

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

Mid-Semester Examination

Course No.: Phy 4241

Course Title: Physics II

Summer Semester, A.Y. 2016-2017

Time: 90 Minutes

Full Marks: 75

There are 4 (four) questions. Answer any 3 (three) questions. All questions carry equal marks. Marks in the margin indicate full marks. Programmable calculators are not allowed. Do not write on this question paper.

1. a) Find the equivalent conductance for "s" number of resistors connected in parallel. 5

- b) Find V_1 and V_2 in the Fig. 1(b) using nodal analysis. 10

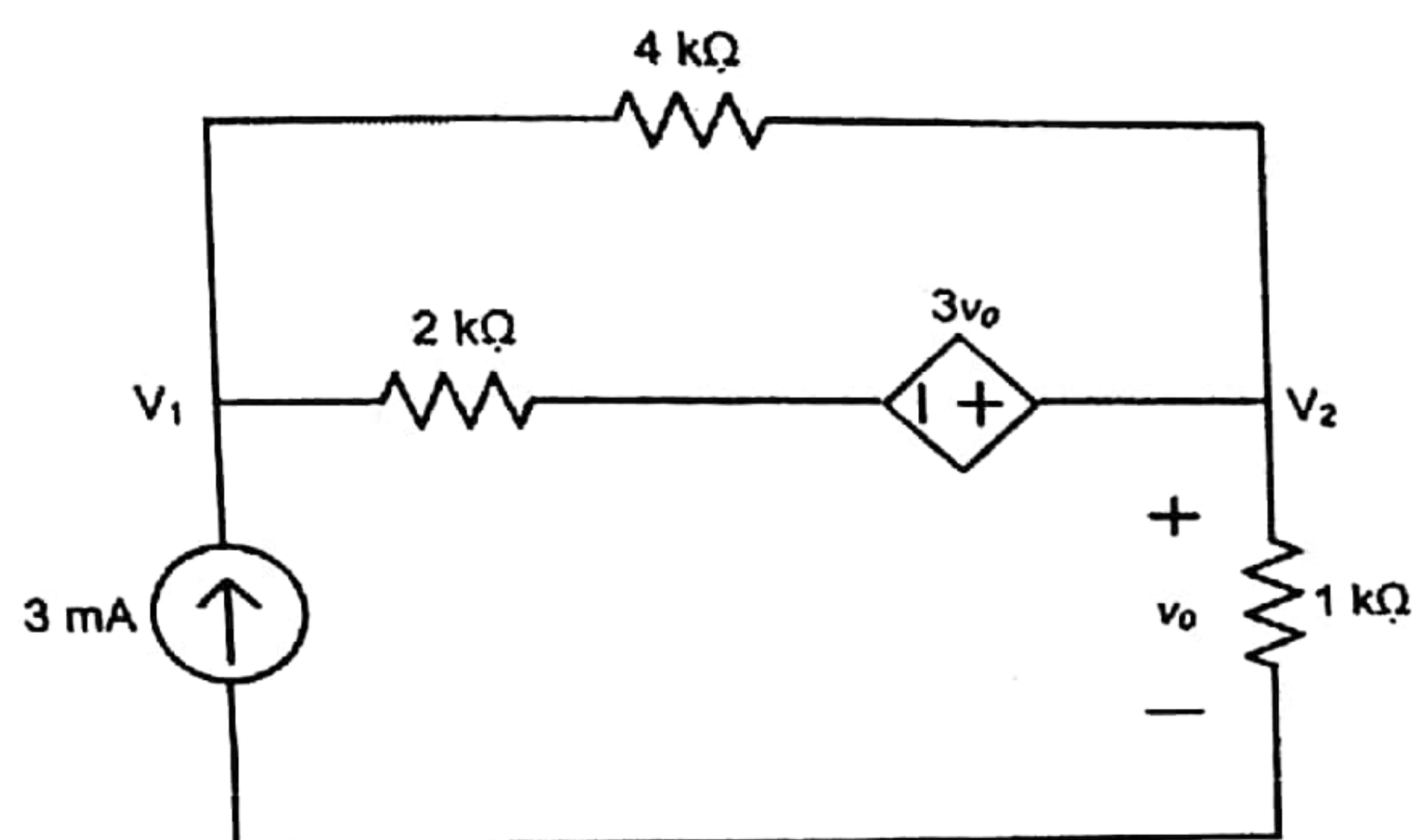


Fig. 1(b)

