

Name: _____ (please print)

Signature: _____

ECE 2300 – Quiz #3
February 22, 2012

**Keep this quiz closed and
face up until you are told to
begin.**

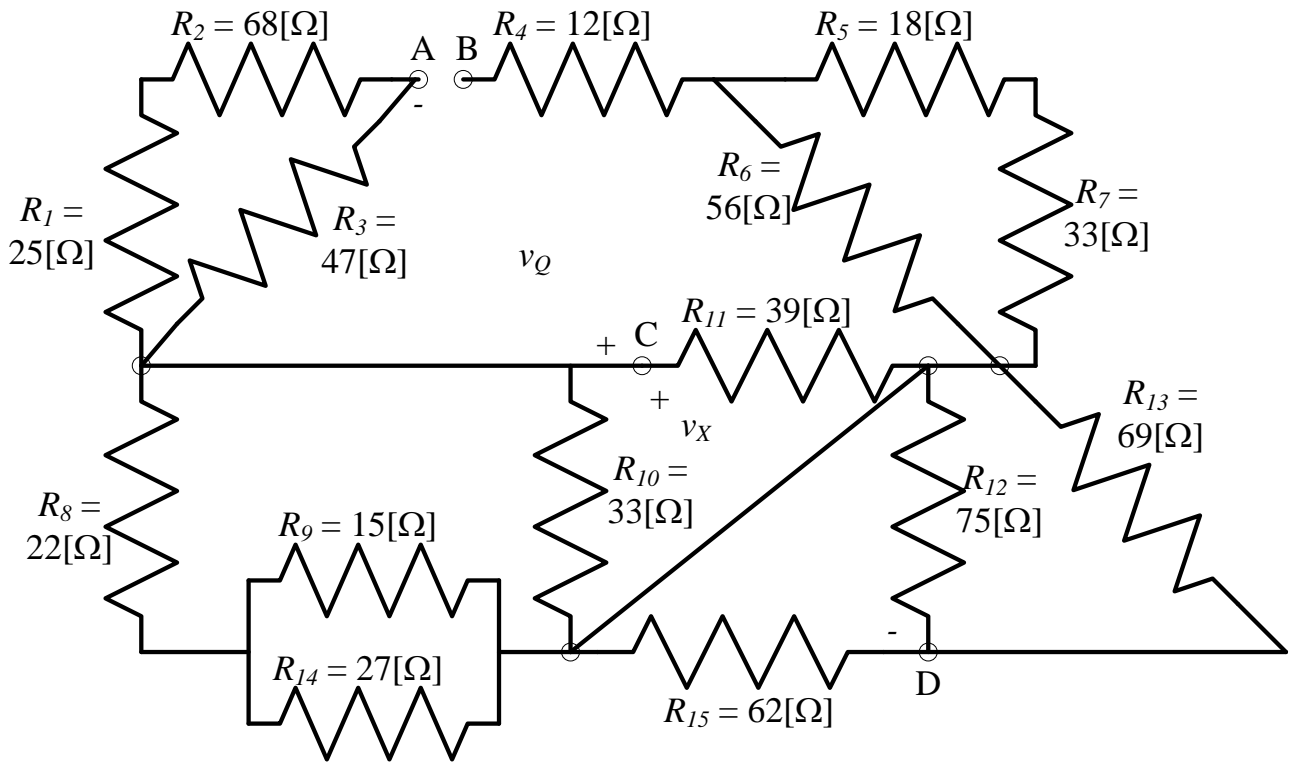
1. This quiz is closed book, closed notes. You may use one 8.5" x 11" crib sheet, or its equivalent.
2. Show all work on these pages. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order will lose credit.
3. It is assumed that your work will begin on the same page as the problem statement. If you choose to begin your work on another page, you must indicate this on the page with the problem statement, with a clear indication of where the work can be found. **If your work continues on to another page, indicate clearly where your work can be found. Failure to indicate this clearly will result in a loss of credit.**
4. Show all units in solutions, intermediate results, and figures. Units in the quiz will be included between square brackets.
5. Do not use red ink. Do not use red pencil.
6. You will have 30 minutes to work on this quiz.

_____/20

Room for extra work

Use the circuit given below to solve for the numerical quantities requested. Show enough steps so that your work can be followed. Show at least two significant figures in all of your calculations.

- Find the equivalent resistance of this circuit with respect to terminals A and B.
- Find the equivalent resistance of this circuit with respect to terminals A and C.
- Find the equivalent resistance of this circuit with respect to terminals C and D.

