



# LGS GROUP OF COLLEGES

A PROJECT OF LAHORE GRAMMAR SCHOOL

Sheet # \_\_\_\_\_

Name: Muhammad Abu Bakar Pasomy

Class: 12<sup>th</sup>

Roll No. 230307

Subject: Physics (Assignment)

Test No. W-8

Date: 20/11/24

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

**Q/A**

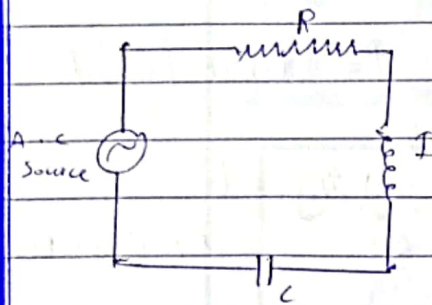
**(i)**

**Ans.**

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

**(ii)**

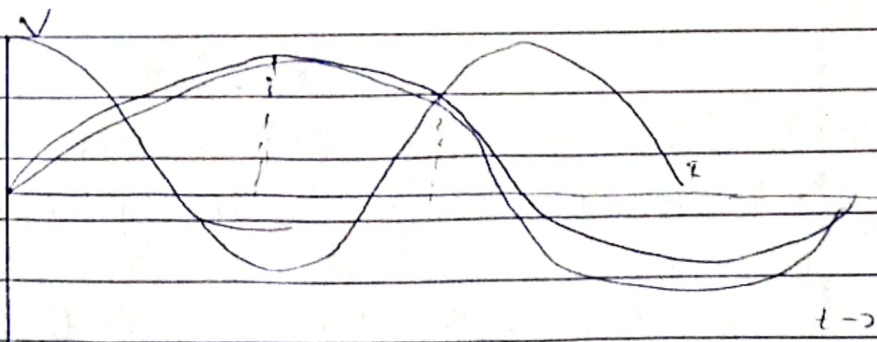
**Ans.**



At resonance frequency, the current  $I$  and voltage  $V$  are both in-phase so, power factor ( $\cos \phi = 1$ ) is 1

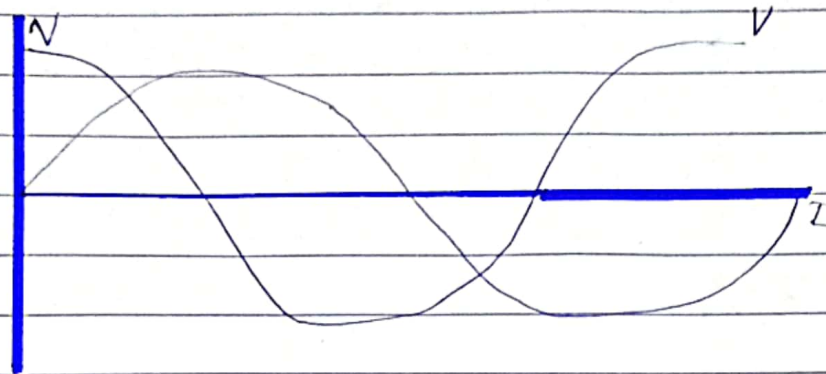
**(iii)**

**In capacitor:**





In inducta:



(iv)

**Ans.** The transmission Range for A.M is  $10^6 \text{ Hz}$  to  $10^8 \text{ Hz}$   
The transmission Range for F.M is  $10^8 \text{ Hz}$  to  $10^{10} \text{ Hz}$

(v)

**Ans Information:**

- i) It is actual content to be transferred.
- ii) It is of low-frequency.
- iii) It is the message like voice etc
- iv) e.g when person speaks on a microphone.

**Carrier:**

- i) It is wave that is used to carry information on it.
- ii) It is of <sup>high</sup> low-frequency.
- iii) It is the medium to transfer info.
- iv. e.g sinusoidal wave

(vi)

**Ans.** A choke coil is basically a coil of thick copper wire wound closely on large number of turns on a soft iron laminated core.  
It is used in A.C circuit to limit value



of current with very small voltage.

(vii)

Ans.

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

$$\text{resistance} = R = 10 \Omega$$

$$V = 240 \text{ V}$$

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

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

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

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

$$Z = \sqrt{10^2 + 51.84}$$

$$Z = 12.32 \Omega$$

To find  $I_{\text{rms}}$

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

$$= 240 / 12.32$$

$$I_{\text{rms}} = 19.48 \text{ A}$$

To find  $\theta$

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

$$\theta = \tan^{-1} \left( \frac{7.2}{10} \right) \quad \theta = 35.75^\circ$$

So

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

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

$$= 4675.2 \times 0.8116$$

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

for  $X_L$

$$X_L = \omega L$$

$$X_L = 2\pi f L$$

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

$$X_L = 7.2 \Omega$$