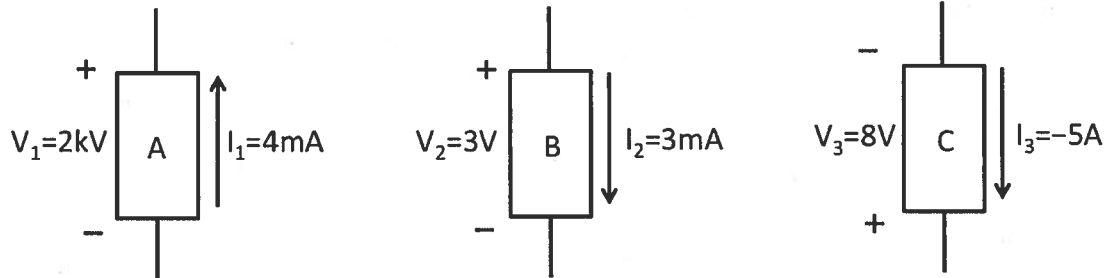


NAME _____ McGill ID# _____

READ each question carefully. Do your work independently. SHOW ALL YOUR WORK. Give units on your answers (where appropriate).

Consider the circuit diagrams below. Answer the questions.



- 1) What is the power delivered (or absorbed) by circuit element A ? [1pt]
- 2) What is the power delivered (or absorbed) by circuit element B ? [1pt]
- 3) What is the power delivered (or absorbed) by circuit element C ? [1pt]

1) $P_1 = i_1 V_1 = 8W$ delivered by A [1]

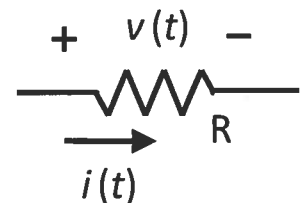
2) $P_2 = i_2 V_2 = 9mW$ absorbed by B [1]

3) $P_3 = i_3 V_3 = -40W$ delivered by C [1]
or 40W absorbed by C

Consider the resistor R with voltage $v(t)$ and current $i(t)$ defined as shown.

- 4) Write Ohm's law for the resistor R . [1pt]

- 5) The voltage $v(t) = 10V \cos(2\pi t)$, with the time t given in seconds. The resistance $R = 1k\Omega$. How much energy does the resistor absorb (or deliver) over the time interval from $t = 0s$ to $t = 1s$? [1pt]



4) $v = i R$ [1]

5) $P_{abs} = i v = \frac{v^2}{R} = \frac{(10V \cos(2\pi t))^2}{1k\Omega} = 100mW \cos^2(2\pi t)$

$$U_{abs} = \int_0^1 100mW \cos^2(2\pi t) dt = \int_0^1 100mW \cdot \frac{1}{2} [1 + \cos(4\pi t)] dt$$

$$= \frac{1}{2} \cdot 100mW \left[t + \frac{1}{4\pi} \sin(4\pi t) \right]_{t=0}^1 = 50mJ \text{ [1]}$$

(absorbed)

