

# GATE - 21 EE (14)

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Question :-

For  $I = 0$ ,

$$Z = \infty \quad (1)$$

In the given circuit, the value of capacitor  $C$  that makes current  $I=0$  in  $\mu F$  is

$$Z = 10 + sL + \left( \frac{\left( sL + \frac{1}{sC} \right) \times sL}{sL + \frac{1}{sC} + sL} \right) \quad (2)$$

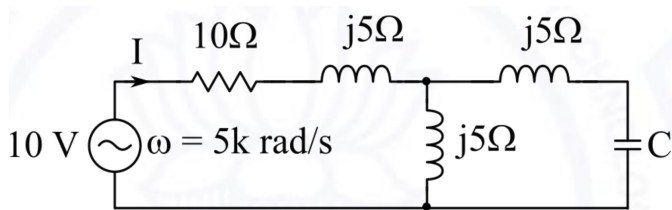
$$= 10 + sL + \frac{sL + \frac{1}{sC}}{1 + \frac{1}{s^2LC} + 1} \quad (3)$$

$$\Rightarrow 2 + \frac{1}{s^2LC} = 0 \quad (4)$$

$$C = \frac{-1}{2s^2L} \quad (5)$$

$$= \frac{1}{2(\omega L)\omega} \quad (6)$$

$$\Rightarrow C = 20\mu F \quad (7)$$



Solution:-

Symbol	Value	Description
$C$	—	capacitance
$X_L$	$\omega L = 5\Omega$	inductive reactance

TABLE I

Using Laplace transform, modified figure is

