

-: Q₁

$$\begin{aligned} * Z &= \sqrt{R^2 + (\chi_L - \chi_C)^2} \\ &= \sqrt{225 + 400} = \sqrt{625} = 25 \Omega \end{aligned}$$

$$I_{rms} = \frac{V_{rms}}{Z} = \frac{150}{25} = 6A$$

$$\begin{aligned} * \chi_L = \chi_C & \quad \left. \begin{array}{l} \omega = 2\pi f \\ = 2\pi(60) \\ = 377 \text{ rad/s} \end{array} \right\} \\ 20 = \frac{1}{\omega C} & \\ C = \frac{1}{20 \times 377} & \end{aligned}$$

$$= 1.33 \times 10^{-4} F$$

$$* I_{rms} = \frac{V_{rms}}{R} = \frac{150}{15} = 10A$$

$$\begin{aligned} * \chi_L = \omega L &= 2\pi f L = 2\pi(50)(0.1) \quad -: Q_2 \\ &= 31.4 \Omega \end{aligned}$$

$$\begin{aligned} * Z &= \sqrt{R^2 + (\chi_L - \chi_C)^2} \\ &= \sqrt{64 + (36)} = \sqrt{100} = 10 \Omega \end{aligned}$$

$$* I = 6A$$

$$\Delta V_R = I R = 6 \times 8 = 48V$$

$$\Delta V_L = I \chi_L = 6 \times 31.4 = 188.4V$$

$$\Delta V_C = I \chi_C = 6 \times 25.4 = 152.4V$$

$$\omega = 2\pi f = 2\pi \times (50) = 314 \text{ rad/s} \quad \therefore Q_3$$

$$* \chi_L = \omega L = 314 \times 20 \times 10^{-3} = 6.28 \Omega$$

$$* I_{\text{rms}} = \frac{V_{\text{rms}}}{\chi_L} = \frac{150}{6.28} = 23.9 \text{ A}$$

$$* \omega = 2\pi (5 \times 10^3) = 31.4 \times 10^3 \text{ rad/s}$$

$$\chi_L = \omega L = 31.4 \times 10^3 \times 20 \times 10^{-3} \\ = 628 \Omega$$

$$I_{\text{rms}} = \frac{V_{\text{rms}}}{\chi_L} = \frac{150}{628} = 0.239 \text{ A}$$

$$\omega = 2\pi f = 314 \text{ rad/s}$$

$$* \chi_C = \frac{1}{\omega C} = \frac{1}{(314)(10 \times 10^{-6})} = 318.5 \Omega \quad \therefore Q_4$$

$$* V_{\text{rms}} = I_{\text{rms}} \chi_L = (0.6)(318.5) \\ = 191 \text{ V}$$

$$* Z = \sqrt{R^2 + (\chi_L - \chi_C)^2} \quad \therefore Q_5 \\ = \sqrt{1600 + 900} = \sqrt{2500} \\ = 50 \Omega$$

$$I_{\text{rms}} = \frac{V_{\text{rms}}}{Z} = \frac{150}{50} = 3 \text{ A}$$

$$P = I^2 R = 9 \times 40 = 360 \text{ W}$$

$$* V_{\text{rms}} = I_{\text{rms}} \chi_L = 3 \times 80 = 240 \text{ V}$$

$$* \omega = 2\pi f = 100\pi = 314 \text{ rad/s}$$

$$X_L = \omega L$$

$$80 = 314L$$

$$L = 0.25 \text{ H}$$

~~$$* I_{\text{rms}} = \frac{V_{\text{rms}}}{R} = \frac{150}{150}$$~~

$$* V_{\text{rms}} = 0.71 V_{\text{max}}$$

$$V_{\text{max}} = \frac{150}{0.71} = 211 \text{ V}$$

$$* \omega = 100\pi = 314 \text{ rad/s}$$

-: Q6

$$X_C = \frac{1}{\omega C} = \frac{1}{(314)(5 \times 10^{-6})} = 637 \Omega$$

$$I_{\text{max}} = \frac{V_{\text{max}}}{X_L} = \frac{80}{637} = 0.126 \text{ A}$$

* تيار الجهد المستمر :-

$$I_{\text{rms}} = 0.71 I_{\text{max}}$$

$$= 0.71 (0.126) = 0.09 \text{ A}$$

تيار الجهد المتردد :-

$$V_{\text{rms}} = 0.71 V_{\text{max}}$$

$$= 0.71 \times 80 = 56.8 \text{ V}$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{0.25 \times 16 \times 10^{-6}}} \quad \therefore Q_7$$
$$= \frac{1}{2 \times 10^{-3}} = 500 \text{ rad/s}$$

$$* \omega_0 = 100 \pi = 314 \text{ rad/s} \quad \therefore Q_8$$

$$* X_L = \omega L$$
$$50 = 314 L$$

$$L = 0.159 \text{ H.}$$

$$* C = \frac{1}{\omega^2 L}$$

$$= \frac{1}{98596 \times 0.159} = 6.3 \times 10^{-5} \text{ F}$$