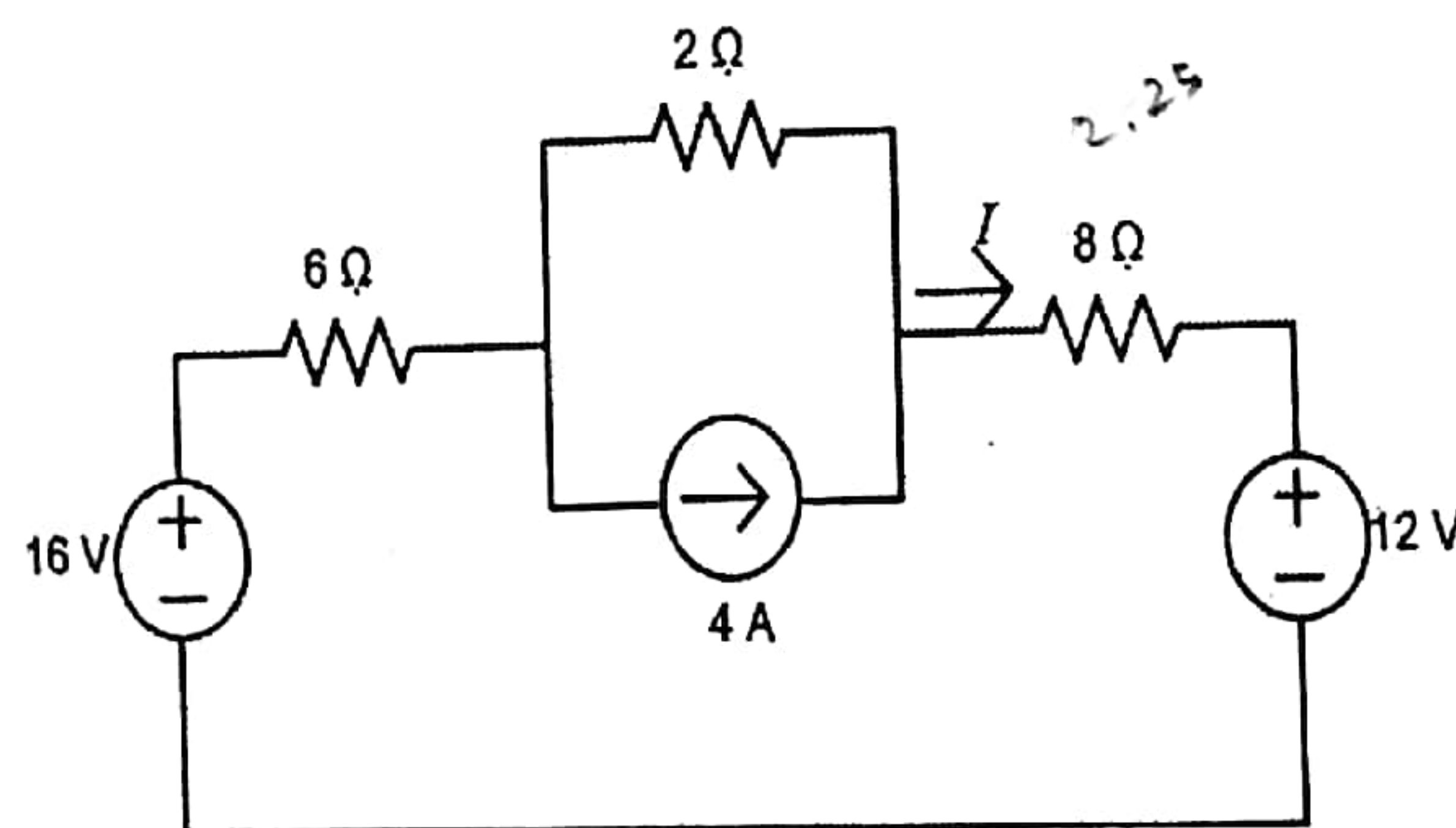


Fig. 1(c)

