

PHYSICS · JEE MAIN

Alternating Current

Chapter-wise previous year questions, with answer key

93

PYQS

2020–2025

PAPERS

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TOPICS

AC Circuits: R, L, C

Phasors and Impedance

Resonance in AC Circuits

Power in AC Circuits

Transformers

Series RLC Circuit

Resonance and Q-Factor

Transformer

AC Voltage and Current

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap “Step-by-step solution” under it for the full working.

Stuck on a question?

Every question has a free step-by-step solution on PrepWiser — tap “Step-by-step solution” under it.

Practise this chapter online with instant answer checking: prepwiser.in/learn · No signup needed to browse

Q1 JEE Main 2025 · 4 Apr · Shift 2

An inductor of self inductance 1 H is connected in series with a resistor of 100π ohm and an ac supply of 100π volt, 50 Hz. Maximum current flowing in the circuit is _____ A.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/8TU3I3b9dF](https://www.prepwiser.in/questions/8TU3I3b9dF)

Q2 JEE Main 2025 · 29 Jan · Shift 1

Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) : Choke coil is simply a coil having a large inductance but a small resistance. Choke coils are used with fluorescent mercury-tube fittings. If household electric power is directly connected to a mercury tube, the tube will be damaged.

Reason (R): By using the choke coil, the voltage across the tube is reduced by a factor $(R/\sqrt{R^2 + \omega^2 L^2})$, where ω is frequency of the supply across resistor R and inductor L . If the choke coil were not used, the voltage across the resistor would be the same as the applied voltage.

In the light of the above statements, choose the **most appropriate answer** from the options given below :

- (A) (A) is true but (R) is false
- (B) Both (A) and (R) are true and (R) is the correct explanation of (A) 3.
- (C) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (D) (A) is false but (R) is true

[Step-by-step solution ► prepwiser.in/questions/Iv_6ArYmxu](https://www.prepwiser.in/questions/Iv_6ArYmxu)

Q3 JEE Main 2024 · 9 Apr · Shift 1

When a coil is connected across a 20V dc supply, it draws a current of 5A. When it is connected across 20V, 50Hz ac supply, it draws a current of 4A. The self inductance of the coil is _____ mH. (Take $\pi = 3$)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/_fEbxFO9WV](https://www.prepwiser.in/questions/_fEbxFO9WV)

Q4 JEE Main 2024 · 9 Apr · Shift 1

A bulb and a capacitor are connected in series across an ac supply. A dielectric is then placed between the plates of the capacitor. The glow of the bulb :

- (A) becomes zero
- (B) remains same
- (C) increases
- (D) decreases

[Step-by-step solution ► prepwiser.in/questions/plvnPaH1xo](https://www.prepwiser.in/questions/plvnPaH1xo)

Q5 JEE Main 2024 · 8 Apr · Shift 2

A coil of negligible resistance is connected in series with 90Ω resistor across 120V, 60Hz supply. A voltmeter reads 36V across resistance. Inductance of the coil is :

- (A) 0.91 H
- (B) 0.76 H
- (C) 2.86 H
- (D) 0.286 H

[Step-by-step solution ► prepwiser.in/questions/MNWWWMcEYX](https://www.prepwiser.in/questions/MNWWWMcEYX)

Q6 JEE Main 2024 · 8 Apr · Shift 2

An alternating emf $E = 110\sqrt{2}\sin 100t$ volt is applied to a capacitor of $2\mu\text{F}$, the rms value of current in the circuit is _____ mA.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/7BZhkbqpej](https://www.prepwiser.in/questions/7BZhkbqpej)

Q7 JEE Main 2024 · 5 Apr · Shift 2

A series LCR circuit is subjected to an ac signal of 200V, 50Hz. If the voltage across the inductor ($L = 10\text{mH}$) is 31.4V, then the current in this circuit is _____.

- (A) 10 A (B) 10 mA
(C) 68 A (D) 63 A

[Step-by-step solution ► prepwiser.in/questions/oLYc0Zqcyg](https://www.prepwiser.in/questions/oLYc0Zqcyg)

Q8 JEE Main 2024 · 4 Apr · Shift 1

In an ac circuit, the instantaneous current is zero, when the instantaneous voltage is maximum. In this case, the source may be connected to :

- A. pure inductor.
B. pure capacitor.
C. pure resistor.
D. combination of an inductor and capacitor.

Choose the correct answer from the options given below :

- (A) A, B and C only (B) A and B only
(C) A, B and D only (D) B, C and D only

[Step-by-step solution ► prepwiser.in/questions/jBfIMQqMOK](https://www.prepwiser.in/questions/jBfIMQqMOK)

Q9 JEE Main 2024 · 29 Jan · Shift 1

A capacitor of capacitance $100\mu\text{F}$ is charged to a potential of 12V and connected to a 6.4mH inductor to produce oscillations. The maximum current in the circuit would be :

- (A) 2.0 A (B) 3.2 A
(C) 1.5 A (D) 1.2 A

[Step-by-step solution ► prepwiser.in/questions/-mNNBC1bYu](https://www.prepwiser.in/questions/-mNNBC1bYu)

Q10 JEE Main 2023 · 6 Apr · Shift 2

A capacitor of capacitance $150.0\mu\text{F}$ is connected to an alternating source of emf given by $E = 36\sin(120\pi t)\text{V}$. The maximum value of current in the circuit is approximately equal to :

- (A) $\frac{1}{\sqrt{2}}\text{A}$ (B) $2\sqrt{2}\text{A}$
(C) $\sqrt{2}\text{A}$ (D) 2A

[Step-by-step solution ► prepwiser.in/questions/t5Yio1X1R3](https://www.prepwiser.in/questions/t5Yio1X1R3)

Q11 JEE Main 2023 · 31 Jan · Shift 2

An alternating voltage source $V = 260 \sin(628t)$ is connected across a pure inductor of 5mH . Inductive reactance in the circuit is :

- (A) 6.28Ω (B) 0.318Ω
(C) 0.5Ω (D) 3.14Ω

Step-by-step solution ► [prepwisser.in/questions/I9OPj_j1oR](https://www.prepwisser.in/questions/I9OPj_j1oR)

Q12 JEE Main 2022 · 29 Jul · Shift 1

An alternating emf $E = 440 \sin 100\pi t$ is applied to a circuit containing an inductance of $\frac{\sqrt{2}}{\pi}\text{H}$. If an a.c. ammeter is connected in the circuit, its reading will be :

