Green University of Bangladesh

Department of Computer Science and Engineering

CT-02

Course Title: Introduction to Electrical Engineering

Course code: EEE 201

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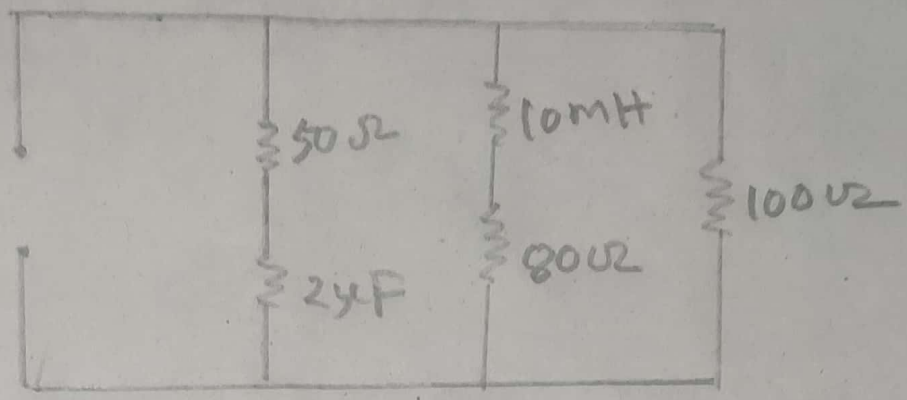
Ans to the Q.NO: 1



