

QUESTIONS FROM COMPETITIVE EXAMS

7.1 Introduction 7.2 AC Generator

(MHT-CET 2002)

1. E.m.f. is given by $e = 200 \sin 50 t$. The r.m.s. value of current in a circuit of resistance 50Ω is
- a) 0.02828 b) 0.2828 c) 2.828 d) 28.28

7.3 Average and r.m.s. Values 7.4 Phasors

(MHT-CET 2003)

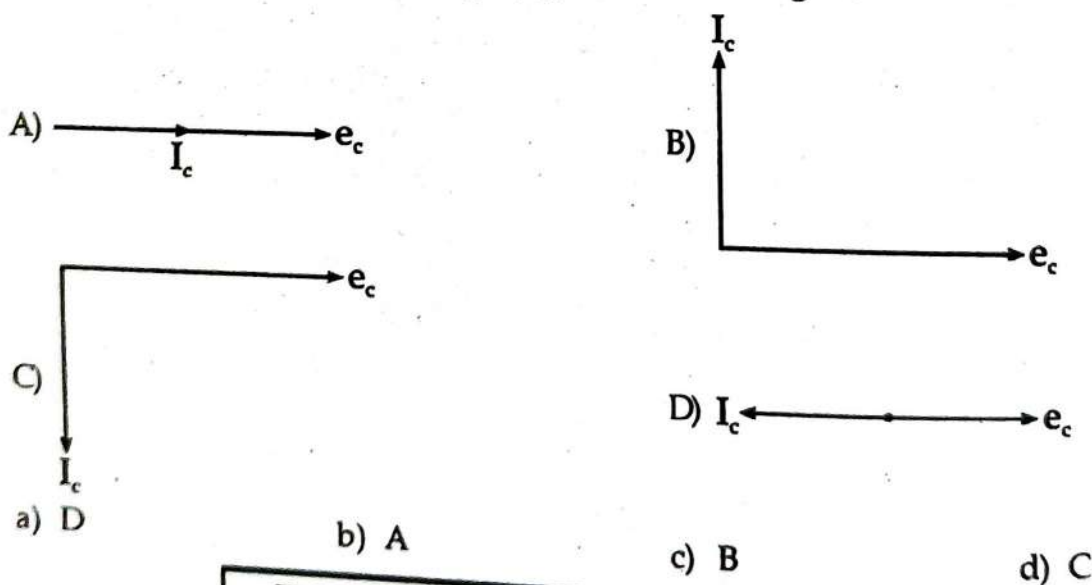
2. In an a.c. circuit containing only capacitor,
- a) current leads voltage by π b) current is in phase with voltage
- c) current leads voltage by $\pi/2$ d) current lags voltage by $\pi/2$

(MHT-CET 2009)

3. In a circuit the current lags behind the voltage by a phase difference of $\pi/2$, the circuit contains which of the following ?
- a) only R b) only C c) only L d) R and C

(MHT-CET 2022)

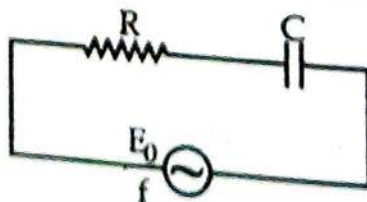
4. When a.c. source is connected across a pure capacitor, the correct phase relation between current (i_c) and voltage (e_c) is shown in figure

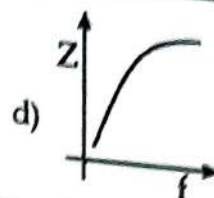
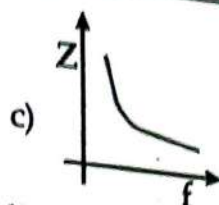
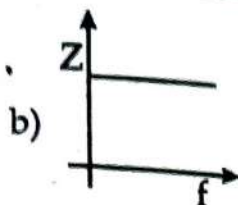
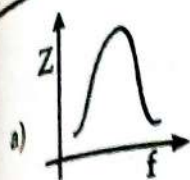


7.5 Different Types of AC Circuits

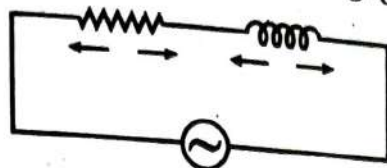
(MHT-CET 2001)

5. Which graph gives the correct relation between Z and f for the given R-C circuit ?





In the given L-R circuit, which of the following gives correct relation between V , V_R and V_L ?