- c) By superposition principle find I in the circuit shown in Fig. 1(c). 10

2. a) Prove that each resistor in the Y network is the product of the resistors in the two adjacent Δ branches, divided by the sum of the three Δ resistors. 5

- b) Find V_o and I_o in the following circuit shown in Fig. 2(b). 10

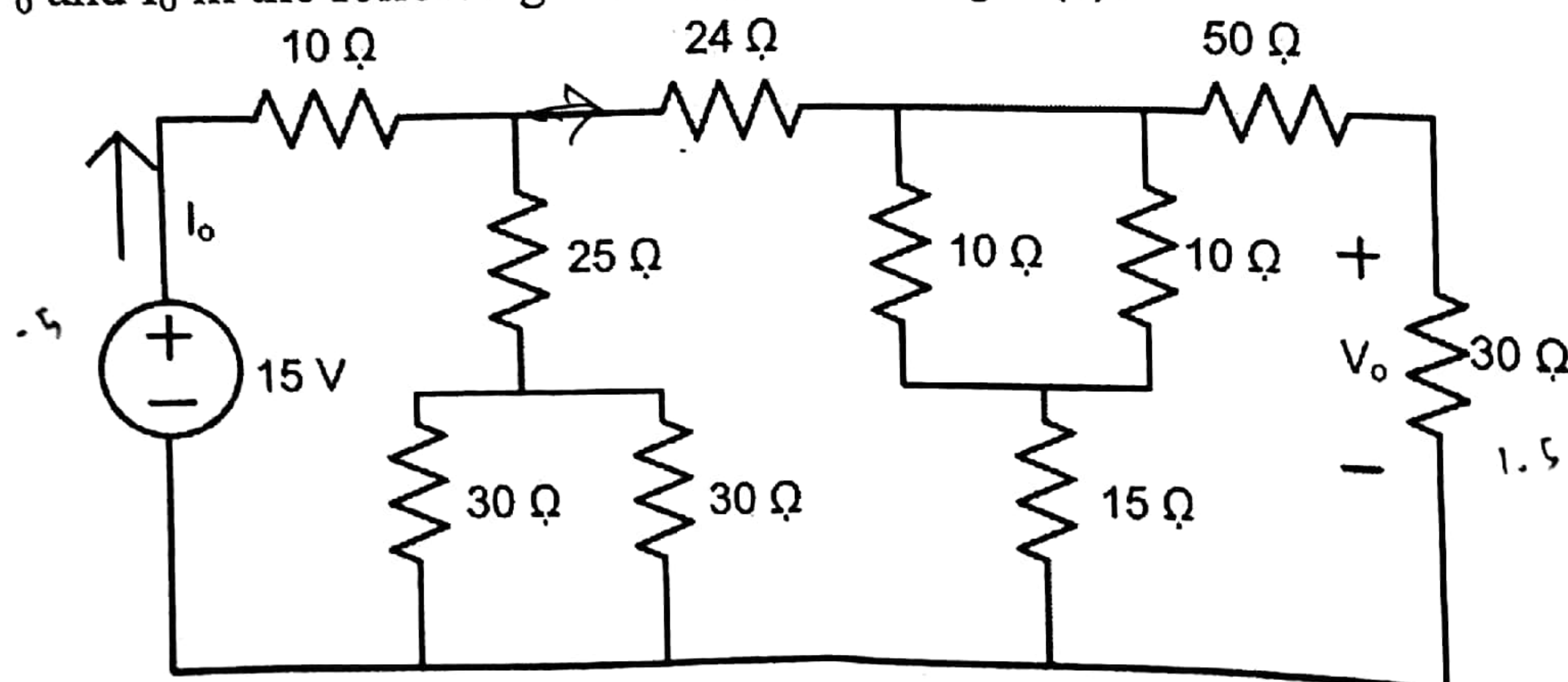


Fig. 2(b)

- c) Find the Thevenin equivalent at terminals a-b in the Fig. 2(c).

