

Hard

Assistant Engineer (Electrical), Class-2

2025

Building Department

440 V, 50 Hz AC

LCR

- A

50.53

, 49.57

Correct
- B

52.12

, 49.8
- C

55.02

, 48.95
- D

50

, 49

Correct Answer: A

Full Detailed Explanation

Impedance of the series RLC circuit is given by

$$|Z| = \sqrt{R^2 + (X_L - X_C)^2}$$

At resonance, $X_L = X_C$ and the impedance is minimum and equal to the resistance R .

Given, $V = 440\text{ V}$, $f = 50\text{ Hz}$, $R = 10\text{ }\Omega$, $L = 0.05\text{ H}$, $C = 100\text{ }\mu\text{F}$

At resonance, $f = \frac{1}{2\pi\sqrt{LC}}$

Substituting the values, we get

$$f = \frac{1}{2\pi\sqrt{0.05 \times 100 \times 10^{-6}}}$$

$f = 100\text{ Hz}$

At resonance, the impedance is minimum and equal to the resistance R .

$|Z| = R = 10\text{ }\Omega$

The current in the circuit is given by

$$I = \frac{V}{|Z|} = \frac{440}{10} = 44\text{ A}$$

Therefore, the correct answer is A.