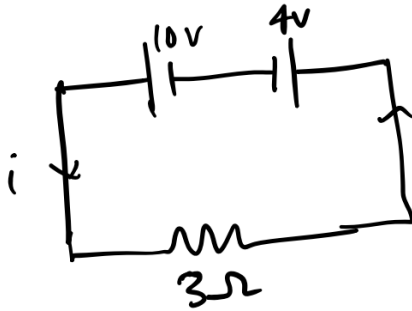


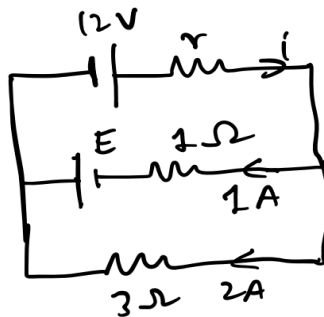
Discussion 2

Q1. In the circuit shown in the figure, find

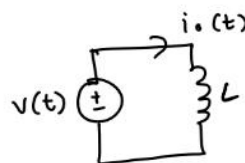
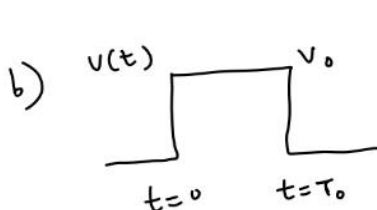
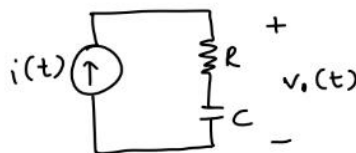
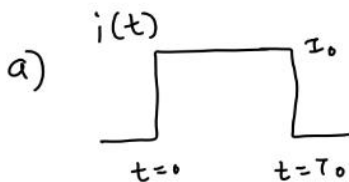


- The power supplied by 10V battery
- The power consumed by 4V battery
- The power dissipated in 3 Ω resistance

Q2. In the circuit shown in the figure, a 12 V battery with unknown internal resistance r is connected to another battery with unknown emf E and internal resistance 1Ω and to a resistance of 3Ω carrying a current of 2 A. The current through the unknown emf E is 1 A in the direction shown. Find the unknown current i , internal resistance r , and the emf E . Also, find the power delivered by the 12 V battery and the power dissipated in 3Ω resistor.



Q3. Find $v_o(t)$ for part a) and current $i_o(t)$ flowing through the circuit for part b).



Q4. The rated values of two bulbs are (P_1, V) and (P_2, V) . Find the actual power consumed by both of them if they are connected in (a) series (b) parallel and V potential difference is applied across both of them.

Q5. Two temperature-dependent resistors are given by $R_1(T) = R_{10}(1 + \alpha_1 T)$ and $R_2(T) = R_{20}(1 + \alpha_2 T)$, where R_{10} , R_{20} are the resistances at zero temperature and α_1 and α_2 are temperature coefficients. Find the temperature coefficient of the compound resistor when these two resistors are connected in 1) series 2) parallel.

Q6. Assume a capacitor is initially charged to V_0 . At $t=0$, it is connected to an uncharged capacitor of similar capacitance (Figure a) via a switch of zero resistance. Find

1) Final the potential across the two capacitors after the switch turns on.

2) Initial and final energy. What is the energy lost in the process?