10

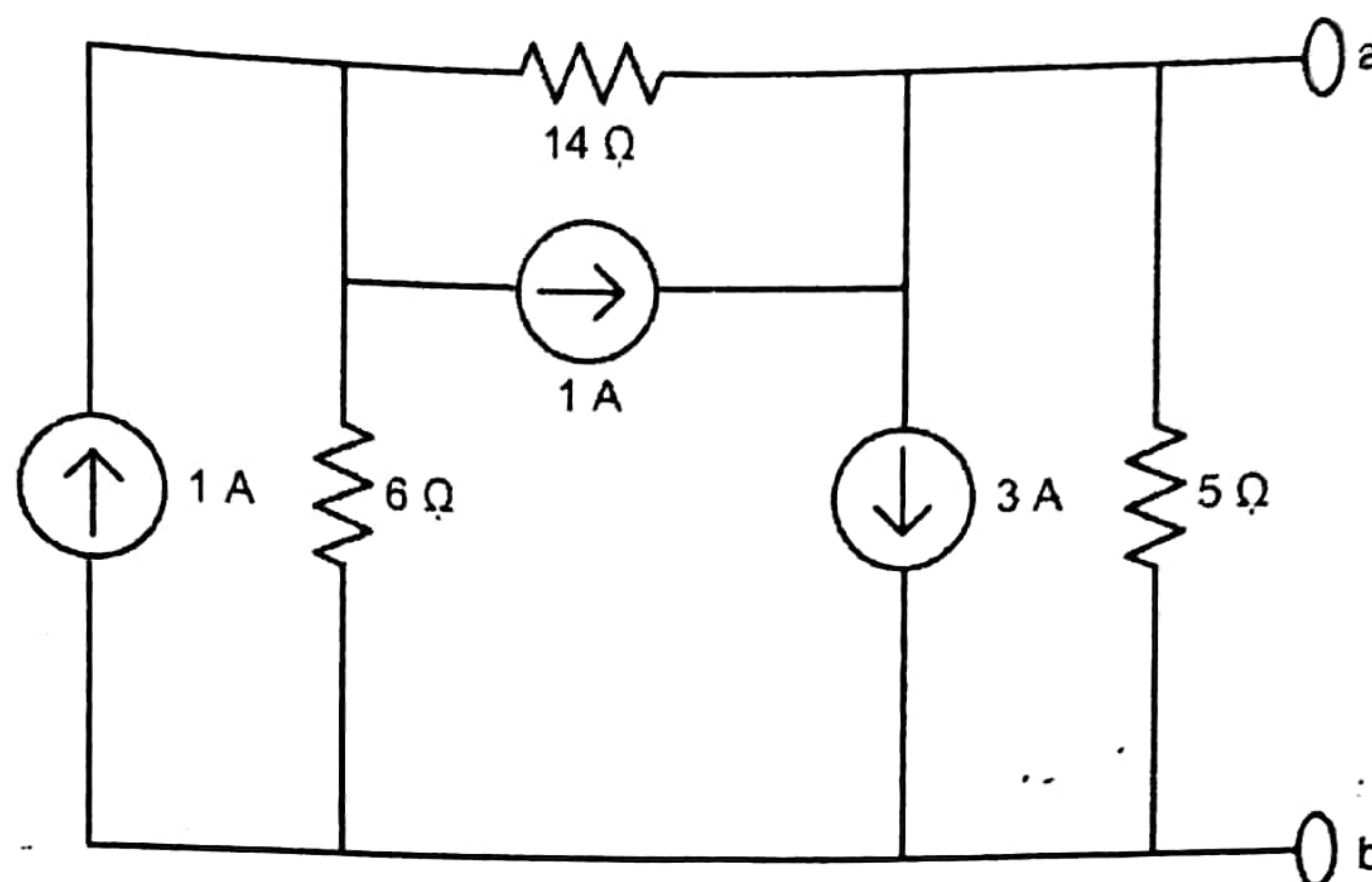


Fig. 2(c)

4, -8

3. a) Prove that maximum power transfer occurs when R_L is equal to R_{TH} and find the expression of P_{max} for maximum power transfer.

