VE215
Assignment #1
Fall 2016

Problem 1

Determine the total charge flowing into an element for $0 < t < 2$ s when the current entering its positive terminal is $i(t) = e^{-2t}$ mA.

Problem 2

The voltage v across a device is v(t) = 5 cos 2t V and the current I pass through it i(t) = $10(1 - e^{-0.5t})$ A

Calculate:

(a) the total charge in the device at t = 1 s

(b) the power consumed by the device at t = 1 s.

Problem 3

Find the power absorbed by each of the elements in Fig.1

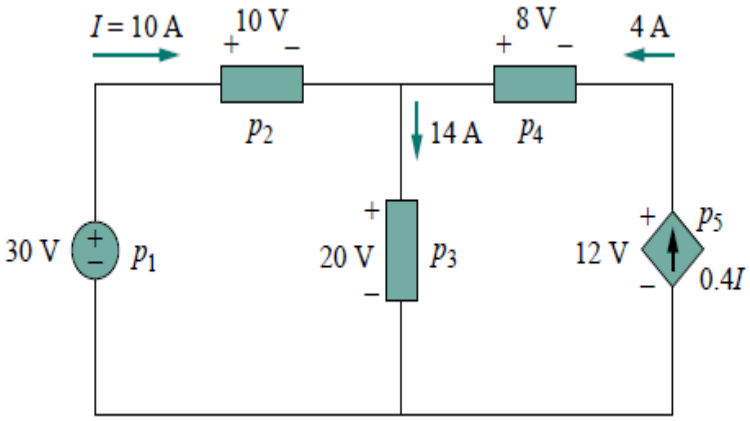

Figure 1

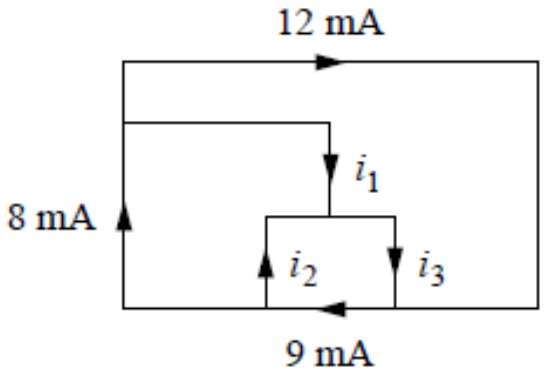

Figure 2

Problem 4

A battery may be rated in ampere-hours (Ah). An lead-acid battery is rated at 160 Ah.

(a) What is the maximum current it can supply for 40 h?

(b) How many days will it last if it is discharged at 1 mA?

Problem 5

An electric stove with four burners and an oven is used in preparing a meal as follows.

Burner 1: 20 minutes Burner 2: 40 minutes

Burner 3: 15 minutes Burner 4: 45 minutes
Oven: 30 minutes
If each burner is rated at 1.2 kW and the oven at 1.8 kW, and electricity costs 12 cents per kWh, calculate the cost of electricity used in preparing the meal.

Problem 6

Use KCL to obtain currents i1, i2, and i3 in the circuit shown in Fig. 2.

Problem 7

Determine v1 through v4 in the circuit in Fig. 3.

Problem 8

Determine i1, i2, v1, and v2 in the ladder network in Fig. 4. Calculate the power dissipated in the 2Ω resistor.

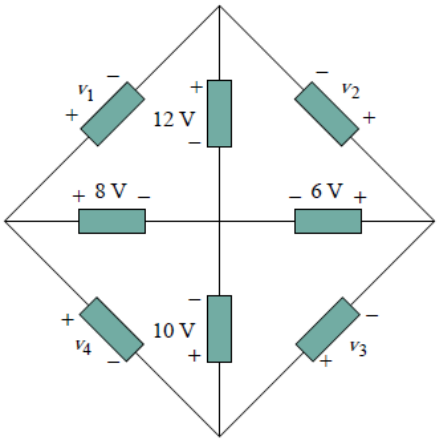

Figure 3

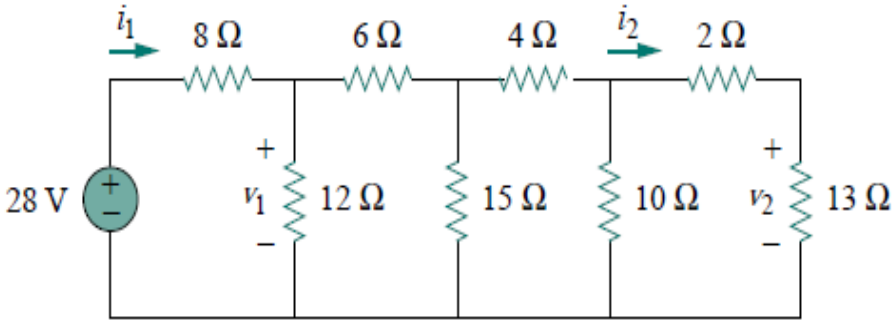

Figure 4

Problem 9

The lightbulb in Fig. 5 is rated 120 V, 0.75 A. Calculate Vs to make the lightbulb operate at the rated conditions.

Problem 10

Calculate Io in the circuit of Fig. 6.

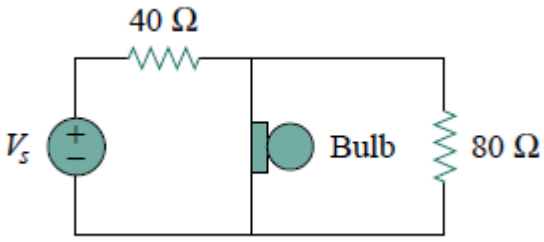

Figure 5

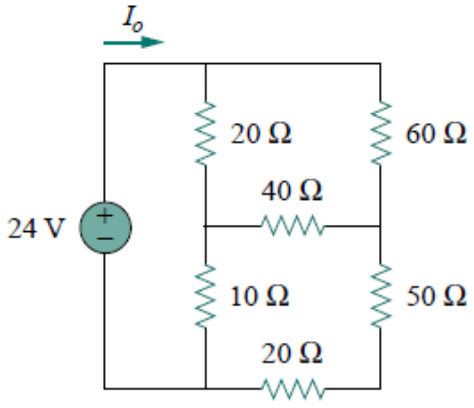

Figure 6