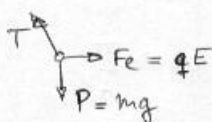


①



$$\tan 30^\circ = 0.577 = \frac{qE}{mg} \Rightarrow E = 0.577 \frac{mg}{q}$$

$$E = 0.577 \frac{0.0032 \times 9.8}{5.8 \times 10^{-6}} = 3119 \text{ V/m}$$

$$\Delta V = Ed = 3119 \times 0.05 = 156 \text{ V}$$

②

$$\mathcal{E} = 1.5 + 1.5 = 3.0 \text{ V}$$

$$I = \frac{1.5 + 1.5}{1.1 + 1.5 + 8} = 0.283 \text{ A} \quad \Delta V = 0.283 \times 8 = 2.26 \text{ V}$$

c)

$$I = \frac{1.5 - 1.5}{1.1 + 1.5} = 76.9 \text{ mA} \quad \Delta V = 1.5 + 0.0769 \times 1.5 = 1.515 \text{ V}$$

d)

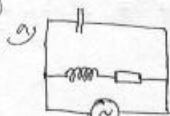
$$I_1 = I_2 + I_3$$

$$1.6 - 1.1 I_1 - 1.5 I_2 - 1.4 = 0 \Rightarrow I_2 = 2.67 \text{ A}$$

$$1.4 + 1.5 I_2 - 8 I_3 = 0 \Rightarrow I_3 = 0.1755 \text{ A}$$

$$\Rightarrow \Delta V = 1.5 + 2.67 \times 10^{-3} \times 1.5 = 1.504 \text{ V}$$

③



$$\bar{X}_C = -j\omega C = \frac{-j}{6280 \times 2 \times 10^{-6}} = -79.62 j \Omega$$

$$\bar{X}_L = j\omega L = 62.8 j \Omega$$

$$\omega = 2\pi \times 1000 = 6280 \text{ rad/s}$$

$$\bar{Z} = R + \bar{X}_L = 55 + 62.8 j = 83.5 \angle 33.5^\circ \Omega$$

$$\bar{Z}_{\text{total}} = \frac{\bar{X}_C \cdot \bar{Z}}{\bar{X}_C + \bar{Z}} = \frac{79.62 \angle -90^\circ \cdot 83.5 \angle 33.5^\circ}{-79.62 j + 55 + 62.8 j} = \frac{6648 \angle -41.2^\circ}{57.5 \angle 17^\circ} = 115.6 \angle -24.2^\circ \Omega$$

$$\bar{I} = \frac{\bar{V}}{\bar{Z}_{\text{total}}} = \frac{100 \angle 0^\circ}{115.6 \angle -24.2^\circ} = 0.865 \angle 24.2^\circ \text{ A}$$

$$\omega = 2\pi \times 1100 = 6912 \text{ rad/s}$$

$$\bar{X}_C = -72.34 j \Omega$$

$$\bar{X}_L = 69.12 j \Omega$$

$$\bar{Z} = 55 + 69.12 j = 88.3 \angle 51.5^\circ \Omega$$

$$\bar{Z}_{\text{total}} = \frac{72.34 \angle -90^\circ \cdot 88.3 \angle 51.5^\circ}{-72.34 j + 55 + 69.12 j} = \frac{6388 \angle -38.5^\circ}{55.09 \angle 3.5^\circ} = 115.9 \angle -35.1^\circ \Omega$$

$$\bar{I} = 0.862 \angle 35.1^\circ \text{ A}$$