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 :   (JEE MAIN 2021)

A $\frac{1}{2}$

B $\frac{\sqrt{3}}{2}$

C $\frac{1}{\sqrt{2}}$

D $\frac{1}{2\sqrt{2}}$

2. In given LCR circuit;

$$X_L = 10\,\Omega \;,\; X_c = 4\,\Omega \;,\; R = 6\,\Omega$$

$$\therefore \; Z = \sqrt{R^2 + (X_c - X_L)^2}$$

$$= \sqrt{36 + 36}$$

$$Z = 6\sqrt{2}\;\Omega$$

$$\therefore \text{Power factor i.e. } \cos\phi = \frac{R}{Z}$$

$$= \frac{6}{6\sqrt{2}}$$

$$\boxed{\cos\phi = \frac{1}{\sqrt{2}}}$$