- (A) 4.4 A (B) 1.55 A
(C) 2.2 A (D) 3.11 A

Step-by-step solution ► [prepwisser.in/questions/IVzaBwGyhu](https://www.prepwisser.in/questions/IVzaBwGyhu)

Q13 JEE Main 2022 · 27 Jul · Shift 1

To light, a 50W , 100V lamp is connected, in series with a capacitor of capacitance $\frac{50}{\pi\sqrt{x}}\mu\text{F}$, with 200V , 50Hz AC source. The value of x will be _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwisser.in/questions/Wdxklm5Zp1](https://www.prepwisser.in/questions/Wdxklm5Zp1)

Q14 JEE Main 2022 · 25 Jul · Shift 1

The rms value of conduction current in a parallel plate capacitor is $6.9\mu\text{A}$. The capacity of this capacitor, if it is connected to 230V ac supply with an angular frequency of 600rad/s , will be :

- (A) 5 pF (B) 50 pF
(C) 100 pF (D) 200 pF

Step-by-step solution ► [prepwisser.in/questions/LxOgNSgecA](https://www.prepwisser.in/questions/LxOgNSgecA)

Q15 JEE Main 2022 · 24 Jun · Shift 2

Given below are two statements :

Statement I : The reactance of an ac circuit is zero. It is possible that the circuit contains a capacitor and an inductor.

Statement II : In ac circuit, the average power delivered by the source never becomes zero.

In the light of the above statements, choose the correct answer from the options given below.

- (A) Both Statement I and Statement II are true.
(B) Both Statement I and Statement II are false.
(C) Statement I is true but Statement II is false.
(D) Statement I is false but Statement II is true.

Step-by-step solution ► [prepwisser.in/questions/clC6QwWnaj](https://www.prepwisser.in/questions/clC6QwWnaj)

Q16 JEE Main 2021 · 27 Jul · Shift 1

A 0.07 H inductor and a 12Ω resistor are connected in series to a 220V , 50 Hz ac source. The approximate current in the circuit and the phase angle between current and source voltage are respectively. [Take π as $\frac{22}{7}$]

- (A) 8.8 A and $\tan^{-1}\left(\frac{11}{6}\right)$
- (B) 88 A and $\tan^{-1}\left(\frac{11}{6}\right)$
- (C) 0.88 A and $\tan^{-1}\left(\frac{11}{6}\right)$
- (D) 8.8 A and $\tan^{-1}\left(\frac{6}{11}\right)$

[Step-by-step solution ► prepwiser.in/questions/eiYUhQvJKV](https://www.prepwiser.in/questions/eiYUhQvJKV)

Q17 JEE Main 2021 · 20 Jul · Shift 2

For a series LCR circuit with $R = 100\Omega$, $L = 0.5\text{ mH}$ and $C = 0.1\text{ pF}$ connected across 220V – 50 Hz AC supply, the phase angle between current and supplied voltage and the nature of the circuit is :

- (A) 0° , resistive circuit
- (B) $\approx 90^\circ$, predominantly inductive circuit
- (C) 0° , resonance circuit
- (D) $\approx 90^\circ$, predominantly capacitive circuit

[Step-by-step solution ► prepwiser.in/questions/wrGfFvnKbS](https://www.prepwiser.in/questions/wrGfFvnKbS)

Q18 JEE Main 2021 · 17 Mar · Shift 2

What happens to the inductive reactance and the current in a purely inductive circuit if the frequency is halved?

- (A) Both, inducting reactance and current will be doubled.
- (B) Inductive reactance will be doubled and current will be halved.
- (C) Both, inductive reactance and current will be halved.
- (D) Inductive reactance will be halved and current will be doubled.

[Step-by-step solution ► prepwiser.in/questions/ky24UImChQ](https://www.prepwiser.in/questions/ky24UImChQ)

Q19 JEE Main 2020 · 3 Sep · Shift 1

A 750 Hz , 20 V (rms) source is connected to a resistance of 100Ω , an inductance of 0.1803 H and a capacitance of $10\mu\text{F}$ all in series. The time in which the resistance (heat capacity $2\text{ J/}^\circ\text{C}$) will get heated by 10°C . (assume no loss of heat to the surroudnings) is close to :

- | | |
|--------------------|--------------------|
| (A) 348 s | (B) 418 s |
| (C) 245 s | (D) 365 s |

[Step-by-step solution ► prepwiser.in/questions/iomfwv0o6V](https://www.prepwiser.in/questions/iomfwv0o6V)

Q20 JEE Main 2020 · 2 Sep · Shift 2

An inductance coil has a reactance of $100\ \Omega$. When an AC signal of frequency 1000 Hz is applied to the coil, the applied voltage leads the current by 45° . The self-inductance of the coil is

- (A) $6.7 \times 10^{-7}\text{ H}$
- (B) $1.1 \times 10^{-1}\text{ H}$
- (C) $5.5 \times 10^{-5}\text{ H}$
- (D) $1.1 \times 10^{-2}\text{ H}$

[Step-by-step solution](#) ► [prepwiser.in/questions/J7waYftmXz](https://www.prepwiser.in/questions/J7waYftmXz)

Phasors and Impedance · 1 PYQs

Q21 JEE Main 2022 · 29 Jul · Shift 2

A circuit element X when connected to an a.c. supply of peak voltage 100 V gives a peak current of 5 A which is in phase with the voltage. A second element Y when connected to the same a.c. supply also gives the same value of peak current which lags behind the voltage by $\frac{\pi}{2}$. If X and Y are connected in series to the same supply, what will be the rms value of the current in ampere?

