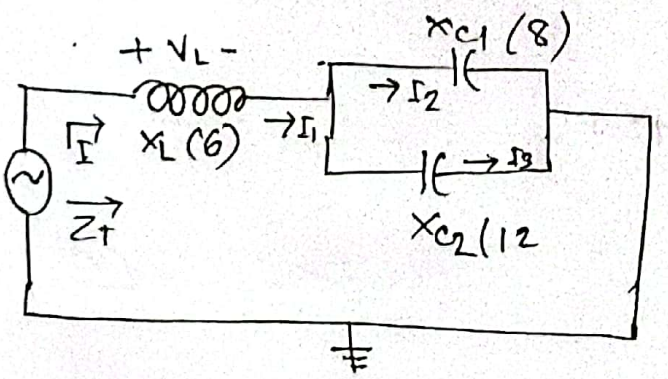
Mating



E

$E = 12\angle 0°$, $X_L = 6$, $X_{C_1} = 8\Omega$, $X_{C_2} = 12\Omega$

(a) Calculate Z_1,

(b) Determine I also draw the wave shape.

(c) Determine I_1 also draw the wave shape.

(d) Find I_2 also draw the wave shape.

(e) Find I_3 also draw the wave shape.

(f) find V_L also draw the wave shape.

(a)

~~$Z_{C_1} = 8\angle 90°$~~ , ~~$Z_L = 6\angle 90°$~~ , $Z_{C_1} = 8\angle -90°$, $Z_{C_2} = 12\angle -9$

~~$Z_{C_2} = 12\angle 90°$~~

$$Z_1 = \frac{Z_{C_1} \times Z_{C_2}}{Z_{C_1} + Z_{C_2}}$$

$$= \frac{8\angle -90° \times 12\angle -90°}{8\angle -90° + 12\angle -90°} = \frac{96\angle -180°}{20\angle -90°}$$

$Z_i = 4.8 \angle -180 + 90°$

$= 4.8 \angle -90°$

$Z_T = Z_1 + Z_L$

$= 4.8 \angle -90° + .6 \angle 90°$

$= -4.8\hat{j} + 6\hat{j}$

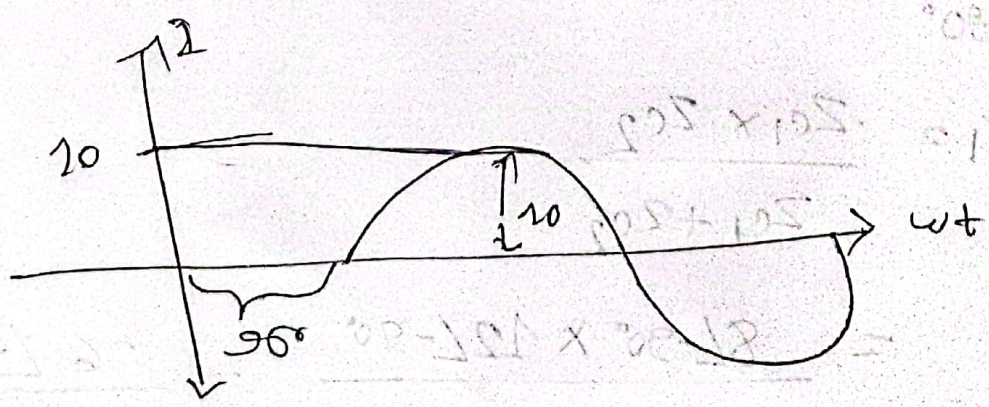
$= 1.2\hat{j}$

$= 1.2 \angle 90°$

(b) (a) $E = 12 \angle 0°$

$Z_T = 1.2 \angle 90°$

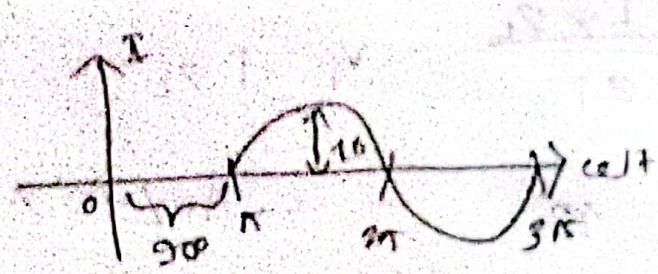
$I = \frac{E}{Z_T} = \frac{12 \angle -90°}{1.2} = 10 \angle -90°$



(c) $I_1 = \frac{I}{Z_L}$

$= \frac{12\angle 0°}{6\angle 90°}$

$= 2\angle$



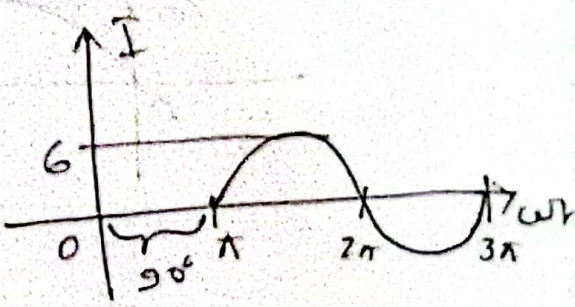
(c) $I_1 = I_{1\phi} = 10\angle -90°$

(d) $I_2 = \frac{Z_{C_2} \times I}{Z_{C_1} + Z_{C_2}}$

$= \frac{12\angle -90° \times 10\angle -90°}{8\angle -90° + 12\angle -90°}$

$= \frac{120\angle -180° + 90°}{20}$

$= 6\angle -90°$

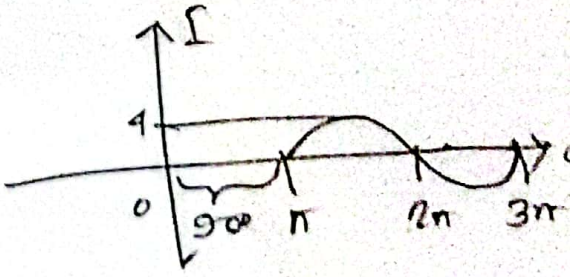


(e) $I_3 = \frac{Z_{C_1} \times I}{Z_{C_1} + Z_{C_2}}$

$= \frac{8\angle -90° \times 10\angle -90°}{20\angle -90°}$

$= \frac{80\angle -180° + 90°}{20}$

$= 4\angle -90°$



(f) $V_L = \frac{I \times Z_L}{Z_T}$

$V_L = I Z_L$

$= 10 \angle -90° \times 6 \angle 90°$

$= 60 \angle 0°$