

JEE MAIN ALTERNATING CURRENT — SERIES LCR CIRCUIT, IMPEDANCE AND PHASE — PYQS

Max. Marks: 16
Questions: 4

Section A (MCQ) — 3 questions

- Q.1** An a.c. source of angular frequency ω is connected across a resistor R and a capacitor C in series. The current is observed as I . Now the frequency of the source is changed to $\omega/4$, (keeping the voltage unchanged) the current is found to be $I/3$. The ratio of resistance to reactance at frequency ω is

[JEE Main 2026 (Online) 5th April Morning Shift]

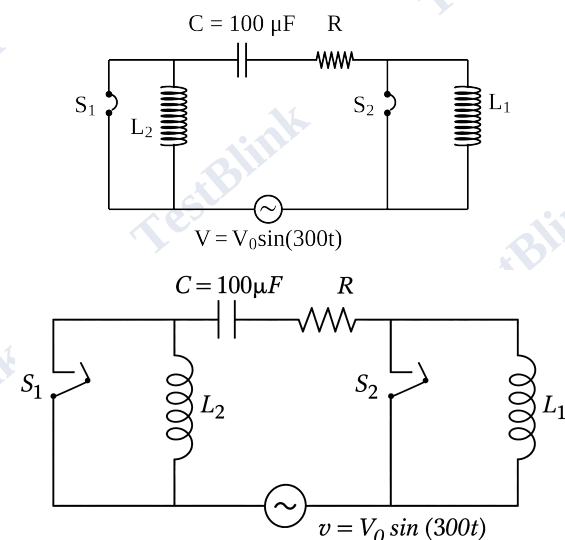
- (1) $\sqrt{\frac{6}{7}}$ (2) $\sqrt{\frac{3}{5}}$ (3) $\sqrt{\frac{7}{8}}$ (4) $\sqrt{\frac{3}{4}}$

Scan or tap for the full solution



- Q.2** The figure given below shows an LCR series circuit with two switches S_1 and S_2 . When switch S_1 is closed keeping S_2 open, the phase difference (ϕ) between the current and source voltage is 30° and phase difference is 60° when S_2 is closed keeping S_1 open. The value of $(3L_1 - L_2)$ is _____ H.

[JEE Main 2026 (Online) 2nd April Evening Shift]



- (1) $\frac{9}{2}$ (2) $\frac{2}{9}$ (3) $\frac{1}{3}$ (4) 3

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- Q.3** 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 :

[JEE Main 2025 (Online) 29th January Morning Shift]

- (1) (A) is true but (R) is false
 (2) Both (A) and (R) are true and (R) is the correct explanation of (A).
 (3) Both (A) and (R) are true but (R) is not the correct explanation of (A)
 (4) (A) is false but (R) is true

Scan or tap for the full solution



Section B (Numerical) — 1 question

- Q.4** 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.

[JEE Main 2025 (Online) 4th April Evening Shift]

Scan or tap for the full solution



ANSWER KEY

Section A (MCQ) — 3 questions

Ques.	1	2	3							
Ans.	3	2	2							

Section B (Numerical) — 1 question

Ques.	4									
Ans.	1									