- (A) $\frac{10}{\sqrt{2}}$
- (B) $\frac{5}{\sqrt{2}}$
- (C) $5\sqrt{2}$
- (D) $\frac{5}{2}$

[Step-by-step solution](#) ► [prepwiser.in/questions/koH8hPO8an](https://www.prepwiser.in/questions/koH8hPO8an)

Resonance in AC Circuits · 17 PYQs

Q22 JEE Main 2025 · 23 Jan · Shift 2

In a series LCR circuit, a resistor of $300\ \Omega$, a capacitor of 25 nF and an inductor of 100 mH are used. For maximum current in the circuit, the angular frequency of the ac source is _____ $\times 10^4\text{ radians s}^{-1}$

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwiser.in/questions/puJVii8Jtw](https://www.prepwiser.in/questions/puJVii8Jtw)

Q23 JEE Main 2025 · 22 Jan · Shift 2

A series LCR circuit is connected to an alternating source of emf E . The current amplitude at resonant frequency is I_0 . If the value of resistance R becomes twice of its initial value then amplitude of current at resonance will be

- (A) $\frac{I_0}{2}$
- (B) $\frac{I_0}{\sqrt{2}}$
- (C) $2I_0$
- (D) I_0

[Step-by-step solution](#) ► [prepwiser.in/questions/eCHGCCn3CI](https://www.prepwiser.in/questions/eCHGCCn3CI)

Q24 JEE Main 2024 · 6 Apr · Shift 1

Given below are two statements :

Statement I : In an LCR series circuit, current is maximum at resonance.

Statement II : Current in a purely resistive circuit can never be less than that in a series LCR circuit when connected to same voltage source.

In the light of the above statements, choose the correct from the options given below :

- (A) Statement I is true but Statement II is false
- (B) Statement I is false but Statement II is true
- (C) Both Statement I and Statement II are true
- (D) Both Statement I and Statement II are false

[Step-by-step solution ► prepwisser.in/questions/DWHFKG8a7z](https://www.prepwisser.in/questions/DWHFKG8a7z)

Q25 JEE Main 2024 · 6 Apr · Shift 2

For a given series LCR circuit it is found that maximum current is drawn when value of variable capacitance is 2.5 nF . If resistance of 200Ω and 100 mH inductor is being used in the given circuit. The frequency of ac source is _____ $\times 10^3\text{ Hz}$ (given $a^2 = 10$)

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/QFI0zBaX5r](https://www.prepwisser.in/questions/QFI0zBaX5r)

Q26 JEE Main 2024 · 1 Feb · Shift 1

In series LCR circuit, the capacitance is changed from C to $4C$. To keep the resonance frequency unchanged, the new inductance should be:

- (A) increased by $2L$
- (B) reduced by $\frac{1}{4}L$
- (C) reduced by $\frac{3}{4}L$
- (D) increased to $4L$

[Step-by-step solution ► prepwisser.in/questions/bTU7DrnLPB](https://www.prepwisser.in/questions/bTU7DrnLPB)

Q27 JEE Main 2023 · 13 Apr · Shift 2

Given below are two statements:

Statement I : An AC circuit undergoes electrical resonance if it contains either a capacitor or an inductor.

Statement II : An AC circuit containing a pure capacitor or a pure inductor consumes high power due to its non-zero power factor.

In the light of above statements, choose the correct answer form the options given below:

- (A) Both Statement I and Statement II are false
- (B) Statement I is true but statement II is false
- (C) Statement I is false but statement II is true
- (D) Both Statement I and Statement II are true

[Step-by-step solution ► prepwisser.in/questions/kVEkbB8mDe](https://www.prepwisser.in/questions/kVEkbB8mDe)

Q28 JEE Main 2023 · 8 Apr · Shift 1

An oscillating LC circuit consists of a 75 mH inductor and a $1.2\mu\text{F}$ capacitor. If the maximum charge to the capacitor is $2.7\mu\text{C}$. The maximum current in the circuit will be _____ mA

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/FnrzNz9ITE](https://www.prepwisser.in/questions/FnrzNz9ITE)

Q29 JEE Main 2023 · 1 Feb · Shift 1

A series LCR circuit is connected to an ac source of 220V, 50Hz. The circuit contains a resistance $R = 100\Omega$ and an inductor of inductive reactance $X_L = 79.6\Omega$. The capacitance of the capacitor needed to maximize the average rate at which energy is supplied will be _____ μF .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/QQEqCNQzB-](https://www.prepwiser.in/questions/QQEqCNQzB-)

Q30 JEE Main 2023 · 31 Jan · Shift 1

An inductor of 0.5mH , a capacitor of $20\mu\text{F}$ and resistance of 20Ω are connected in series with a 220V ac source. If the current is in phase with the emf, the amplitude of current of the circuit is $\sqrt{x}$ A. The value of x is _____

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/G_SV0Hsd6j](https://www.prepwiser.in/questions/G_SV0Hsd6j)

Q31 JEE Main 2023 · 25 Jan · Shift 1

An LCR series circuit of capacitance 62.5 nF and resistance of 50Ω , is connected to an A.C. source of frequency 2.0 kHz . For maximum value of amplitude of current in circuit, the value of inductance is _____ mH .

(Take $\pi^2 = 10$)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/Kc91p98Fso](https://www.prepwiser.in/questions/Kc91p98Fso)

Q32 JEE Main 2022 · 25 Jul · Shift 1

To increase the resonant frequency in series LCR circuit,

- (A) source frequency should be increased.
- (B) another resistance should be added in series with the first resistance.
- (C) another capacitor should be added in series with the first capacitor.
- (D) the source frequency should be decreased.

[Step-by-step solution ► prepwiser.in/questions/ijw9htkKCr](https://www.prepwiser.in/questions/ijw9htkKCr)

Q33 JEE Main 2022 · 30 Jun · Shift 1

A series LCR circuit with $R = \frac{250}{11}\Omega$ and $X_L = \frac{70}{11}\Omega$ is connected across a 220 V, 50 Hz supply. The value of capacitance needed to maximize the average power of the circuit will be _____ μF . (Take : $\pi = \frac{22}{7}$)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/TXWmsUqFFG](https://www.prepwiser.in/questions/TXWmsUqFFG)

Q34 JEE Main 2022 · 28 Jun · Shift 1

A telegraph line of length 100 km has a capacity of $0.01\mu\text{F/km}$ and it carries an alternating current at 0.5 kilo cycle per second. If minimum impedance is required, then the value of the inductance that needs to be introduced in series is _____ mH . (if $\pi = \sqrt{10}$)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/HVGRhNpPWI](https://www.prepwiser.in/questions/HVGRhNpPWI)

Q35 JEE Main 2021 · 27 Jul · Shift 2

A 100Ω resistance, a $0.1\ \mu\text{F}$ capacitor and an inductor are connected in series across a 250 V supply at variable frequency. Calculate the value of inductance of inductor at which resonance will occur. Given that the resonant frequency is 60 Hz .

