

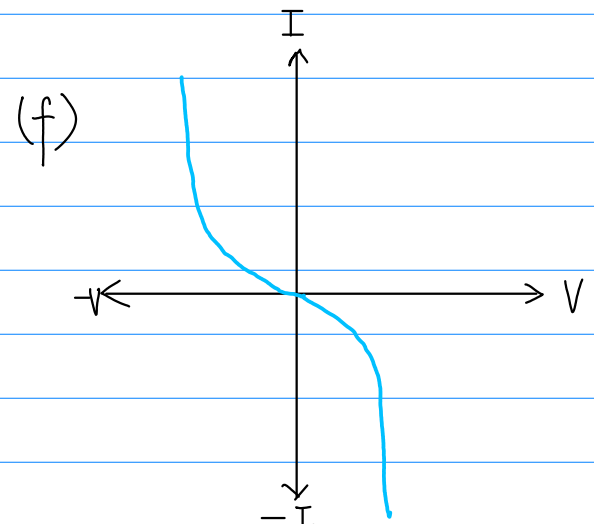
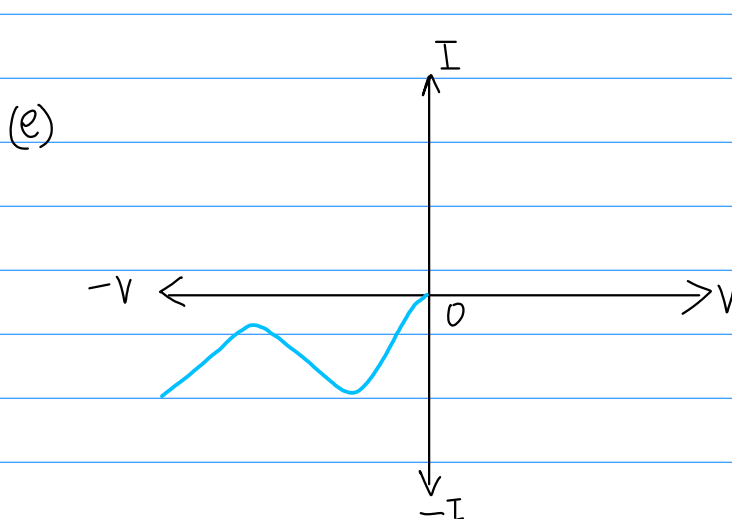
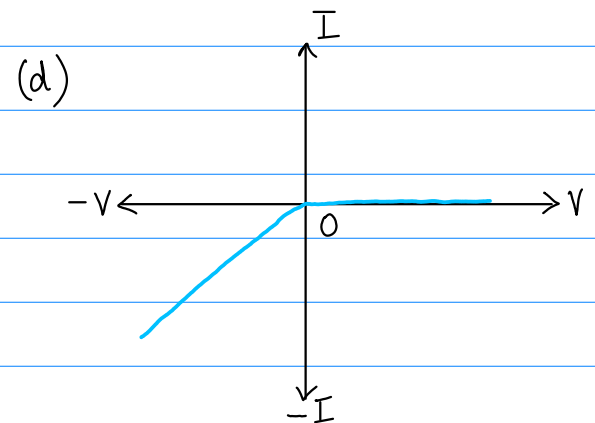
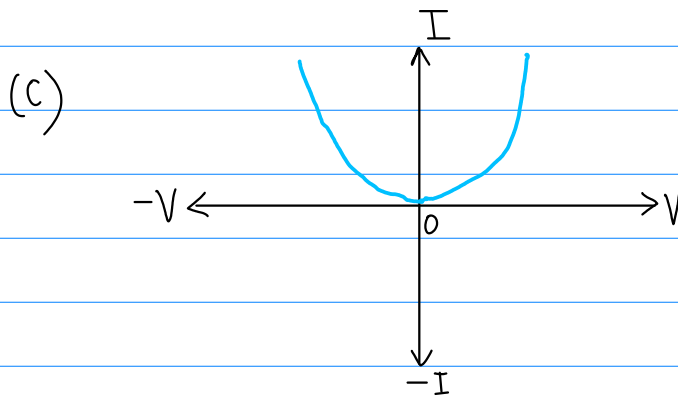