- a) $V < V_R + V_L$ b) $V > V_R + V_L$ c) $V = V_R + V_L$ d) none of these

(MHT-CET 2002)

Reactance of capacitor of capacitance $C \mu\text{F}$ for ac frequency $400/\pi \text{ Hz}$ is 25Ω . The value of C is

- a) $50 \mu\text{F}$ b) $25 \mu\text{F}$ c) $100 \mu\text{F}$ d) $75 \mu\text{F}$

A varying current in a coil changes from 10 A to zero in 0.5 sec . If the average e.m.f. induced in the coil is 220 V , then the self inductance of the coil is

- a) 5 H b) 10 H c) 11 H d) 22 H

The capacitive reactance is 20Ω , when the frequency is 100 Hz . Find the reactance, when frequency is 150 Hz .

- a) 13Ω b) 12.5Ω c) 12.3Ω d) 13.3Ω

(MHT-CET 2003)

10. In a purely inductive circuit, the current

- a) leads the applied emf by $\pi/2$ b) lags behind applied emf by $\pi/2$
c) is in same phase as applied emf d) none of these

(MHT-CET 2005)

11. In a purely capacitive circuit, the current

- a) leads the applied emf by $\pi/2$ b) lags behind the applied emf by $\pi/2$
c) is in same phase as applied emf d) none of these

(MHT-CET 2006)

12. The average value of power dissipated by resistance is (I_0 = peak value of current)

- a) $\frac{1}{2} I_0^2 R$ b) $I_0^2 R$ c) $\frac{1}{2} I_0^2 R \cos \phi$ d) $I_0^2 R \cos \phi$

(MHT-CET 2008)

13. An A.C. voltmeter is connected to alternating source of peak value 141.4 V . The reading of voltmeter is

- a) 50 V b) 150 V c) 100 V d) 141.4 V

14. Inductance of a coil is 5 mH and it is connected to A.C. source of 220 V , 50 Hz . The ratio of A.C. to D.C. resistance of the coil is

- a) 5 b) 0 c) infinity d) data is incomplete

(MHT-CET 2009)

15. An alternating voltage $E = 200 \sqrt{2} \sin 100 t$ is connected to $1 \mu\text{F}$ capacitor. The current through a.c. ammeter shall be

- a) 10 mA b) 20 mA c) 40 mA d) 80 mA

(MHT-CET 2011)

16. An emf $e = 200 \sqrt{2} \sin(100t)$ volt is applied across capacitor of capacitance $2 \mu\text{F}$, then current through capacitor is
- a) 4 mA b) 40 mA c) 2 mA d) 3 mA

(MHT-CET 2012)

17. In LCR series circuit an ac emf of 2 volt and frequency 50 Hz is applied across the combination. If resistance is 4Ω , capacitance is $8 \mu\text{F}$ and inductance is 10^{-2} H , then the voltage across inductor will be
- a) $(3/5 \text{ V})$ b) $(5/3 \text{ V})$ c) $(2/3 \text{ V})$ d) (0.02 V)

(MH-CET 2015)

18. Same current is flowing in two a.c. circuits. First contains only inductance and second contains only capacitance. If frequency of a.c. is increased for both, the current will
- a) increase in first circuit and decrease in second
b) increase in both circuits
c) decrease in both circuits
d) decrease in first circuit and increase in second

(MH-CET 2018)

19. An alternating voltage $e = 200 \sqrt{2} \sin(100 t)$ volt is connected to $1 \mu\text{F}$ capacitor through a.c.ammeter. The reading of ammeter is
- a) 5mA b) 10mA c) 15mA d) 20mA

(MHT-CET 2019)