- (A) 0.70 H
- (B) 70.3 mH
- (C) $7.03 \times 10^{-5}\text{ H}$
- (D) 70.3 H

[Step-by-step solution ► prepwisser.in/questions/GmGIXgv39U](https://www.prepwisser.in/questions/GmGIXgv39U)

Q36 JEE Main 2021 · 18 Mar · Shift 1

In a series LCR resonance circuit, if we change the resistance only, from a lower to higher value :

- (A) The bandwidth of resonance circuit will increase.
- (B) The resonance frequency will increase.
- (C) The quality factor will increase.
- (D) The quality factor and the resonance frequency will remain constant.

[Step-by-step solution ► prepwisser.in/questions/UKpW-z2jAW](https://www.prepwisser.in/questions/UKpW-z2jAW)

Q37 JEE Main 2021 · 16 Mar · Shift 1

A sinusoidal voltage of peak value 250 V is applied to a series LCR circuit, in which $R = 8\Omega$, $L = 24\text{ mH}$ and $C = 60\ \mu\text{F}$. The value of power dissipated at resonant condition is ' x ' kW. The value of x to the nearest integer is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/fvosIadTI](https://www.prepwisser.in/questions/fvosIadTI)

Q38 JEE Main 2021 · 25 Feb · Shift 1

A transmitting station releases waves of wavelength 960 m . A capacitor of $2.56\ \mu\text{F}$ is used in the resonant circuit. The self inductance of coil necessary for resonance is _____ $\times 10^{-8}\text{ H}$.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/EjIGI76igk](https://www.prepwisser.in/questions/EjIGI76igk)

Power in AC Circuits · 11 PYQs

Q39 JEE Main 2025 · 7 Apr · Shift 2

An inductor of reactance 100Ω , a capacitor of reactance 50Ω , and a resistor of resistance 50Ω are connected in series with an AC source of 10 V , 50 Hz . Average power dissipated by the circuit is _____ W.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/NIgeB4zWko](https://www.prepwisser.in/questions/NIgeB4zWko)

Q40 JEE Main 2024 · 9 Apr · Shift 2

A capacitor of reactance $4\sqrt{3}\Omega$ and a resistor of resistance 4Ω are connected in series with an ac source of peak value $8\sqrt{2}V$. The power dissipation in the circuit is _____ W.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/IyYUTROWpF](https://www.prepwisser.in/questions/IyYUTROWpF)

Q41 JEE Main 2024 · 6 Apr · Shift 1

When a *dc* voltage of 100V is applied to an inductor, a *dc* current of 5A flows through it. When an ac voltage of 200V peak value is connected to inductor, its inductive reactance is found to be $20\sqrt{3}\Omega$. The power dissipated in the circuit is _____ W.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/IB3bCNWmhv](https://www.prepwisser.in/questions/IB3bCNWmhv)

Q42 JEE Main 2024 · 31 Jan · Shift 2

An AC voltage $V = 20 \sin 200\pi t$ is applied to a series LCR circuit which drives a current $I = 10 \sin (200\pi t + \frac{\pi}{3})$. The average power dissipated is:

- (A) 21.6 W (B) 200 W
(C) 173.2 W (D) 50 W

[Step-by-step solution ► prepwisser.in/questions/-h_l43cGUU](https://www.prepwisser.in/questions/-h_l43cGUU)

Q43 JEE Main 2024 · 29 Jan · Shift 2

In an a.c. circuit, voltage and current are given by:

$V = 100 \sin(100t)V$ and $I = 100 \sin(100t + \frac{\pi}{3})$ mA respectively.

The average power dissipated in one cycle is:

- (A) 5 W (B) 25 W
(C) 2.5 W (D) 10 W

[Step-by-step solution ► prepwisser.in/questions/9MXghCZbux](https://www.prepwisser.in/questions/9MXghCZbux)

Q44 JEE Main 2023 · 30 Jan · Shift 1

In a series LR circuit with $X_L = R$, power factor P_1 . If a capacitor of capacitance C with $X_C = X_L$ is added to the circuit the power factor becomes P_2 . The ratio of P_1 to P_2 will be :

- (A) $1 : \sqrt{2}$ (B) $1 : 3$
(C) $1 : 2$ (D) $1 : 1$

[Step-by-step solution ► prepwisser.in/questions/6HVuMij2vY](https://www.prepwisser.in/questions/6HVuMij2vY)

Q45 JEE Main 2023 · 25 Jan · Shift 2

A series LCR circuit is connected to an AC source of 220 V, 50 Hz. The circuit contains a resistance $R = 80\Omega$, an inductor of inductive reactance $X_L = 70\Omega$, and a capacitor of capacitive reactance $X_C = 130\Omega$. The power factor of circuit is $\frac{x}{10}$. The value of x is :

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/EvfRpMnNKI](https://www.prepwisser.in/questions/EvfRpMnNKI)

Q46 JEE Main 2022 · 27 Jul · Shift 1

A direct current of 4A and an alternating current of peak value 4A flow through resistance of 3Ω and 2Ω respectively. The ratio of heat produced in the two resistances in same interval of time will be :

- (A) 3 : 2 (B) 3 : 1
(C) 3 : 4 (D) 4 : 3

[Step-by-step solution ► prepwisar.in/questions/HQNY6mKvCY](https://www.prepwisar.in/questions/HQNY6mKvCY)

Q47 JEE Main 2022 · 26 Jul · Shift 1

In a series LR circuit $X_L = R$ and power factor of the circuit is P_1 . When capacitor with capacitance C such that $X_L = X_C$ is put in series, the power factor becomes P_2 . The ratio $\frac{P_1}{P_2}$ is:

- (A) $\frac{1}{2}$ (B) $\frac{1}{\sqrt{2}}$
(C) $\frac{\sqrt{3}}{\sqrt{2}}$ (D) 2 : 1

[Step-by-step solution ► prepwisar.in/questions/wFdi_uy9CC](https://www.prepwisar.in/questions/wFdi_uy9CC)

Q48 JEE Main 2022 · 25 Jun · Shift 1

If wattless current flows in the AC circuit, then the circuit is :

- (A) Purely Resistive circuit (B) Purely Inductive circuit
(C) LCR series circuit (D) RC series circuit only

[Step-by-step solution ► prepwisar.in/questions/JCNZ4I7kii](https://www.prepwisar.in/questions/JCNZ4I7kii)

