

1. Solve the following simultaneous equations for i_1 , i_2 , and i_3 :

$$(-4i_1 + 3i_2) + (3i_2 - i_1 + 6i_3) - 2 = 0$$

$$i_2 + 4(3i_1 + i_3) - 2i_1 = 0$$

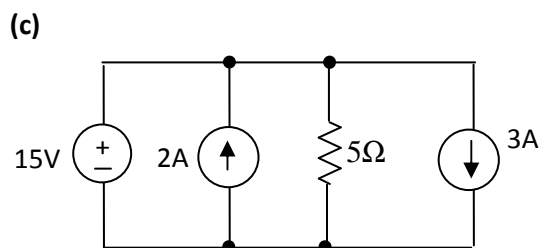
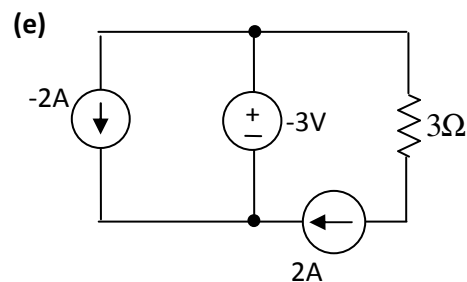
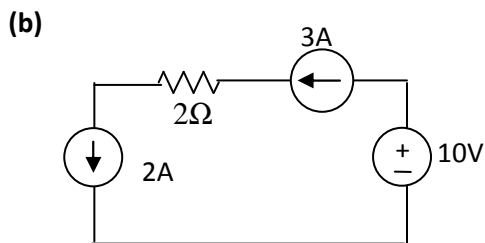
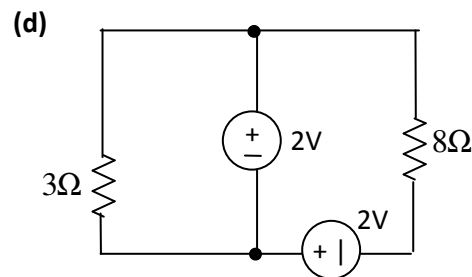
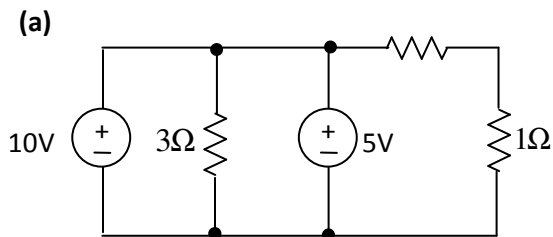
$$5i_1 - 1 - i_3 = 0$$

2. Perform the following calculations. Write the answers with appropriate prefixes (such as μ , m, k etc.) for engineering units:

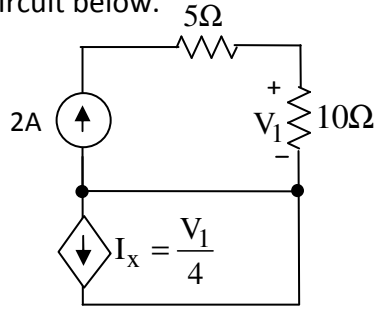
a) $P = 7.2 \text{ MA} \times 6 \text{ mV}$ (Note: $V \cdot A = W$)

b) $R = 4.5 \mu\Omega + 1600 \text{ n}\Omega$

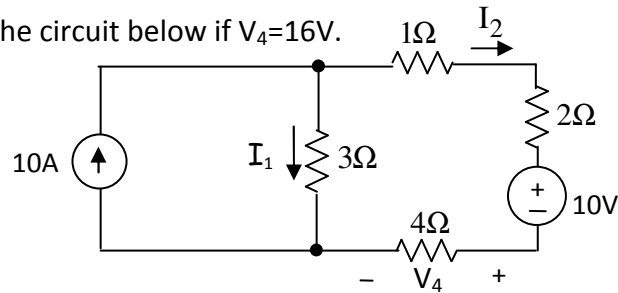
3. Determine whether each of the following circuits is valid or invalid.



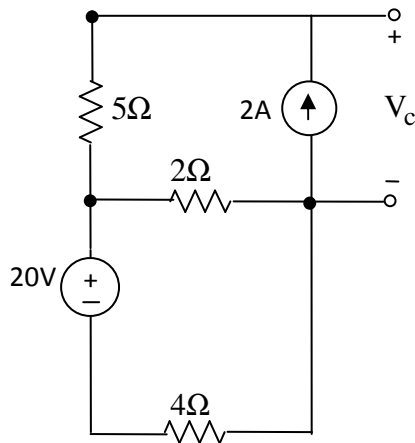
4. Find I_x in the circuit below.



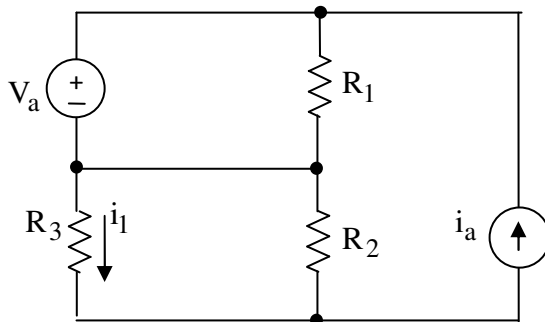
5. Find I_1 in the circuit below if $V_4 = 16V$.



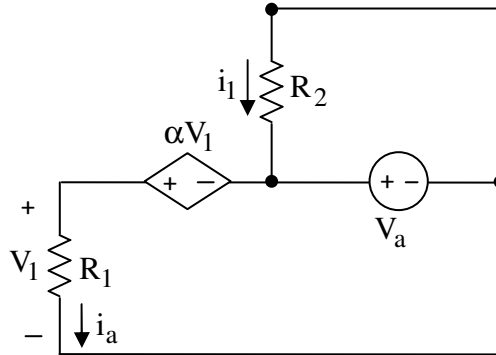
6. Use Kirchoff's laws and Ohm's Law to find the value of V_c .



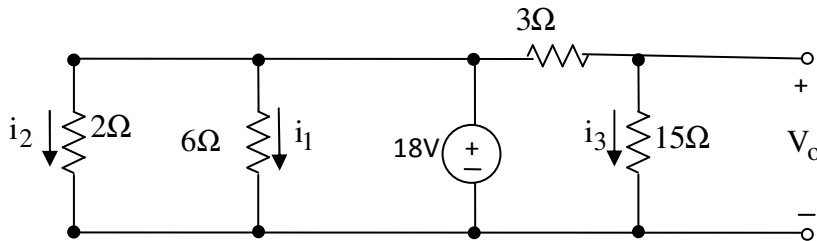
7. Use Kirchoff's laws and Ohm's Law to find the expression for i_1 . The expression can contain no other parameters than V_a , i_a , R_1 , R_2 , and/or R_3 .



8. Use Kirchoff's laws and Ohm's Law to find the expression for i_1 . The expression can contain no other parameters than V_a , α , R_1 , and/or R_2 . (Hint: Eliminate V_1 from the expression)



9. (a) Find i_1 , i_2 , i_3 , and v_o .
 (b) Find the power dissipated in the 24Ω resistor and the power supply.



10. Find i_1 , i_2 , i_3 , and v_o .