20. In a series LCR circuit $R = 300 \Omega$, $L = 0.9 \text{ H}$, $C = 2 \mu\text{F}$, $\omega = 1000 \text{ rad/s}$. The impedance of the circuit is
- a) 900Ω b) 500Ω c) 400Ω d) 1300Ω
21. An alternating voltage is given by $e = 100 \sin(\omega t + \pi/6) \text{ V}$, the voltage will be maximum for the first time when $t =$
- a) $\frac{T}{2}$ b) $\frac{T}{12}$ c) $\frac{T}{6}$ d) $\frac{T}{3}$

(MHT-CET 2020)

22. An alternating e.m.f. of frequency 50 Hz is applied across series combination of resistor 'R' and inductance $\left(\frac{\sqrt{3}}{\pi}\right) \text{ H}$. If the phase difference between applied e.m.f. and current 'I' is 60° , then the value of R is
- a) 300Ω b) 50Ω c) 200Ω d) 100Ω

(MHT-CET 2021)

23. A power supply of 220 V, 50 Hz is connected to a resistor. The time taken by the alternating current flowing in the resistor, to change from maximum value to r.m.s. value is
- a) $10 \times 10^{-3} \text{ s}$ b) $2.5 \times 10^{-3} \text{ s}$ c) $2.5 \times 10^3 \text{ s}$ d) $5 \times 10^{-3} \text{ s}$
24. A parallel plate capacitor having plates of radius 6 cm has capacitance 100 pF . It is connected to 230 V a.c. supply with angular frequency 300 rad/s , the r.m.s. value of current is
- a) $6.9 \times 10^{-6} \text{ A}$ b) $2.3 \times 10^{-5} \text{ A}$ c) $6.9 \times 10^{-5} \text{ A}$ d) $3.9 \times 10^{-4} \text{ A}$

31. In LCR series circuit, an alternating e.m.f. 'e' and current 'i' are given by the equations
 $e = 100 \sin(100t)$ volt, $i = 100 \sin\left(100t + \frac{\pi}{3}\right)$ mA.

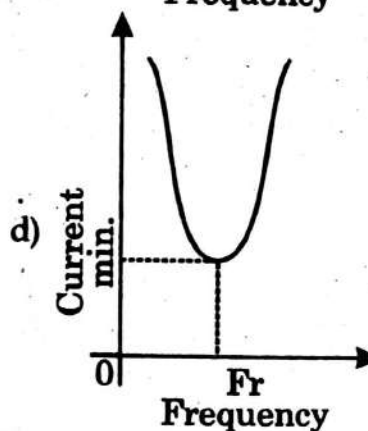
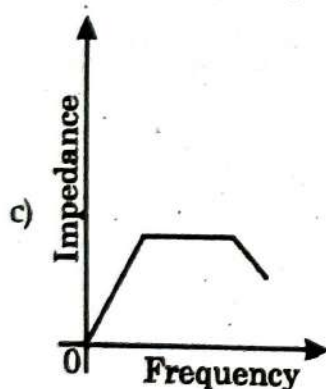
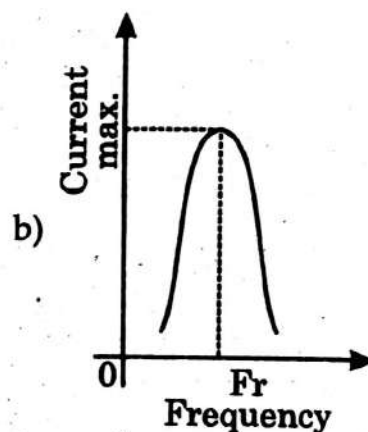
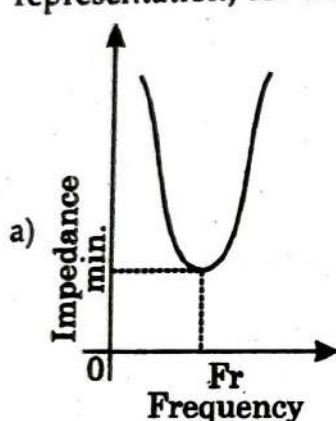
The average power dissipated in the circuit will be

- a) 100 W b) 10 W c) 5 W d) 2.5 W

(MH-CET 2017)

32. In series LCR circuit $R = 18 \Omega$ and impedance is 33Ω . An r.m.s. voltage 220 V is applied across the circuit. The true power consumed in the a.c. circuit is
 a) 220 W b) 400 W c) 600 W d) 800 W

33. Out of the following graphs, which graph shows the correct relation (graphical representation) for LC parallel resonant circuit?



