



12th Science : Physics  
AC Circuits,

DATE:

TIME: 1 hr

MARKS: 25

SEAT NO:

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**Note:-**

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

**Section A**

**Q.1 Select and Write the correct answer.**

**(4)**

1. In LCR circuit, the capacitance is changed from  $C$  to  $2C$ . For same resonant frequency; the inductance should be changed from  $L$  to  
A)  $4L$                       B)  $L/4$   
C)  $L/2$                       D)  $2L$
2. A capacitor is connected to an A.C. generator. The ratio of reactance and impedance is  
A) one                              B) less than one  
C) greater than one      D) zero
3. Two coils have a mutual inductance of  $0.001$  H. The current in the first coil is given by  $I = I_0 \sin(\omega t)$  where  $I_0 = 5$  A and  $\omega = 100\pi$ . What is the value of maximum e.m.f. in the second coil ?  
A)  $1.57$  V                      B)  $3.14$  V  
C)  $5$  V                              D)  $6.28$  V
4. If the rms current in a  $50$  Hz AC circuit is  $5$  A, the value of the current  $\frac{1}{300}$  seconds after its value becomes zero is  
A)  $5\sqrt{2}A$                       B)  $5\sqrt{\frac{3}{2}}A$   
C)  $\frac{5}{6}A$                               D)  $\frac{5}{\sqrt{2}}A$

**Q.2 Answer the following.**

**(3)**

1. Define : Peak value of alternating current
2. What is the use of a starter?
3. Why is choke coil needed in the use of fluorescent tubes with ac mains. Why can we not use an ordinary resistor instead of the choke coil?

**Section B**  
**Attempt any Four**

- Q.3 What are the examples of AC? **(2)**
- Q.4 An electric lamp is connected in series with a capacitor and an AC source is glowing with a certain brightness. How does the brightness of the lamp change on increasing the capacitance? **(2)**
- Q.5 Distinguish between an acceptor circuit and a rejector circuit. **(2)**

- Q.6 Explain power factor. (2)
- Q.7 When 100 volt D.C. is applied across a coil, a current of 1A flows through it. When 100 V A.C. of (2) frequency 50 Hz is applied to the same coil only 0.5 A current flows through it. Calculate resistance, impedance and self inductance of the coil.
- Q.8 A  $10 \mu\text{F}$  capacitor is charged to a 25 volt of potential. The battery is disconnected and a pure (2)  $100 \text{ m H}$  coil is connected across the capacitor so that LC oscillations are set up. Calculate the maximum current in the coil.

**Section C**  
**Attempt any Two**

- Q.9 In a series LR circuit  $X_L = R$  and power factor of the circuit is  $P_1$ . When capacitor with (3) capacitance  $C$  such that  $X_L = X_C$  is put in series, the power factor becomes  $P_2$  calculate  $\frac{P_1}{P_2}$ .
- Q.10 What is Peak value and r.m.s. value of alternating e.m.f. and alternating current. (3)
- Q.11 Find the capacity of a capacitor which when put in series with a  $10 \Omega$  resistor makes the power (3) factor equal to 0.5. Assume an 80V-100Hz AC supply.

**Section D**  
**Attempt any One**

- Q.12 What is rejector circuit? (4)  
Find the time required for a 50 Hz alternating current to change its value from zero to the rms value.
- Q.13 What is parallel resonant circuit? Obtain condition for parallel resonance. (4)