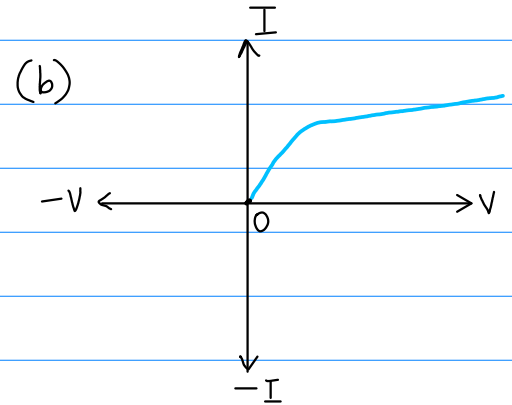
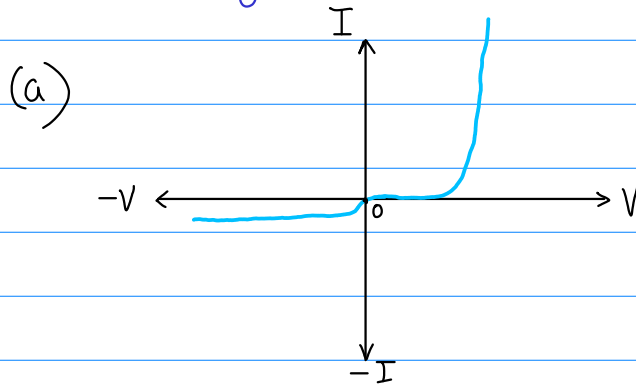
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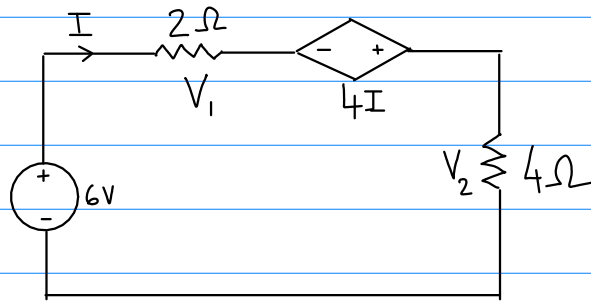
Assignment - 01