Q49 JEE Main 2020 · 6 Sep · Shift 2

In a series LR circuit, power of 400W is dissipated from a source of 250 V, 50 Hz. The power factor of the circuit is 0.8. In order to bring the power factor to unity, a capacitor of value C is added in series to the L and R. Taking the value of C as $\left(\frac{n}{3\pi}\right) \mu F$, then value of n is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/j_k8vtU1f1](https://www.prepwisar.in/questions/j_k8vtU1f1)

Transformers · 3 PYQs

Q50 JEE Main 2024 · 30 Jan · Shift 2

A power transmission line feeds input power at 2.3kV to a step down transformer with its primary winding having 3000 turns. The output power is delivered at 230V by the transformer. The current in the primary of the transformer is 5A and its efficiency is 90%. The winding of transformer is made of copper. The output current of transformer is _____ A.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/-1KK9A2JLn](https://www.prepwisar.in/questions/-1KK9A2JLn)

Q51 JEE Main 2023 · 6 Apr · Shift 1

An ideal transformer with purely resistive load operates at 12kV on the primary side. It supplies electrical energy to a number of nearby houses at 120V. The average rate of energy consumption in the houses served by the transformer is 60 kW. The value of resistive load (R_s) required in the secondary circuit will be _____ m Ω .

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/r1Ce78ml8j](https://www.prepwisar.in/questions/r1Ce78ml8j)

Q52 JEE Main 2022 · 28 Jul · Shift 2

A transformer operating at primary voltage 8 kV and secondary voltage 160V serves a load of 80kW. Assuming the transformer to be ideal with purely resistive load and working on unity power factor, the loads in the primary and secondary circuit would be

- (A) $800\ \Omega$ and $1.06\ \Omega$ (B) $10\ \Omega$ and $500\ \Omega$
(C) $800\ \Omega$ and $0.32\ \Omega$ (D) $1.06\ \Omega$ and $500\ \Omega$

[Step-by-step solution](#) ► [prepwiser.in/questions/yTFUcnA_SY](https://www.prepwiser.in/questions/yTFUcnA_SY)

Series RLC Circuit · 12 PYQs

Q53 JEE Main 2024 · 27 Jan · Shift 2

A series LCR circuit with

$$L = \frac{100}{\pi} \text{mH}, C = \frac{10^{-3}}{\pi} \text{F}$$

and $R = 10\ \Omega$, is connected across an ac source of 220V, 50Hz supply. The power factor of the circuit would be _____.

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwiser.in/questions/u1NCw9UmDv](https://www.prepwiser.in/questions/u1NCw9UmDv)

Q54 JEE Main 2023 · 12 Apr · Shift 1

Given below are two statements:

Statement I : When the frequency of an a.c source in a series LCR circuit increases, the current in the circuit first increases, attains a maximum value and then decreases.

Statement II : In a series LCR circuit, the value of power factor at resonance is one.

In the light of given statements, choose the most appropriate answer from the options given below.

- (A) Both Statement I and Statement II are False.
(B) Statement I is incorrect but Statement II is true.
(C) Both Statement I and Statement II are true.
(D) Statement I is correct but Statement II is false.

[Step-by-step solution](#) ► [prepwiser.in/questions/KZjMxY61In](https://www.prepwiser.in/questions/KZjMxY61In)

Q55 JEE Main 2023 · 31 Jan · Shift 2

A series LCR circuit consists of $R = 80\ \Omega$, $X_L = 100\ \Omega$, and $X_C = 40\ \Omega$. The input

voltage is $2500 \cos(100\pi t)$ V. The amplitude of current, in the circuit, is _____ A.

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwiser.in/questions/O2oBG7adQP](https://www.prepwiser.in/questions/O2oBG7adQP)

Q56 JEE Main 2022 · 27 Jul · Shift 2

A series LCR circuit has $L = 0.01 \text{ H}$, $R = 10 \Omega$ and $C = 1 \mu\text{F}$ and it is connected to ac voltage of amplitude (V_m) 50 V . At frequency 60% lower than resonant frequency, the amplitude of current will be approximately :

- (A) 466 mA (B) 312 mA
(C) 238 mA (D) 196 mA

[Step-by-step solution ► prepwisser.in/questions/f2f0jWteLS](https://www.prepwisser.in/questions/f2f0jWteLS)

Q57 JEE Main 2022 · 29 Jun · Shift 2

An inductor of 0.5 mH , a capacitor of $200 \mu\text{F}$ and a resistor of 2Ω are connected in series with a 220 V ac source. If the current is in phase with the emf, the frequency of ac source will be _____ $\times 10^2 \text{ Hz}$.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/6p-k5TWcB0](https://www.prepwisser.in/questions/6p-k5TWcB0)

Q58 JEE Main 2022 · 25 Jun · Shift 2

A sinusoidal voltage $V(t) = 210 \sin 3000 t$ volt is applied to a series LCR circuit in which $L = 10 \text{ mH}$, $C = 25 \mu\text{F}$ and $R = 100 \Omega$. The phase difference (Φ) between the applied voltage and resultant current will be :

- (A) $\tan^{-1}(0.17)$
(B) $\tan^{-1}(9.46)$
(C) $\tan^{-1}(0.30)$
(D) $\tan^{-1}(13.33)$

[Step-by-step solution ► prepwisser.in/questions/9ACEFHgdeL](https://www.prepwisser.in/questions/9ACEFHgdeL)

Q59 JEE Main 2021 · 31 Aug · Shift 1

In an ac circuit, an inductor, a capacitor and a resistor are connected in series with $X_L = R = X_C$. Impedance of this circuit is :

- (A) $2R^2$
(B) Zero
(C) R
(D) $R\sqrt{2}$

[Step-by-step solution ► prepwisser.in/questions/0oX2x6nG3F](https://www.prepwisser.in/questions/0oX2x6nG3F)

Q60 JEE Main 2021 · 20 Jul · Shift 1

In an LCR series circuit, an inductor 30 mH and a resistor 1Ω are connected to an AC source of angular frequency 300 rad/s . The value of capacitance for which, the current leads the voltage by 45° is $\frac{1}{x} \times 10^{-3} \text{ F}$. Then the value of x is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/R4Ue9KvCxH](https://www.prepwisser.in/questions/R4Ue9KvCxH)

