

EE 101: Electrical Sciences, Tutorial - 4
DEPARTMENT OF ELECTRONICS & ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

Name : _____ **Roll No. :** _____ **Tutorial Group :** _____
[Q1 is for pre-tutorial. Solve it in the space provided and submit at beginning of tutorial]

1. Find the Thevenin's equivalent circuit for the network shown in Fig. 1.

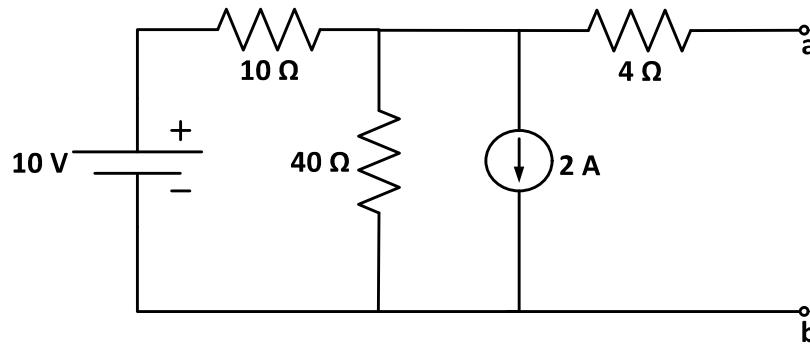


Fig. 1

2. An electric arc welder is a low-voltage, high-current power source designed to supply enough electric current to sustain an arc capable of welding metal with its high temperature (**Fig. 2**). It is possible to derive a Norton equivalent circuit for an arc welder based on empirical measurements of voltage and current. Take for example the measurements under loaded and no-load conditions: shown in **Fig. 2a** and **Fig. 2b** respectively. Based on these measurements, draw a Norton equivalent circuit for the arc welder.

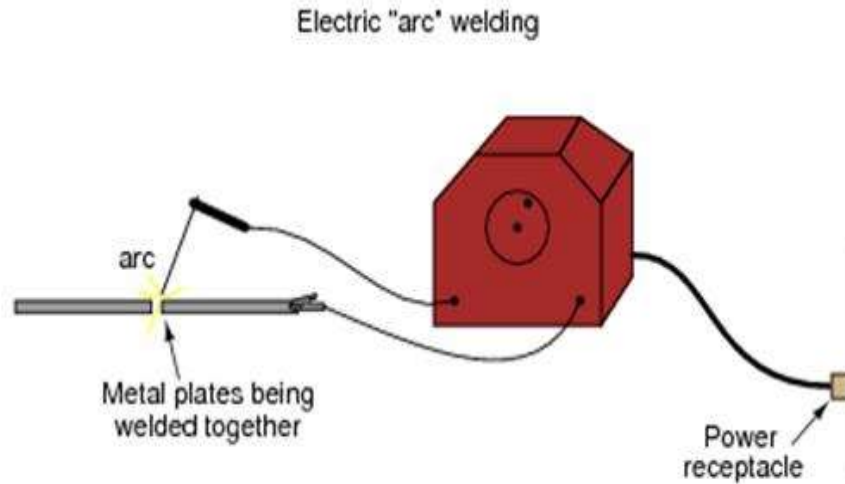


Fig. 2 The arc welding setup.

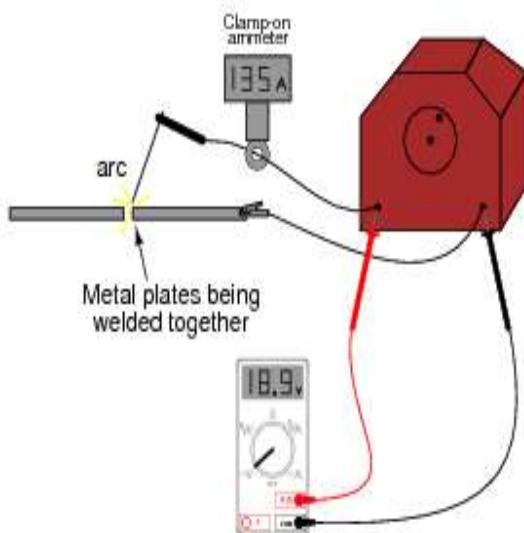


Fig. 2a Reading under loaded condition

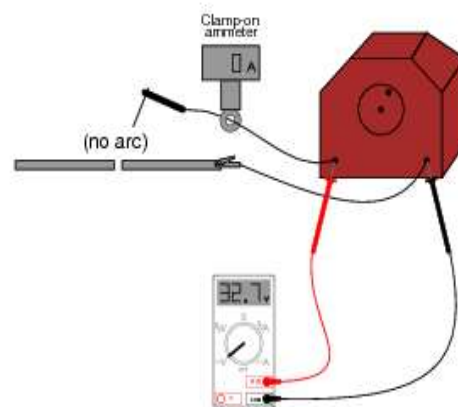


Fig. 2b Reading under no load condition

3. The switch in Fig. 3 has been open for a long time and closes at $t = 0$. Find $i_L(t)$ for all time t .

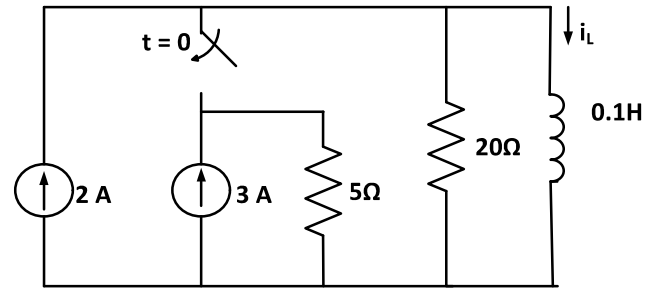


Fig. 3

4. For the circuit shown in Fig. 4, the switch has been open for a long time before it closes at $t = 0$. Find $i_L(t)$ for $t > 0$.

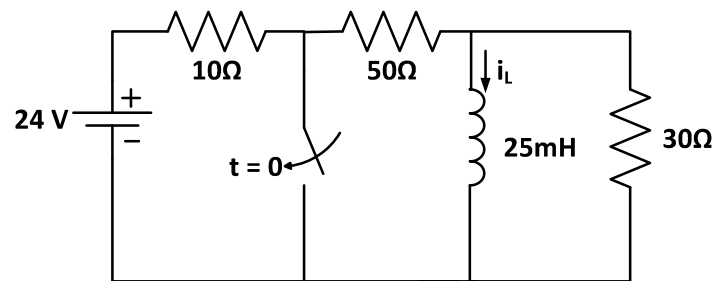


Fig. 4

5. Construct a 16×1 with two 8×1 and one 2×1 multiplexers. Use block diagrams.
6. Implement a full adder with two 4×1 multiplexers.