ECE 300
Short Test #1
Spring 2004

Name Solutions.
Print (last, first)

AM

Each problem counts 10%. Do your work on the exam sheet.

(1) Given the circuit in Figure 1.

(a) How much power is supplied by the 30 V source?
(b) How much power is supplied by the 10 V source?
(c) How much power do the two resistors in the circuit absorb?

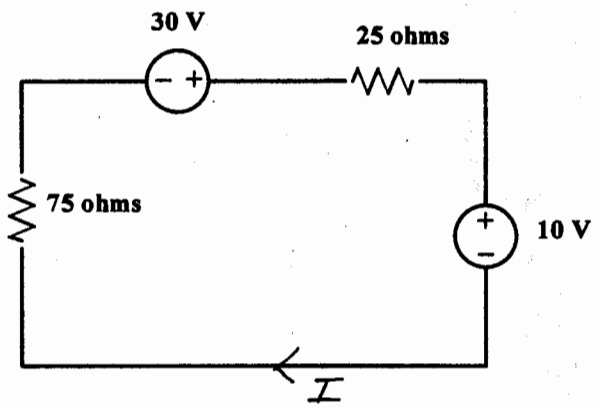


Figure 1: Circuit for problem 1.

$$I = \frac{30 - 10}{75 + 25} = 0.2\ A.$$

Power supplied by the 30V source $= VI = 30 \times 0.2 = 6W$

Power supplied by the 10V source $= -10 \times .2 = -2W$

$+2W$ absorbed

The two resistors absorb

$$75 \times (0.2)^2 + 25 \times (0.2)^2$$

$$= 4W.$$

(2) An ohmmeter is connected to terminals A-B in the circuit below. What value of resistance will the meter read in ohms?

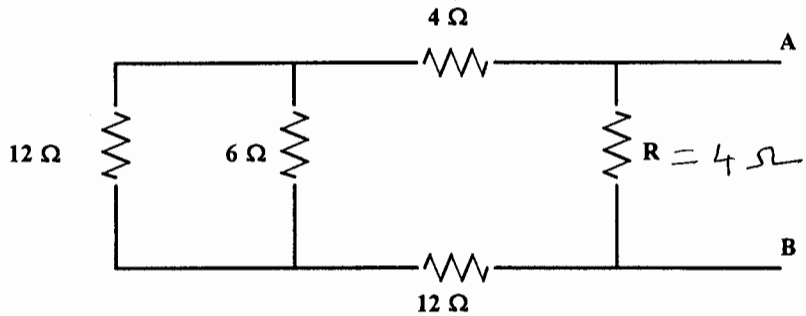
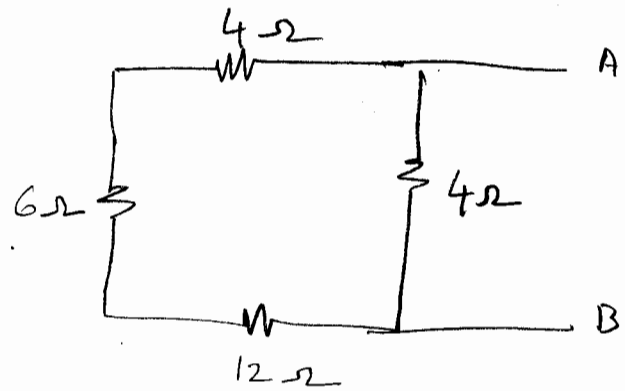
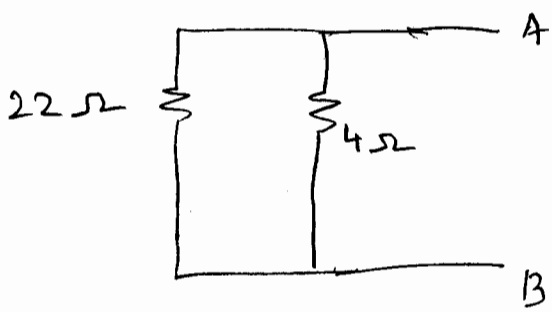


Figure 2: Circuit for problem 2.

$12\,\Omega \parallel 6\,\Omega = 4\,\Omega$



$4 + 6 + 12 = 22\,\Omega$



$22\,\Omega \parallel 4\,\Omega = 3.38\,\Omega$

$R_{AB} = 3.38\,\Omega$

(3) Find the value of R in the circuit below.

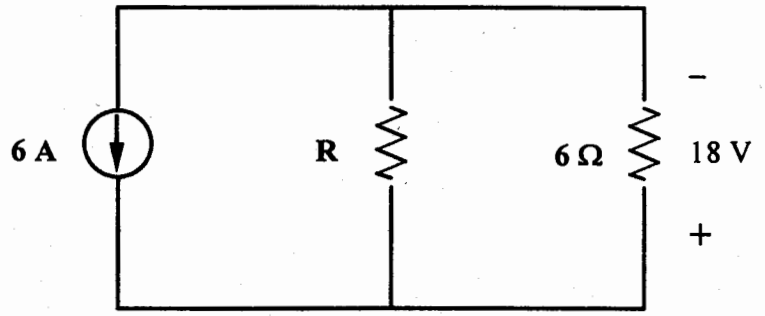


Figure 3: Circuit for problem 3.

The current through the 6Ω resistor will be

$$I = \frac{18\,V}{6\,\Omega} = 3\,A$$

This means the 6 A of current is split 3 A and 3 A in the two branches.

Since the currents in the two branches are equal the resistances must be equal

hence $R = 6\,\Omega$