5

- b) In the circuit shown in Fig. 3(b) find R_{eq} and I_o .

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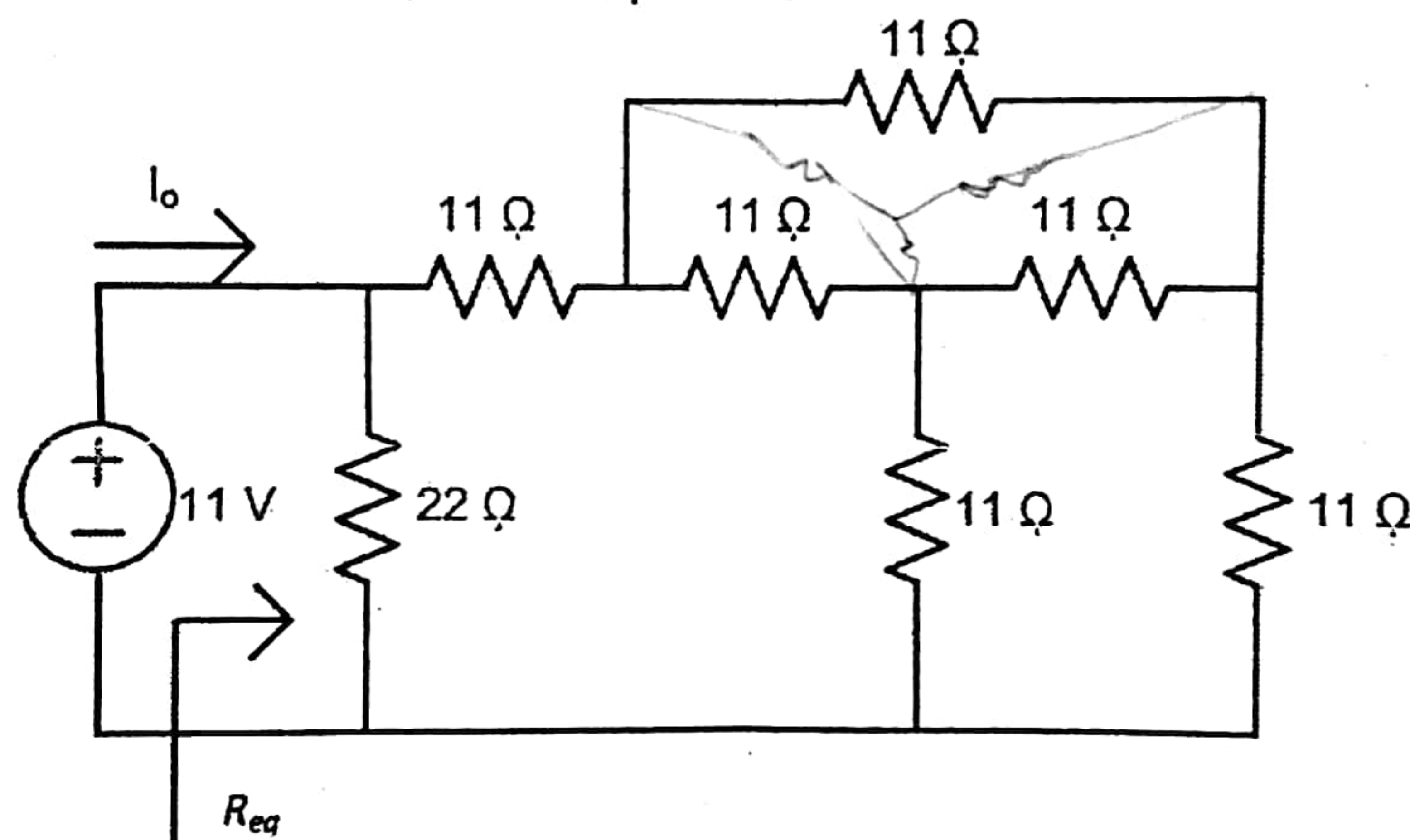


Fig. 3(b)

40"

- c) For the following circuit shown in Fig. 3(c) find I_1 to I_4 using mesh analysis.

