

1, Find v_1 , v_2 , and v_3 by node analysis of Fig. 1. (20%)

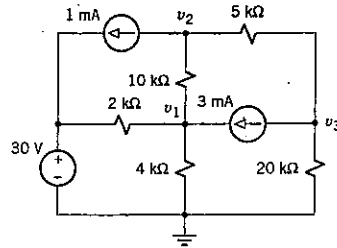


Fig. 1

- 2, Explain natural response and forced response. (10%)
- 3, Is impedance a phasor? Explain why? (10%)
- 4, What are real power and reactive power? (10%)
- 5, What are dual circuit and equivalent circuit? (10%)
- 6, What are self-inductance and mutual inductance? (10%)
- 7, What are copper loss and core loss? (10%)
- 8, Let the network in Fig. 2 have $R_1 = R_2 = 1 \text{ ohm}$, $L = 1 \text{ H}$, and $C = 1/20 \text{ F}$, Show that the input impedance is

$$Z(s) = (2s^2 + 24s + 40) / (s^2 + 4s + 20)$$
 Then find the forced response $v(t)$ when $i(t) = 10 e^{-5t} \text{ A}$ (20%)

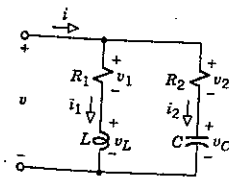


Fig. 2