○	8	○	○	○	○	13	○	○	○	○	18	○	○	○	○
4	○	○	○	○	9	○	○	○	○	14	○	○	○	○	19	○	○	○	○
5	○	○	○	○	10	○	○	○	○	15	○	○	○	○	20	○	○	○	○

Marks Obtained

Assignment:

Physics.

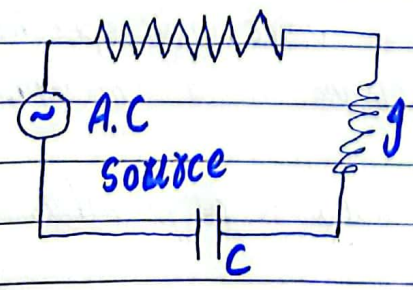
Question/Answers:

—: 1 :—

The frequency response of a capacitor C is very different than that of inductor "g", when subjected to a value of A.C. voltage because "f" dependency is opposite in "C" and "g". As, in C $f \propto \frac{1}{X_C}$ in g $f \propto X_L$

So, in C f is inversely proportional to X_C according to one formula $X_C = \frac{1}{2\pi fC}$. While, in g f is directly proportional to X_L ($X_L = 2\pi fL$).

—: 2 :—

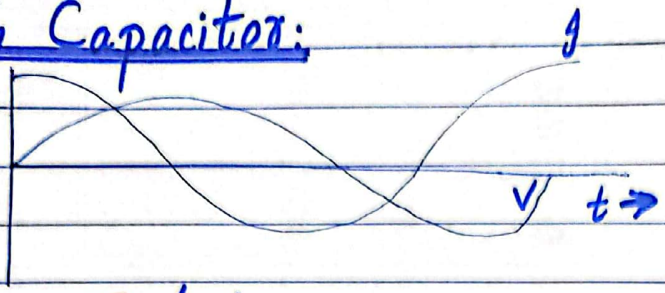


The frequency in RLC circuit at which $X_L = X_C$ is called **Resonance**.

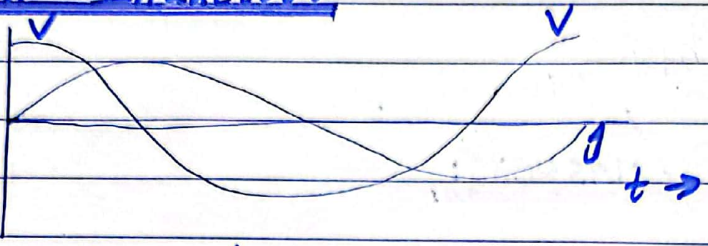
At resonance frequency, the current "I" and voltage "V" are both in-phase. So, power factor ($\cos\theta = 0°$) is 1.

—: 3 :—

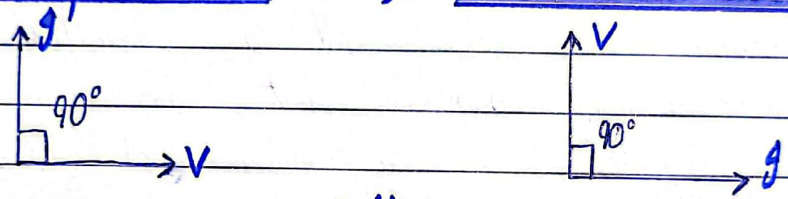
In Capacitor:



In Inductor:



In Capacitor ; In Inductor



—: 4 :—

The transmission Range for **Amplitude Modulation** A.M is 10^6 HZ to 10^8 HZ. Both of these ranges lie before/below visible spectrum range. It means that we can't see it.

Information: —: 5 :—

1- It is actual content to be transferred.
2- It is of low-frequency.
3- It is the message like voice, music, speech etc.
4- For example, when a person speaks on a microphone.

Carriers:

1- It is wave that is used to carry information on it.
2- It is of high-frequency.
3- It is the medium to transfer info.

5- For example, a sinusoidal wave to carry info ~~when~~ with a frequency in the radio-wave or micro-wave range.

—: 6 :—

A choke coil is basically a coil of thick copper wire wound closely in large no of turns on a soft iron laminated core. It has small resistance and high inductance. So, very less power is dissipated in it.

It is used in A.C. circuit to limit value of current with very small wastage of power as compared to rheostat or resistance.

—: 7 :—

Inductance = $L = 20 \times 10^{-3} H$

resistance = $R = 10 \Omega$

voltage = $V = 240 V$

Frequency = $f = \frac{180}{\pi} Hz$

As, Power $P = I_{rms} V_{rms} \cos\theta$.

So, to find I_{rms}, firstly;

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

$\therefore I_{rms} = V_{rms} / Z$

So,

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

So,

$Z = \sqrt{100 + 51.84}$

$Z = 12.32 \Omega$

To find I_{rms},

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

$I_{rms} = 240 / 12.32$

'X_L'

To find X_L,

$X_L = \omega L$

$X_L = 2\pi f L$

$X_L = 2\pi \left(\frac{180}{\pi}\right)(20 \times 10^{-3})$

$X_L = 7.2 \Omega$

$I_{rms} = 19.48\ A$

To find θ,

$$\theta = \tan^{-1}\left(\frac{X_L}{R}\right) = \tan^{-1}\left(\frac{72}{10}\right)$$

$$\theta = \tan^{-1}\left(\frac{18}{2.5}\right)$$

$$\theta = 35.75^\circ$$

So,

$$P = I_{rms}\ V_{rms}\ \cos\theta$$

$$P = 19.48 \times 240 \times \cos(35.75^\circ)$$

$$P = 4675.2 \times (0.8116)$$

$$\boxed{P = 3794.4\ W}$$