

7.13 The line that draws power supply to your house from street has

- (a) zero average current.
- (b) 220 V average voltage.
- (c) voltage and current out of phase by 90° .
- (d) voltage and current possibly differing in phase ϕ such that

$$|\phi| < \frac{\pi}{2}.$$

13. AC supply are used in houses.

Option (a) So, average current in a cycle of AC is zero.
(✓)

Option (b) Power supply in houses is 230 V.
(X)

Option (c) In household circuit, L and C are connected.

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

$\therefore \cos\phi = \frac{R}{Z} \neq 0$; Here R and Z can't be equal.

$\Rightarrow \phi \neq \frac{\pi}{2}$

Option (d) As $\phi \neq \frac{\pi}{2}$; phase angle $\Rightarrow \phi$

(✓)

So, $|\phi| < \frac{\pi}{2}$