$$Z_1 = 50 + \frac{1}{j\omega C}$$

$$= 50 + \frac{-j}{(2\pi)(2\times10^{3})(2\times10^{-6})}$$

$$Z_1 = 50 - j39.79$$

$$Z_2 = 80 + j\omega L$$

$$= 80 + j(2\pi)(2\times10^{3})(10\times10^{-3})$$

$$= 80 + j125.66$$

$$Z_3 = 100$$

NOW,

$$\frac{1}{Z} = \frac{1}{Z_1} + \frac{1}{Z_2} + \frac{1}{Z_3}$$

$$\frac{1}{Z} = \frac{1}{100} + \frac{1}{50 - j39.79} + \frac{1}{80 + j125.66}$$

$$\frac{1}{Z} = 10^{-3}(10 + 12.24 + j9.745 + 3.605 - j5.663)$$

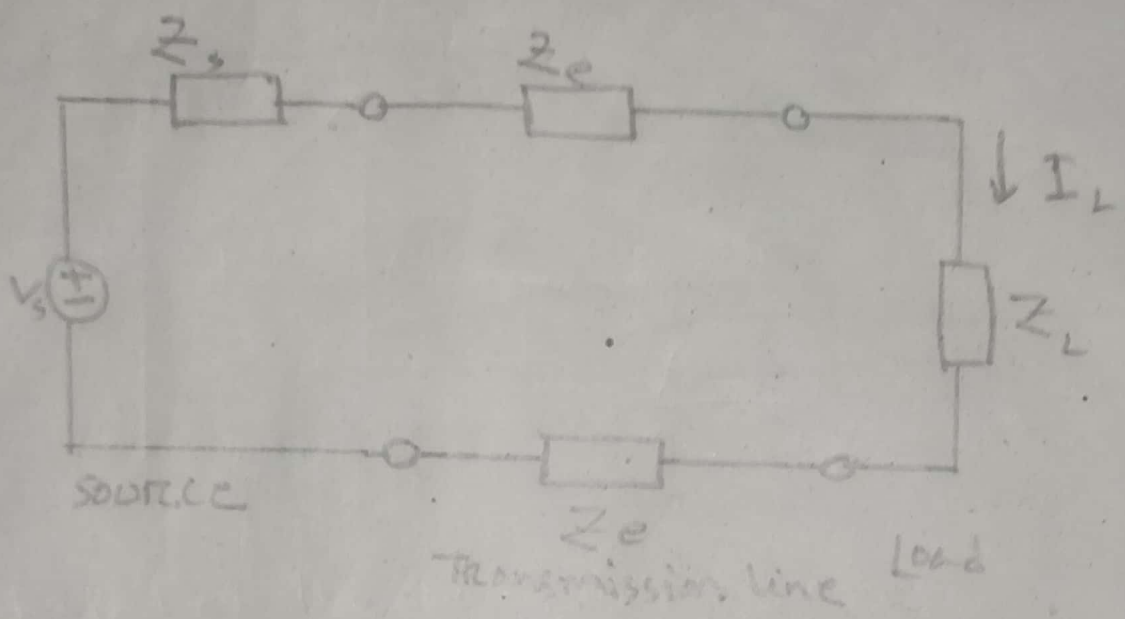
$$= (25.85 + j4.082) \times 10^{-3}$$

$$= 26.17 \times 10^{-3} \angle 8.97^\circ$$

$$\therefore Z = 38.21 \angle -8.97^\circ \Omega$$

Ans.

Ans to the Q.NO: 2



Given that,

$V_s = 1150 \cdot V$, source impedance

$Z_s = 1 + j0.5$, line impedance

$Z_L = 0.4 + j0.3$, and load impedance

$Z_L = 23.2 + j18.9$, find the load current I_L

we know,

$$Z = Z_s + 2Z_1 + Z_L$$

$$Z = (1 + 0.8 + 23.2) + j(0.5 + 0.6 + 18.9)$$

$$Z = 25 + j20$$

we know,

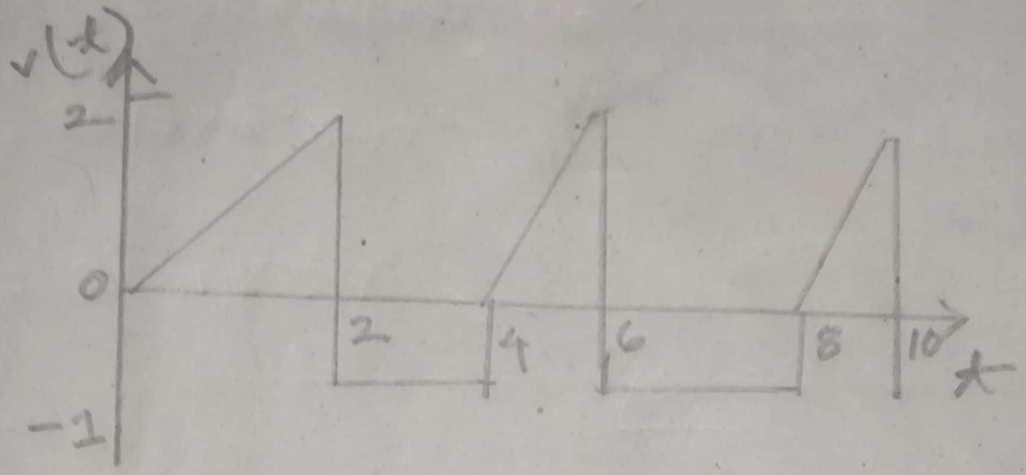
$$I_L = \frac{V_s}{Z}$$

$$= \frac{1150^\circ}{32.02\,38.66^\circ}$$

$$I_L = 3.592\,-38.66^\circ\ A$$

Ans.

Ans to the q.no: 3



the Period of the waveform is $T = 4$

now,

$$v(t) = \begin{cases} 1t, & 0 < t < 2 \\ -1t, & 2 < t < 4 \end{cases}$$

the RMS

$$I_{rms} = \sqrt{\frac{1}{T}\int_0^T v^2 dt}$$

$$= \sqrt{\frac{1}{4}\int_0^4 v^2 dt}$$

$$= \sqrt{\frac{1}{4}\left[\int_0^2 (1t)^2 dt + \int_2^4 (-1t)^2 dt\right]}$$

$$= \frac{1}{4}\left[1 \cdot \frac{x^3}{3}\right]$$

$$= \sqrt{\frac{1}{4}\left[1\left(\frac{8}{3}-0\right)+(1\times 4-1\times 2)\right]}$$

$$= \sqrt{\frac{1}{4}\left(\frac{8}{3}+2\right)}$$

$$= \sqrt{\frac{14}{12}}$$

$$= 1.080 \text{ A}$$

Ans.