Q61 JEE Main 2021 · 18 Mar · Shift 2

In a series LCR circuit, the inductive reactance (X_L) is 10Ω and the capacitive reactance (X_C) is 4Ω . The resistance (R) in the circuit is 6Ω . The power factor of the circuit is :

- (A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$
(C) $\frac{1}{\sqrt{2}}$ (D) $\frac{1}{2\sqrt{2}}$

[Step-by-step solution ► prepwiser.in/questions/u9qNO5kBn7](https://www.prepwiser.in/questions/u9qNO5kBn7)

Q62 JEE Main 2021 · 25 Feb · Shift 2

An LCR circuit contains resistance of 110Ω and a supply of 220 V at 300 rad/s angular frequency. If only capacitance is removed from the circuit, current lags behind the voltage by 45° . If on the other hand, only inductor is removed the current leads by 45° with the applied voltage. The rms current flowing in the circuit will be :

- (A) 1 A (B) 2.5 A
(C) 2 A (D) 1.5 A

[Step-by-step solution ► prepwiser.in/questions/MZ9MQBSQur](https://www.prepwiser.in/questions/MZ9MQBSQur)

Q63 JEE Main 2021 · 24 Feb · Shift 2

A series L-C-R circuit is designed to resonate at an angular frequency $\omega_0 = 10^5\text{ rad/s}$. The circuit draws 16 W power from 120 V source at resonance. The value of resistance 'R' in the circuit is _____ Ω .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/jQtbt8ROeB](https://www.prepwiser.in/questions/jQtbt8ROeB)

Q64 JEE Main 2020 · 7 Jan · Shift 1

A LCR circuit behaves like a damped harmonic oscillator. Comparing it with a physical spring-mass damped oscillator having damping constant 'b', the correct equivalence would be:

- (A) $L \leftrightarrow k, C \leftrightarrow b, R \leftrightarrow m$
(B) $L \leftrightarrow m, C \leftrightarrow k, R \leftrightarrow b$
(C) $L \leftrightarrow m, C \leftrightarrow \frac{1}{k}, R \leftrightarrow b$
(D) $L \leftrightarrow \frac{1}{b}, C \leftrightarrow \frac{1}{m}, R \leftrightarrow \frac{1}{k}$

[Step-by-step solution ► prepwiser.in/questions/jgtQ3tfPrT](https://www.prepwiser.in/questions/jgtQ3tfPrT)

Resonance and Q-Factor · 14 PYQs

Q65 JEE Main 2024 · 8 Apr · Shift 1

A LCR circuit is at resonance for a capacitor C, inductance L and resistance R. Now the value of resistance is halved keeping all other parameters same. The current amplitude at resonance will be now:

- (A) halved (B) same
(C) Zero (D) double

[Step-by-step solution ► prepwiser.in/questions/bFO-ymPSkD](https://www.prepwiser.in/questions/bFO-ymPSkD)

Q66 JEE Main 2023 · 10 Apr · Shift 1

Given below are two statements:

Statement I : Maximum power is dissipated in a circuit containing an inductor, a capacitor and a resistor connected in series with an AC source, when resonance occurs

Statement II : Maximum power is dissipated in a circuit containing pure resistor due to zero phase difference between current and voltage.

In the light of the above statements, choose the correct answer from the options given below:

- (A) Statement I is false but Statement II is true
- (B) Both Statement I and Statement II are false
- (C) Statement I is true but Statement II is false
- (D) Both Statement I and Statement II are true

[Step-by-step solution](https://www.prepwiser.in/questions/_n7u7aYZUd) ► [prepwiser.in/questions/_n7u7aYZUd](https://www.prepwiser.in/questions/_n7u7aYZUd)

Q67 JEE Main 2023 · 8 Apr · Shift 2

A series combination of resistor of resistance 100Ω , inductor of inductance 1H and capacitor of capacitance $6.25\mu\text{F}$ is connected to an ac source. The quality factor of the circuit will be _____

Numerical answer — enter the value.

[Step-by-step solution](https://www.prepwiser.in/questions/gO-pIoKHii) ► [prepwiser.in/questions/gO-pIoKHii](https://www.prepwiser.in/questions/gO-pIoKHii)

Q68 JEE Main 2023 · 31 Jan · Shift 1

If R , X_L , and X_C represent resistance, inductive reactance and capacitive reactance. Then which of the following is dimensionless :

- (A) $\frac{R}{X_L X_C}$
- (B) $R X_L X_C$
- (C) $\frac{R}{\sqrt{X_L X_C}}$
- (D) $R \frac{X_L}{X_C}$

[Step-by-step solution](https://www.prepwiser.in/questions/6WT_mQMhrK) ► [prepwiser.in/questions/6WT_mQMhrK](https://www.prepwiser.in/questions/6WT_mQMhrK)

Q69 JEE Main 2023 · 29 Jan · Shift 2

An inductor of inductance $2\mu\text{H}$ is connected in series with a resistance, a variable capacitor and an AC source of frequency 7 kHz . The value of capacitance for which maximum current is drawn into the circuit $\frac{1}{x}\text{F}$, where the value of x is _____.

(Take $\pi = \frac{22}{7}$)

Numerical answer — enter the value.

[Step-by-step solution](https://www.prepwiser.in/questions/Z8R4Mi-PtW) ► [prepwiser.in/questions/Z8R4Mi-PtW](https://www.prepwiser.in/questions/Z8R4Mi-PtW)

Q70 JEE Main 2023 · 25 Jan · Shift 1

In an LC oscillator, if values of inductance and capacitance become twice and eight times, respectively, then the resonant frequency of oscillator becomes x times its initial resonant frequency ω_0 . The value of x is :

- (A) $1/4$
- (B) $1/16$
- (C) 4
- (D) 16

[Step-by-step solution](https://www.prepwiser.in/questions/BkM4bQMDBx) ► [prepwiser.in/questions/BkM4bQMDBx](https://www.prepwiser.in/questions/BkM4bQMDBx)

Q71 JEE Main 2022 · 28 Jul · Shift 1

The frequencies at which the current amplitude in an LCR series circuit becomes $\frac{1}{\sqrt{2}}$ times its maximum value, are 212 rad s^{-1} and 232 rad s^{-1} . The value of resistance in the circuit is $R = 5 \Omega$. The self inductance in the circuit is _____ mH.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/ZkZJJUzeiM](https://www.prepwiser.in/questions/ZkZJJUzeiM)

