An AC source rated 100 V (rms) supplies a current of 10 A (rms) to a circuit. The average power delivered by the source

(a) must be 1000 W

(b) may be 1000 W

(c) may be greater than 1000 W

(d) may be less than 1000 W

- In the given AC source

$$\varepsilon_{rms} = 100 V, \quad I_{rms} = 10 A$$

$$\therefore P_{average} = (\varepsilon_{rms})(I_{rms}) \cos\phi$$
$$= (100)(10) \cos\phi$$
$$= 1000 \cos\phi$$

$$\left\{ \begin{array}{l} \text{As } \cos\phi \text{ can lie between } 0 \text{ & } 1 \text{ (inclusively)} \\ \quad i.e. \quad 0 \le \cos\phi \le 1 \end{array} \right.$$

$$\Rightarrow P_{average} \le 1000 W$$

It can be 1000W or less than 1000W &

Hence, option (b) and (d) are correct.