10

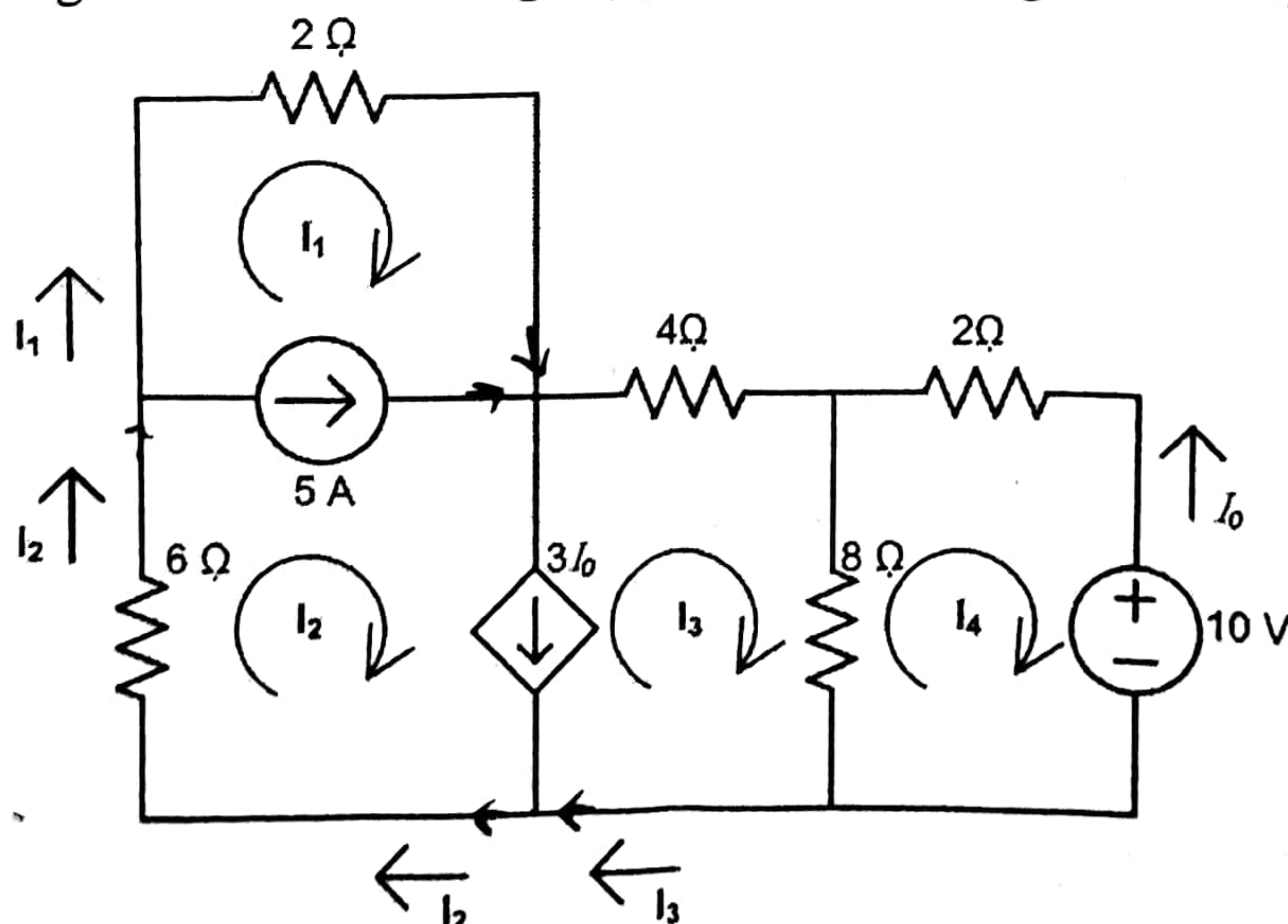


Fig. 3(c)

4. a) Find the phase angle between $i_1 = -4 \sin(377t + 25^\circ)$ and $i_2 = 5 \cos(377t - 40^\circ)$. 3+2
 State which sinusoid is leading. Show them graphically. 10
- b) Find $v(t)$ and $i(t)$ in the following circuit shown in Fig. 4(b).