Q72 JEE Main 2022 · 30 Jun · Shift 1

In series RLC resonator, if the self inductance and capacitance become double, the new resonant frequency (f_2) and new quality factor (Q_2) will be :

(f_1 = original resonant frequency, Q_1 = original quality factor)

- (A) $f_2 = \frac{f_1}{2}$ and $Q_2 = Q_1$
- (B) $f_2 = f_1$ and $Q_2 = \frac{Q_1}{2}$
- (C) $f_2 = 2f_1$ and $Q_2 = Q_1$
- (D) $f_2 = f_1$ and $Q_2 = 2Q_1$

[Step-by-step solution ► prepwiser.in/questions/b_dZw4Thhf](https://www.prepwiser.in/questions/b_dZw4Thhf)

Q73 JEE Main 2021 · 26 Aug · Shift 1

A series LCR circuit driven by 300 V at a frequency of 50 Hz contains a resistance $R = 3 \text{ k}\Omega$, an inductor of inductive reactance $X_L = 250 \pi \Omega$

and an unknown capacitor. The value of capacitance to maximize the average power should be : (Take $\pi^2 = 10$)

- (A) $4 \mu\text{F}$
- (B) $25 \mu\text{F}$
- (C) $400 \mu\text{F}$
- (D) $40 \mu\text{F}$

[Step-by-step solution ► prepwiser.in/questions/Y7-aGNg9Ie](https://www.prepwiser.in/questions/Y7-aGNg9Ie)

Q74 JEE Main 2021 · 22 Jul · Shift 2

Match List - I with List - II

List - I

- (a) $\omega L > \frac{1}{\omega C}$
- (b) $\omega L = \frac{1}{\omega C}$
- (c) $\omega L < \frac{1}{\omega C}$
- (d) Resonant frequency

List - II

- (i) Current is in phase with emf
- (ii) Current lags behind the applied emf
- (iii) Maximum current occurs

Choose the correct answer from the options given below

- (A) a(ii), b(i), c(iv), d(iii)
- (B) a(ii), b(i), c(iii), d(iv)
- (C) a(iii), b(i), c(iv), d(ii)
- (D) a(iv), b(iii), c(ii), d(i)

[Step-by-step solution ► prepwiser.in/questions/K16SP1_E7c](https://www.prepwiser.in/questions/K16SP1_E7c)

Q75 JEE Main 2021 · 20 Jul · Shift 2

A series LCR circuit of $R = 5\Omega$, $L = 20 \text{ mH}$ and $C = 0.5 \mu\text{F}$ is connected across an AC supply of 250 V , having variable frequency. The power dissipated at resonance condition is _____ $\times 10^2 \text{ W}$.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/IMrjKN04en](https://www.prepwiser.in/questions/IMrjKN04en)

Q76 JEE Main 2021 · 26 Feb · Shift 1

In a series LCR resonant circuit, the quality factor is measured as 100. If the inductance is increased by two fold and resistance is decreased by two fold, then the quality factor after this change will be _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/2U6gYolQ3B](https://www.prepwiser.in/questions/2U6gYolQ3B)

Q77 JEE Main 2021 · 24 Feb · Shift 1

A resonance circuit having inductance and resistance $2 \times 10^{-4} \text{ H}$ and 6.28Ω respectively oscillates at 10 MHz frequency. The value of quality factor of this resonator is _____. [$\pi = 3.14$]

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/ytGEasZINI](https://www.prepwiser.in/questions/ytGEasZINI)

Q78 JEE Main 2020 · 6 Sep · Shift 1

An AC circuit has $R = 100 \Omega$, $C = 2 \mu\text{F}$ and $L = 80 \text{ mH}$, connected in series. The quality factor of the circuit is :

- | | |
|---------|---------|
| (A) 20 | (B) 2 |
| (C) 0.5 | (D) 400 |

[Step-by-step solution ► prepwiser.in/questions/CTJGNUHuui](https://www.prepwiser.in/questions/CTJGNUHuui)

Transformer · 3 PYQs

Q79 JEE Main 2024 · 1 Feb · Shift 2

A transformer has an efficiency of 80% and works at 10V and 4kW . If the secondary voltage is 240V , then the current in the secondary coil is :

- | | |
|-----------|------------|
| (A) 1.33A | (B) 13.33A |
| (C) 1.59A | (D) 15.1A |

[Step-by-step solution ► prepwiser.in/questions/Hbxf_pzDWL](https://www.prepwiser.in/questions/Hbxf_pzDWL)

Q80 JEE Main 2024 · 27 Jan · Shift 2

Primary side of a transformer is connected to 230V , 50Hz supply. Turns ratio of primary to secondary winding is $10 : 1$. Load resistance connected to secondary side is 46Ω . The power consumed in it is :

- | | |
|------------|------------|
| (A) 11.5 W | (B) 12.5 W |
| (C) 10.0 W | (D) 12.0 W |

[Step-by-step solution ► prepwiser.in/questions/37g1C2QFMr](https://www.prepwiser.in/questions/37g1C2QFMr)

Q81 JEE Main 2021 · 24 Feb · Shift 1

A common transistor radio set requires 12 V (D.C.) for its operation. The D.C. source is constructed by using a transformer and a rectifier circuit, which are operated at 220 V (A.C.) on standard domestic A.C. supply. The number of turns of secondary coil are 24, then the number of turns of primary are _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/N0Bl4upcro](https://www.prepwiser.in/questions/N0Bl4upcro)

AC Voltage and Current · 12 PYQs

Q82 JEE Main 2025 · 7 Apr · Shift 1

An ac current is represented as

$$i = 5\sqrt{2} + 10 \cos\left(650\pi t + \frac{\pi}{6}\right) \text{ Amp}$$

The r.m.s value of the current is

(A) 10 Amp

(B) $5\sqrt{2}$ Amp

(C) 100 Amp

(D) 50 Amp

[Step-by-step solution ► prepwiser.in/questions/GCuWEfScD1](https://www.prepwiser.in/questions/GCuWEfScD1)

Q83 JEE Main 2025 · 4 Apr · Shift 1

An alternating current is represented by the equation, $i = 100\sqrt{2} \sin(100\pi t)$ ampere. The RMS value of current and the frequency of the given alternating current are