(Submission due : 22 Sep 2023)

Q 1. The current-voltage characteristics of a circuit element is given below. Identify whether it is Active or Passive element.



Q2. Apply Kirchhoff's voltage law (KVL) to find the values of current I and voltage drops V_1 and V_2 in the ckt. below.



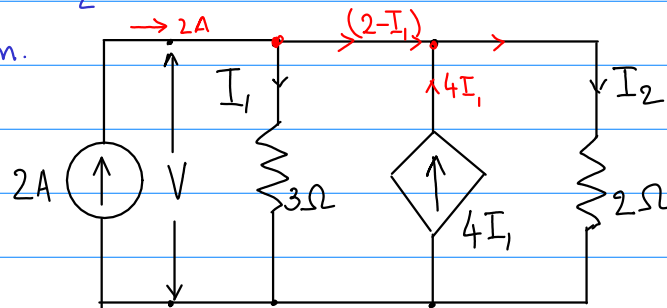
$$6V = I(2\Omega) - 4I + I(4\Omega)$$

$$I = 3A$$

$$V_1 = 6V$$

$$V_2 = 12V$$

Q3. Apply Kirchhoff's current law (KCL) to find the values of current I_1 and I_2 in the ckt. below. Comment on the direction of current shown.

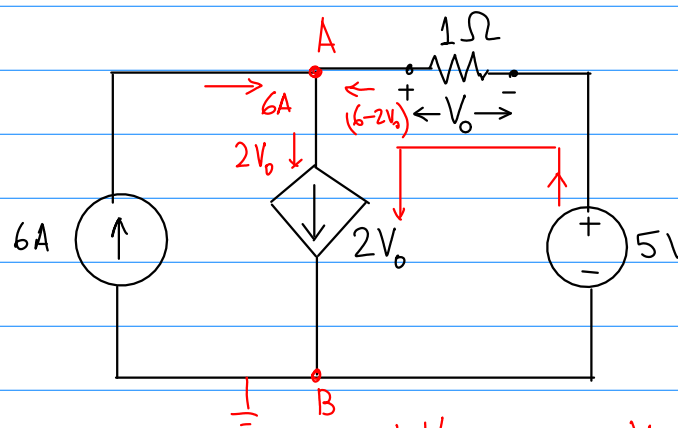


$$I_2 = 2 - I_1 + 4I_1$$

$$I_1 = \frac{V}{3\Omega}$$

$$I_2 = \frac{V}{2\Omega}$$

Q4. Apply KCL to find the value of V_o in the ckt. shown below



$$V_{AB} = 5 + V_o$$

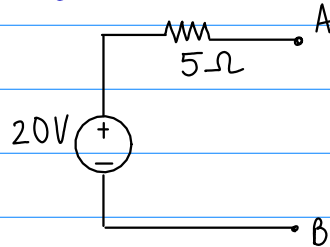
KCL at the junction 'A'

$$6 - 2V_o + \frac{V_o}{1\Omega} = 0$$

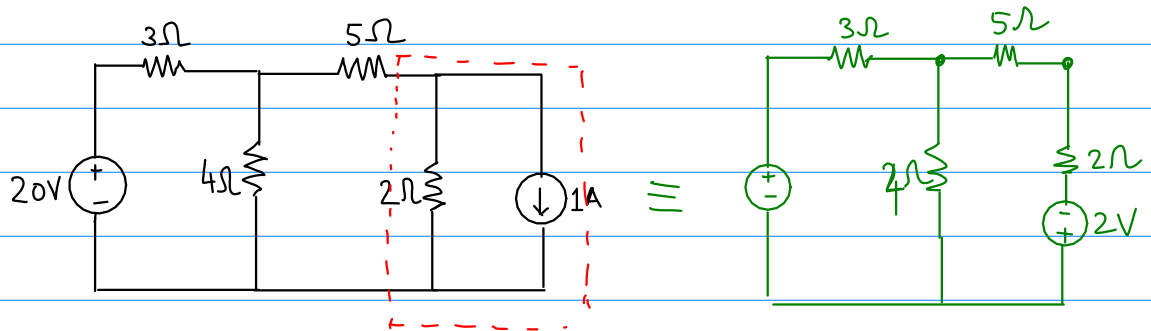
$$V_o = 6V$$

Let's assume $V_B = 0V$

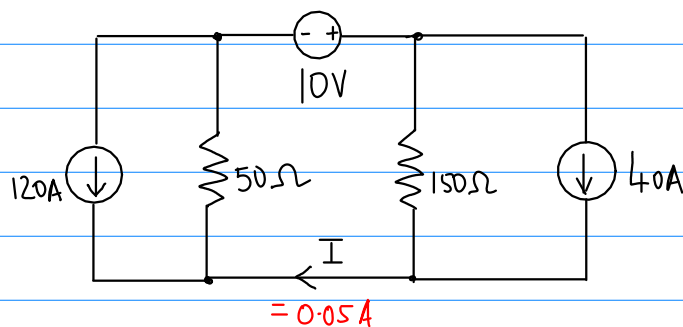
Q5. Convert a given voltage source into equivalent current source.



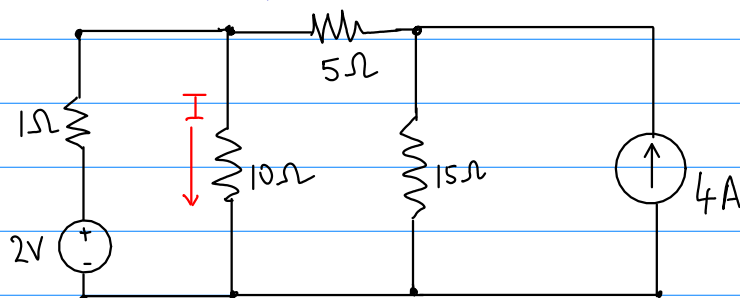
Q6. Calculate the direction and magnitude of current flowing through 5Ω resistor. [Hint: You may convert one source to other.]



Q7. Use superposition theorem to determine the current I shown in the ckt. below.



Q8. Calculate the total power delivered to the 10Ω resistor in the ckt. Use superposition theorem.



$$P_{10\Omega} = I^2 (10\Omega)$$