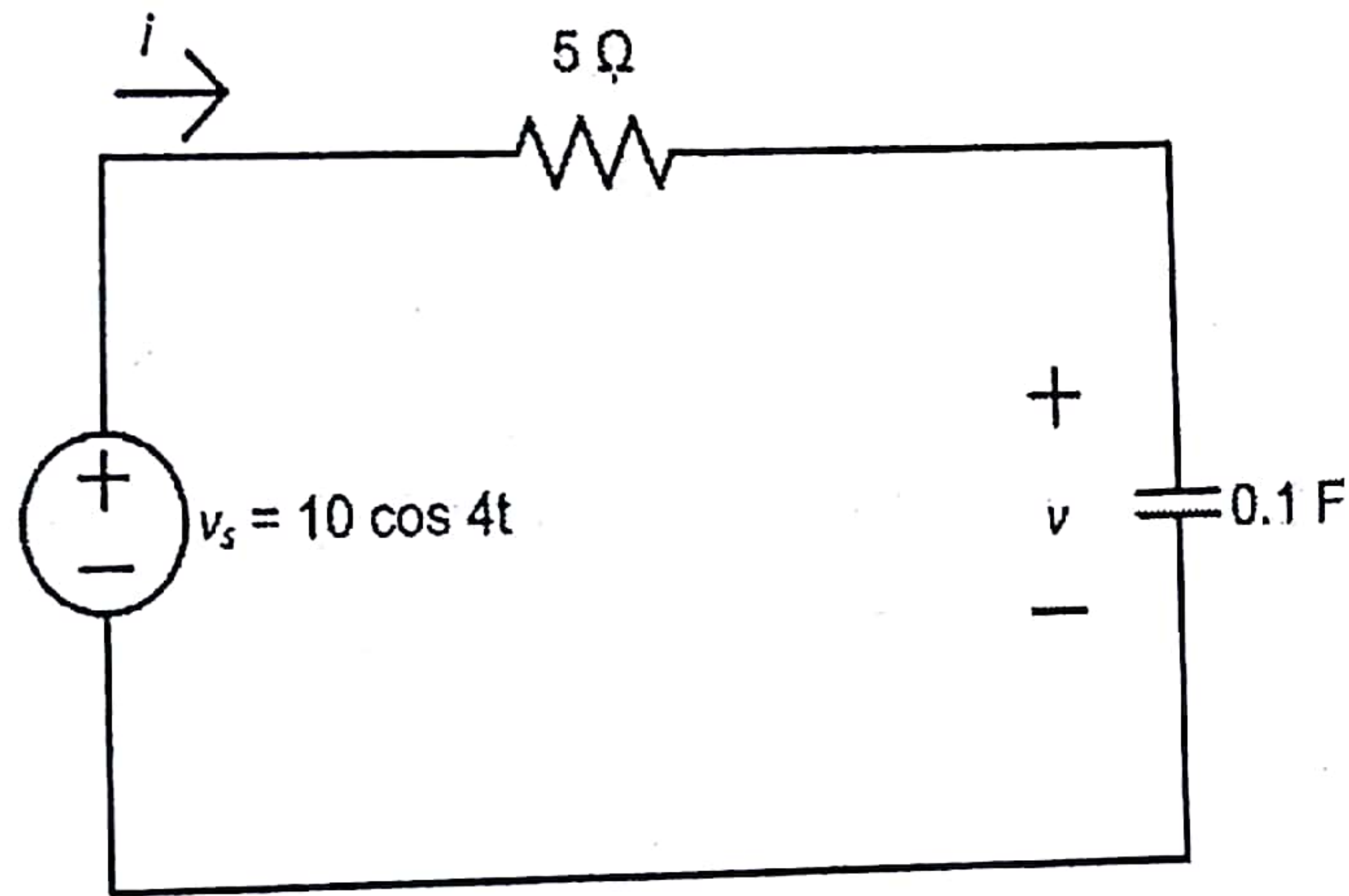


Fig. 4(b)

