HW 1

EE40

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Posted Monday 1/30/2012

Due Monday 2/6/2012

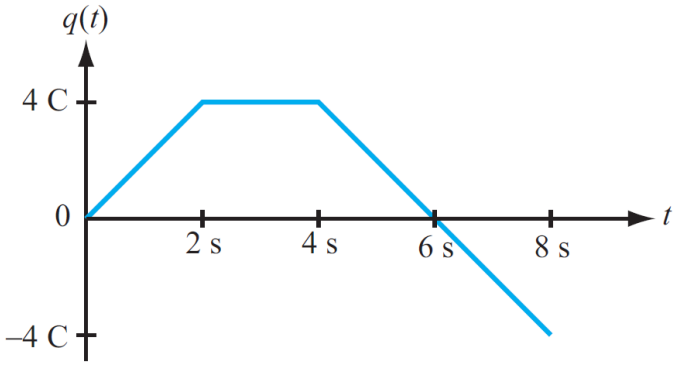
1. A steady flow resulted in 3×10^{15} electrons entering a device in 0.1 ms. What is the current?

2. Determine the current i(t) flowing through a certain device if the cumulative charge that has flowed through it up to time t is given by

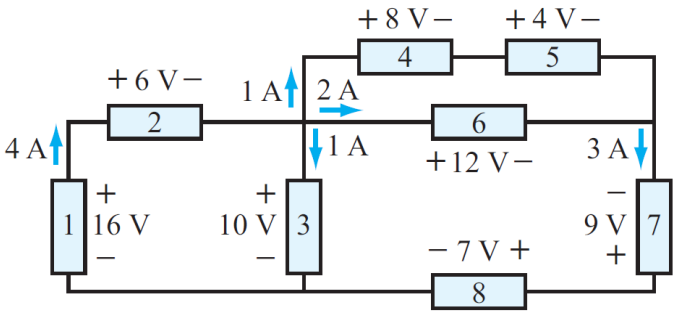
(a) q(t) = 3.6t [mC]
(b) q(t) = 5sin(377t) [mC]
(c) q(t) = $0.3[1-e^{-0.4t}]$ [pC]
(d) q(t) = 0.2t sin(120πt) [nC]

3. The plot below displays the cumulative amount of charge q(t) that has entered a certain device up to time t. What is the current at

(a) t = 1 s
(b) t = 3 s
(c) t = 6 s



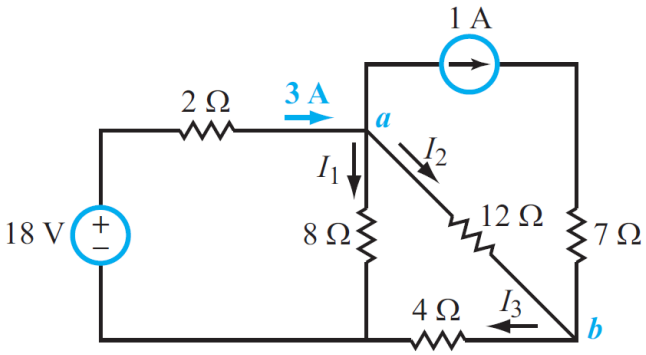
4. For each of the eight devices in the circuit below, determine whether the device is a supplier or a recipient of power and how much power it is supplying or receiving.



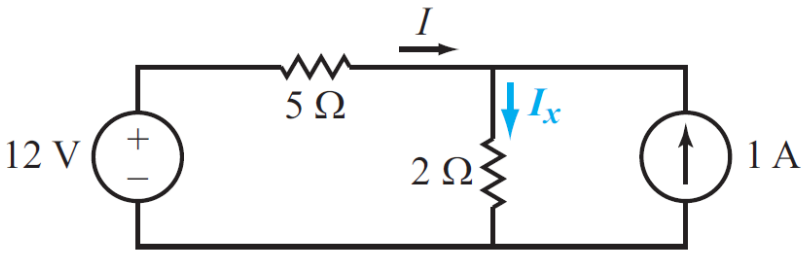
Please reproduce and fill in the following table after showing your work:

Device	Supplier or Recipient?	Power [W]
1		
2		
3		
4		
5		
6		
7		
8		

5. Determine currents I1, I2 and I3 in the circuit below.



6. Determine I_x in the circuit below. Apply KCL once (and provide the equation). Apply KVL once (and provide a second equation). Then provide a solution for I_x.



7. Determine currents I1, I2, I3 and I4 in the circuit below. Again, write KCL and KVL equations, then solve them for the unknown variables.