7.7 LC Oscillations

(MH-CET 2005)

34. The parallel combination of inductor and capacitor is called as
 a) rectifier circuit b) tank circuit c) acceptor circuit d) filter circuit

(MH-CET 2009)

35. The frequency of LC oscillation is given by

- a) $f = \frac{1}{2\pi\sqrt{LC}}$ b) $f = 2\pi\sqrt{LC}$ c) $f = \frac{1}{\pi\sqrt{LC}}$ d) $f = \frac{1}{4\pi\epsilon_0}\sqrt{LC}$

(MH-CET 2016)

36. The LC parallel resonant circuit

- a) has a very high impedance b) has a very high current
 c) acts as resistance of very low value d) has zero impedance

7.8 Electric Resonance

(MHT-ECET 2004)

In a series resonant L-C-R circuit, the power factor is

- a) 0 b) 1 c) 0.3 d) 1.5

(MHT-CET 2007)

If the p.d across the inductor (3 mH) is same as that across the condenser ($30 \mu\text{F}$) in a series R-L-C circuit, then the frequency of the applied emf is

- a) 180 Hz b) 500 Hz c) 890 Hz d) 5 kHz

(MHT-CET 2009)

Some current is flowing in two alternating circuits. The first circuit contains only inductance and the other contains only a capacitor. If the frequency of the emf of ac is increased, the effect on the value of the current will be

- a) increases in the first and decreases in the other
b) increases in both the circuits
c) decreases in both the circuits
d) decreases in the first and increases in the other

(MHT-CET 2012)

In series LCR circuit at resonance,

- a) current is maximum and voltage is minimum
b) current is maximum and voltage is maximum
c) current is minimum and voltage is maximum
d) current is minimum and voltage is minimum

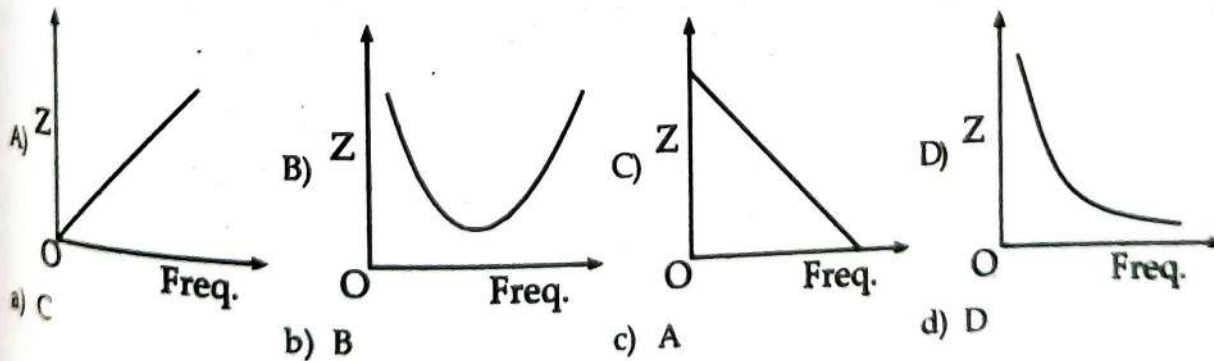
(MHT-CET 2021)

A resonant circuit has a capacitor of $2.5 \mu\text{F}$ and a coil of inductance L . In order to transmit a wave of wavelength 300 m, the value of inductance 'L' of the coil should be

- a) 10^{-8} H b) 10^{-6} H c) $3 \times 10^{-8} \text{ H}$ d) $2 \times 10^{-7} \text{ H}$

(MHT-CET 2022)

Which of the following graphs represents the impedance (Z) of LCR series resonant combination ?



7.9 Q - factor

(MHT-CET 2005)

In L-C-R 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) $2L$