1.

Determine the current flowing through an element if the charge flow is given by

(a) $q(t) = (3t + 8)$ mC

(b) $q(t) = (8t^2 + 4t - 2)$ C

(c) $q(t) = (3e^{-t} - 5e^{-2t})$ nC

2.

Find the charge $q(t)$ flowing through a device if the current is:

(a) $i(t) = 3$ A, $q(0) = 1$ C

(b) $i(t) = (2t + 5)$ mA, $q(0) = 0$

3.

The charge entering the positive terminal of an element is

$$q = 5 \sin 4\pi t \text{ mC}$$

while the voltage across the element (plus to minus) is

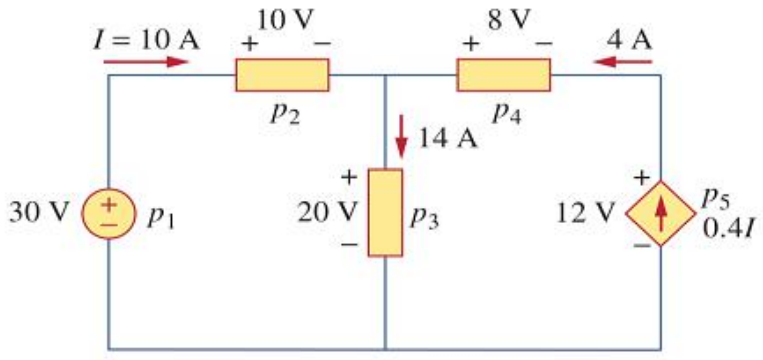
$$v = 3 \cos 4\pi t \text{ V}$$

(a) Find the power delivered to the element at $t = 0.3$ s.

(b) Calculate the energy delivered to the element between 0 and 0.6 s.

4.

Find the power absorbed by each of the elements in Fig. 3.




5.

Two electric circuits, represented by boxes A and B, are connected as shown in Fig. P1.14. The reference direction for the current $i$ in the interconnection and the reference polarity for the voltage $v$ across the interconnection are as shown in the figure. For each

of the following sets of numerical values, calculate the power in the interconnection and state whether the power is flowing from A to B or vice versa.

a) $i = 10$ A, $v = 125$ V

b) $i = 5$ A, $v = -240$ V

c) $i = -12$ A, $v = 480$ V

d) $i = -25$ A, $v = -660$ V

**Figure P1.14**