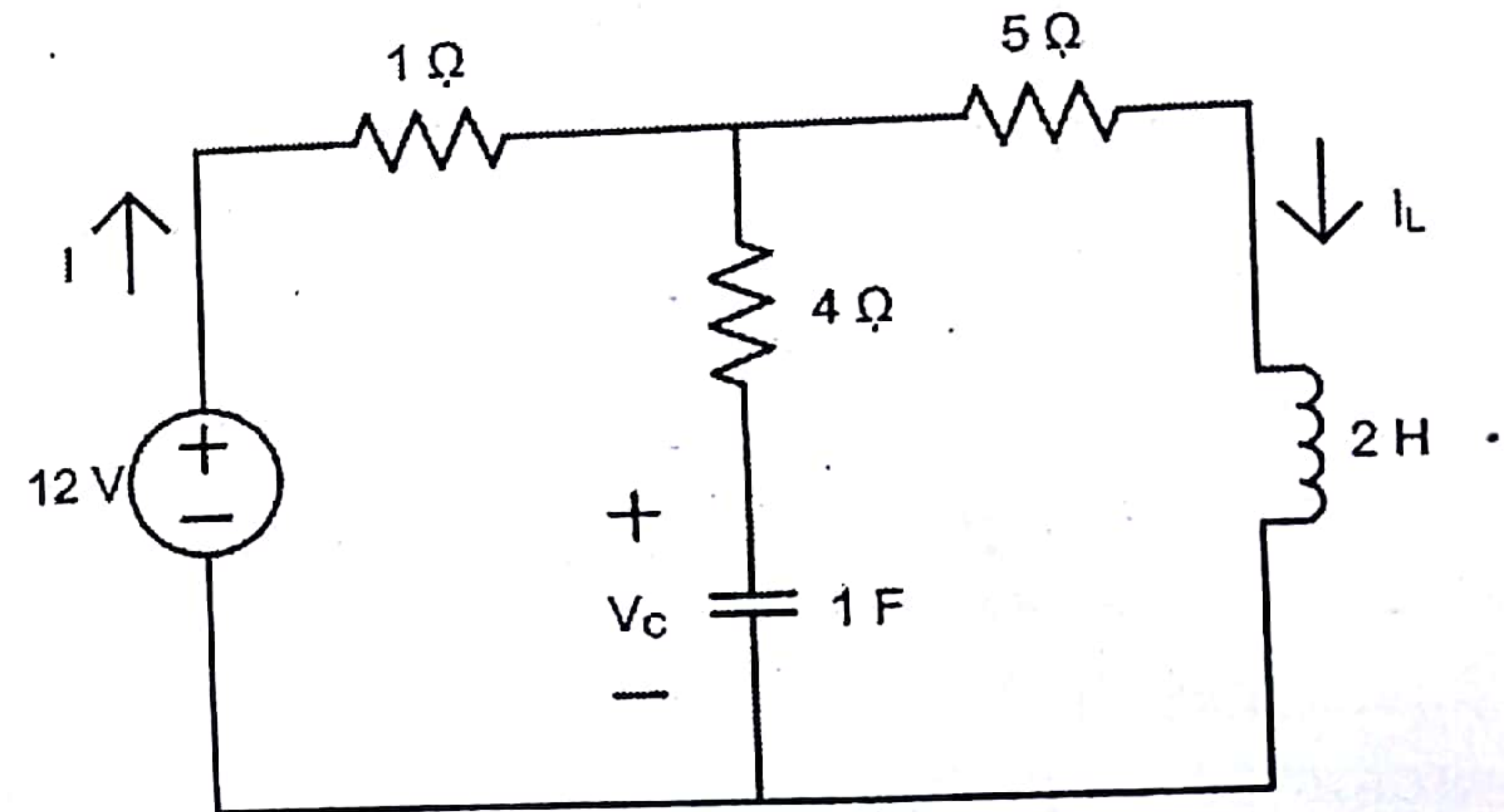


Fig 4(c)

- c) Determine I , V_C , I_L and the energy stored in the capacitor and inductor in the circuit shown in Fig. 4(c). 10