

Ans. w.1.

a) Here,

$$v = 20 \sin(50t + 45)$$

$$\underline{v = 20 \sin(50t + 45)} \quad V_m = 20, \quad \omega = 50, \quad \phi = 45.$$

$$\therefore v = 20 \angle 45^\circ \text{ V (A.)}$$

b) $L = 500 \text{ mH}$

Here,

$$Z_L = j \cdot \omega \cdot L$$

$$= j \cdot 50 \cdot 500 \times 10^{-3}$$

$$[\omega = 50]$$

$$= j25 \Omega$$

(A.)

c) $C_1 = 47 \text{ nF}$

and $C_2 = 470 \text{ pF}$

Here,

$$Z_{C1} = \frac{1}{j \cdot 50 \cdot 47 \times 10^{-9}}$$

$$Z_{C2} = \frac{1}{j \cdot 50 \cdot 470 \times 10^{-12}}$$

$$= -\frac{20}{47} - j \Omega$$

$$= -\frac{2000}{47} - j \Omega$$

~~(A.)~~

Now,

$$Z_{e1} \parallel Z_{e2} = \frac{Z_{e1} \times Z_{e2}}{Z_{e1} + Z_{e2}}$$

$$= \frac{-\frac{20}{47} j \times -\frac{2000}{47} j}{-\frac{20}{47} j - \frac{2000}{47} j}$$

$$= \frac{-2000}{4747} j$$

$$= -0.4213 j \Omega$$

(Ans.)

Ans no. 2

Here,

$$V_1 = 5 \sin(10t)$$

$$= 5 \angle -90^\circ$$

$$= 5 \angle -90^\circ$$

$$V_L = 10 \cos(10t + 30)$$

$$= 10 \angle 30^\circ$$

Again,

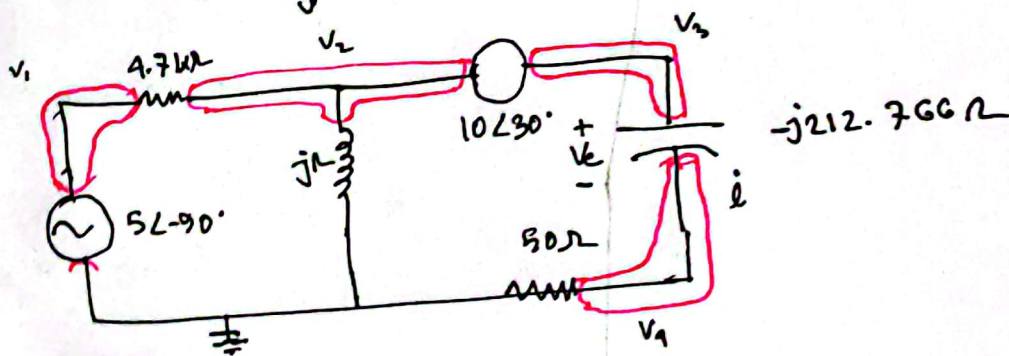
$$100 \text{ mH} = j \cdot 10 \cdot 100 \times 10^{-3}$$

$$= j \cdot 1 \Omega$$

$$470 \mu\text{F} =$$

$$\frac{1}{j \cdot 10 \cdot 470 \times 10^{-6}}$$

$$= -j 212.76595 \Omega$$



Here, we get,

$$\frac{V - 5\angle 30^\circ}{4700} + \frac{V}{j1} + \frac{V - 10\angle 30^\circ}{50 - j212.766} = 0$$

$$\Rightarrow V = 0.04494 \angle -162.904^\circ \text{ V}$$

Now,

$$i = \frac{V - 10\angle 30^\circ}{(50 - j212.766)\Omega}$$

$$= 0.04595 \angle -73.282^\circ \text{ A}$$

We know,

$$V_c = i \cdot -j212.766\Omega$$

$$= 0.04595 \angle -73.282^\circ \cdot -j212.766\Omega$$

$$= 9.777 \angle -163.28^\circ \text{ V}$$

(Ans.)