Bài 13. CÁC MẠCH ĐIỆN XOAY CHIỀU

13.1. Câu D.   **13.2.** Câu C.   **13.3.** Câu D.

13.4. Câu A.   **13.5.** Câu C.   **13.6.** Câu B.

13.7. $u = u_0 \cos\left(\omega t - \dfrac{\pi}{3}\right)$

$$i = I_0 \cos\left(\omega t - \dfrac{\pi}{3} + \dfrac{\pi}{2}\right) = I_0 \sin\left(\omega t - \dfrac{\pi}{3}\right)$$

$$Z_C = \dfrac{1}{\omega C} = \dfrac{1}{100\pi.\dfrac{2.10^{-4}}{\pi}} = 50\,\Omega$$

$$I_0 = \dfrac{U_0}{Z_C} = \dfrac{U_0}{50}$$

Từ $\;U_0 \cos\left(\omega t - \dfrac{\pi}{3}\right) = 150 \Rightarrow \cos\left(\omega t - \dfrac{\pi}{3}\right) = \dfrac{150}{U_0}$

$$I_0 \sin\left(\omega t - \dfrac{\pi}{3}\right) = 4 \Rightarrow \sin\left(\omega t - \dfrac{\pi}{3}\right) = \dfrac{200}{U_0}$$

Từ $\;\cos^2\left(\omega t - \dfrac{\pi}{3}\right) + \sin^2\left(\omega t - \dfrac{\pi}{3}\right) = 1$

$\Rightarrow U_0 = 250 \text{ V} \Rightarrow I_0 = \dfrac{U_0}{Z_C} = \dfrac{250}{50} = 5 \text{ A} \Rightarrow i = 5\cos\left(100\pi t + \dfrac{\pi}{6}\right)$ (A)

13.8. $u = U_0 \cos\left(\omega t + \dfrac{\pi}{3}\right)$

$\quad i = I_0 \cos\left(\omega t + \dfrac{\pi}{3} - \dfrac{\pi}{2}\right) = I_0 \cos\left(\omega t - \dfrac{\pi}{6}\right)$

$\quad\quad = I_0 \sin\left(\omega t + \dfrac{\pi}{3}\right)$

$\quad Z_L = L\omega = \dfrac{1}{2\pi}.100\pi = 50 \ \Omega$

$\quad U_0 \cos\left(\omega t + \dfrac{\pi}{3}\right) = 100\sqrt{2} \Rightarrow \cos\left(\omega t + \dfrac{\pi}{3}\right) = \dfrac{100\sqrt{2}}{U_0}$

$\quad i = \dfrac{U_0}{Z_L} \sin\left(\omega t + \dfrac{\pi}{3}\right) = 2 \Rightarrow \sin\left(\omega t + \dfrac{\pi}{3}\right) = \dfrac{100}{U_0}$

$\quad \cos^2\left(\omega t + \dfrac{\pi}{3}\right) + \sin^2\left(\omega t + \dfrac{\pi}{3}\right) = 1$

$\quad \Rightarrow 2.10^4 + 10^4 = U_0^2 \Rightarrow U_0 = 100\sqrt{3}$

$\quad \Rightarrow i = 2\sqrt{3} \cos\left(100\pi t - \dfrac{\pi}{6}\right)$ (A)

13.9. a) $\quad I_0 = I\sqrt{2} = 4\sqrt{2}$ A

$\quad\quad \omega = 2\pi f = 100\pi$ (rad/s)

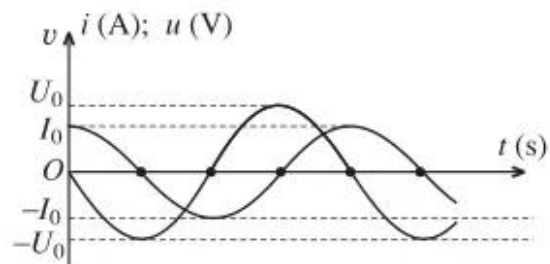$\quad$ Tại $t = 0$; $i = I_0 \cos\varphi = I_0 \Rightarrow \cos\varphi = 1 \Rightarrow \varphi = 0$

$\quad\quad i = 4\sqrt{2} \cos 100\pi t$ (A)

$\quad$ b) $\quad U_0 = U\sqrt{2} = 220\sqrt{2}$ (V)

$\quad\quad \omega = 100\pi$

$\quad u = 220\sqrt{2} \cos\left(100\pi t + \dfrac{\pi}{2}\right)$ (V)

$\quad$ c) (Xem Hình 13.1G)

Hình 13.1G

13.10. a) $Z_C = 50 \ \Omega$; $I = \dfrac{120}{50} = 2,4$ A.

$\quad\quad i = 2,4\sqrt{2} \cos\left(100\pi t + \dfrac{\pi}{2}\right)$ (A).

b) $Z_C = 5{,}0\ \Omega$; $I = 24$ A.

$$i = 24\sqrt{2}\cos\left(1000\pi t + \frac{\pi}{2}\right)\ (A).$$

13.11. a) $Z_L = 50\ \Omega$; $I = 2{,}4$ A.

$$i = 2{,}4\sqrt{2}\cos\left(100\pi t - \frac{\pi}{2}\right)\ (A).$$

b) $Z_L = 500\ \Omega$; $I = 0{,}24$ A.

$$i = 0{,}24\sqrt{2}\cos\left(1\,000\pi t - \frac{\pi}{2}\right)\ (A).$$