(A) $\frac{100}{\sqrt{2}}$ A, 100Hz

(B) $50\sqrt{2}$ A, 50Hz

(C) $100\sqrt{2}$ A, 100Hz

(D) 100 A, 50Hz

[Step-by-step solution ► prepwiser.in/questions/Mn15Ra12I2](https://www.prepwiser.in/questions/Mn15Ra12I2)

Q84 JEE Main 2025 · 3 Apr · Shift 2

An electric bulb rated as 100W – 220V is connected to an ac source of rms voltage 220 V. The peak value of current through the bulb is :

(A) 0.32 A

(B) 0.64 A

(C) 0.45 A

(D) 2.2 A

[Step-by-step solution ► prepwiser.in/questions/y-ry_cyL6V](https://www.prepwiser.in/questions/y-ry_cyL6V)

Q85 JEE Main 2025 · 24 Jan · Shift 1

An alternating current is given by $I = I_A \sin \omega t + I_B \cos \omega t$. The r.m.s current will be

(A) $\frac{\sqrt{I_A^2 + I_B^2}}{2}$

(B) $\sqrt{\frac{I_A^2 + I_B^2}{2}}$

(C) $\frac{I_A + I_B}{\sqrt{2}}$

(D) $\sqrt{I_A^2 + I_B^2}$

[Step-by-step solution ► prepwiser.in/questions/RYcmEiZBUp](https://www.prepwiser.in/questions/RYcmEiZBUp)

Q86 JEE Main 2024 · 4 Apr · Shift 1

An alternating current at any instant is given by $i = [6 + \sqrt{56} \sin(100\pi t + \pi/3)]$ A. The *rms* value of the current is ____ A.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/yAJGEedOVqD](https://www.prepwiser.in/questions/yAJGEedOVqD)

Q87 JEE Main 2024 · 30 Jan · Shift 2

An alternating voltage $V(t) = 220 \sin 100\pi t$ volt is applied to a purely resistive load of 50Ω . The time taken for the current to rise from half of the peak value to the peak value is:

- (A) 7.2 ms (B) 3.3 ms
(C) 5 ms (D) 2.2 ms

[Step-by-step solution ► prepwiser.in/questions/sX4F4Bs_x-](https://www.prepwiser.in/questions/sX4F4Bs_x-)

Q88 JEE Main 2022 · 27 Jun · Shift 1

The current flowing through an ac circuit is given by

$$I = 5 \sin(120\pi t) \text{ A}$$

How long will the current take to reach the peak value starting from zero?

- (A) $\frac{1}{60}$ s (B) 60 s
(C) $\frac{1}{120}$ s (D) $\frac{1}{240}$ s

[Step-by-step solution ► prepwiser.in/questions/VTi2qV6jks](https://www.prepwiser.in/questions/VTi2qV6jks)

Q89 JEE Main 2022 · 24 Jun · Shift 1

A resistance of 40Ω is connected to a source of alternating current rated 220 V, 50 Hz. Find the time taken by the current to change from its maximum value to the rms value :

- (A) 2.5 ms (B) 1.25 ms
(C) 2.5 s (D) 0.25 s

[Step-by-step solution ► prepwiser.in/questions/Cfq8XHudHZ](https://www.prepwiser.in/questions/Cfq8XHudHZ)

Q90 JEE Main 2021 · 27 Aug · Shift 1

The alternating current is given by $i = \{\sqrt{42} \sin(\frac{2\pi}{T}t) + 10\}$ A

The r.m.s. value of of this current is A.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/j5DMKLjkGY](https://www.prepwiser.in/questions/j5DMKLjkGY)

Q91 JEE Main 2021 · 18 Mar · Shift 1

An AC source rated 220 V, 50 Hz is connected to a resistor. The time taken by the current to change from its maximum to the rms value is :

- (A) 2.5 ms (B) 25 ms
(C) 2.5 s (D) 0.25 ms

[Step-by-step solution ► prepwiser.in/questions/YJaqNsymb_](https://www.prepwiser.in/questions/YJaqNsymb_)

Q92 JEE Main 2021 · 17 Mar · Shift 1

An AC current is given by $I = I_1 \sin \omega t + I_2 \cos \omega t$. A hot wire ammeter will give a reading :

(A) $\frac{I_1 + I_2}{\sqrt{2}}$

(B) $\sqrt{\frac{I_1^2 + I_2^2}{2}}$

(C) $\sqrt{\frac{I_1^2 + I_2^2}{2}}$

(D) $\frac{I_1 + I_2}{2\sqrt{2}}$

[Step-by-step solution ► prepwisser.in/questions/fg6CUU2TB0](https://www.prepwisser.in/questions/fg6CUU2TB0)

Q93 JEE Main 2021 · 26 Feb · Shift 1

An alternating current is given by the equation $i = i_1 \sin \omega t + i_2 \cos \omega t$. The rms current will be :

(A) $\frac{1}{\sqrt{2}}(i_1^2 + i_2^2)^{\frac{1}{2}}$

(B) $\frac{1}{\sqrt{2}}(i_1 + i_2)$

(C) $\frac{1}{\sqrt{2}}(i_1 + i_2)^2$

(D) $\frac{1}{2}(i_1^2 + i_2^2)^{\frac{1}{2}}$

[Step-by-step solution ► prepwisser.in/questions/msZMIGQCtk](https://www.prepwisser.in/questions/msZMIGQCtk)

Answer key — Alternating Current

Numbers match the question numbers above. For full working, open the solution link under each question.

1	1	2	B	3	10	4	C	5	B	6	22	7	A	8	C
9	C	10	D	11	D	12	C	13	3	14	B	15	C	16	A
17	D	18	D	19	A	20	D	21	D	22	2	23	A	24	C
25	10	26	C	27	A	28	9	29	40	30	242	31	100	32	C
33	500	34	100	35	D	36	A	37	4	38	10	39	1	40	4
41	250	42	D	43	C	44	A	45	8	46	B	47	B	48	B
49	400	50	45	51	240	52	C	53	1	54	C	55	25	56	C
57	5	58	A	59	C	60	3	61	C	62	C	63	900	64	C
65	D	66	D	67	4	68	C	69	3872	70	A	71	250	72	A
73	A	74	A	75	125	76	283	77	2000	78	B	79	B	80	A
81	440	82	A	83	D	84	B	85	B	86	8	87	B	88	D
89	A	90	11	91	A	92	C	93	A						

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