

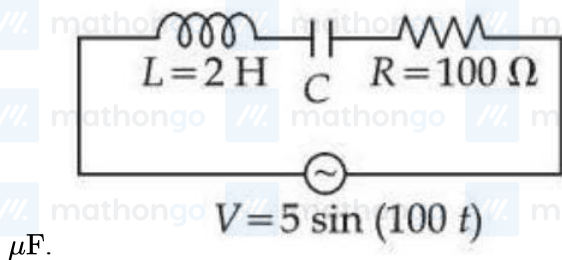
**Q1. 21 January Shift 2**

A capacitor  $C$  is first charged fully with potential difference of  $V_0$  and disconnected from the battery. The charged capacitor is connected across an inductor having inductance  $L$ . In  $t$  s 25% of the initial energy in the capacitor is transferred to the inductor. The value of  $t$  is \_\_\_\_ s.

- (1)  $\frac{\pi\sqrt{LC}}{3}$  (2)  $\frac{\pi\sqrt{LC}}{6}$  (3)  $\frac{\pi\sqrt{LC}}{2}$  (4)  $\pi\sqrt{\frac{LC}{2}}$

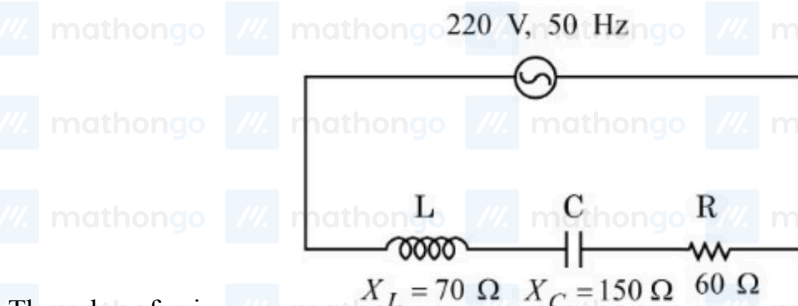
**Q2. 23 January Shift 1**

Using a variable frequency a.c. voltage source the maximum current measured in the given LCR circuit is 50 mA for  $V = 5 \sin(100t)$ . The values of  $L$  and  $R$  are shown in the figure. The capacitance of the capacitor ( $C$ ) used is \_\_\_\_  $\mu\text{F}$ .



**Q3. 24 January Shift 1**

For the series  $LCR$  circuit connected with 220 V, 50 Hz a.c source as shown in the figure, the power factor is  $\frac{\alpha}{10}$ .



The value of  $\alpha$  is \_\_\_\_.

- (1) 10 (2) 4 (3) 6 (4) 8

**Q4. 28 January Shift 1**

The electric current in the circuit is given as  $i = i_0(t/T)$ . The r.m.s current for the period  $t = 0$  to  $t = T$  is \_\_\_\_.

- (1)  $i_0$  (2)  $\frac{i_0}{\sqrt{6}}$  (3)  $\frac{i_0}{\sqrt{3}}$  (4)  $\frac{i_0}{\sqrt{2}}$

**Q5. 28 January Shift 2**

An inductor stores 16 J of magnetic field energy and dissipates 32 W of thermal energy due to its resistance when an a.c. current of 2 A (rms) and frequency 50 Hz flows through it. The ratio of inductive reactance to its resistance is \_\_\_\_\_. ( $\pi = 3.14$ )

ANSWER KEYS					
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