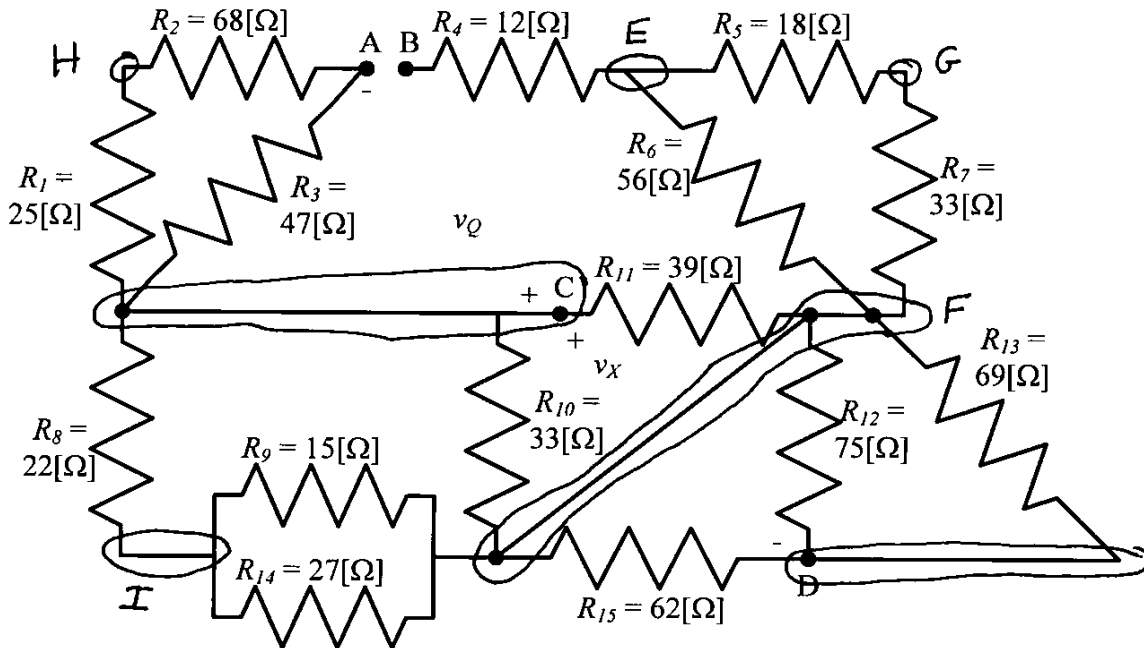


Room for extra work

ECE 2300 -- Quiz #2 -- February 22, 2012 -- Solution

Use the circuit given below to solve for the numerical quantities requested. Show enough steps so that your work can be followed. Show at least two significant figures in all of your calculations.

- Find the equivalent resistance of this circuit with respect to terminals A and B.
- Find the equivalent resistance of this circuit with respect to terminals A and C.
- Find the equivalent resistance of this circuit with respect to terminals C and D.



We begin by naming the nodes. This is not absolutely necessary, but it is useful. Using these, we can simplify using equivalent circuits.

$$(R_1 + R_2) \parallel R_3 = 31.22 \{\Omega\} = R_{16}$$

$$(R_5 + R_7) \parallel R_6 = 26.69 \{\Omega\} = R_{17}$$

$$R_8 + (R_9 \parallel R_{14}) = 31.64 \{\Omega\} = R_{18}$$

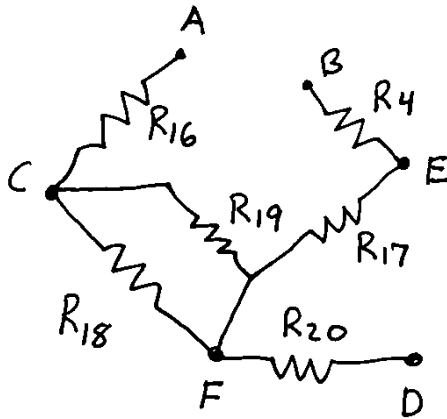
$$R_{11} \parallel R_{10} = 17.88 \{\Omega\} = R_{19}$$

$$R_{15} \parallel R_{12} \parallel R_{13} = 22.75 \{\Omega\} = R_{20}$$

See next page

Room for extra work

With these simplifications, we redraw.



$$R_{19} \parallel R_{18} = 11.42 [\Omega] = R_{21}$$

From here, it appears to be clear that the resistance between A and B, called R_{AB} , is

$$R_{AB} = R_{16} + R_{21} + R_{17} + R_4 = \boxed{81.33 [\Omega]}$$

b) From the figure above, it is clear that the resistance between A and C, called R_{AC} , is

$$R_{AC} = R_{16} = \boxed{31.22 [\Omega]}$$

c) Also from that diagram, we can see that the resistance between C and D, called R_{CD} , is

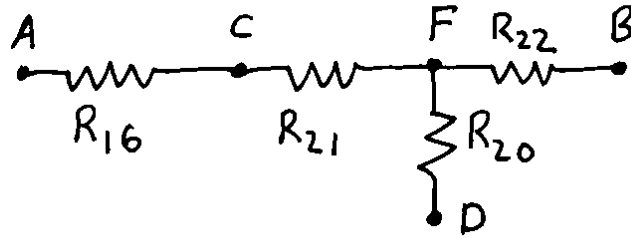
$$R_{CD} = R_{21} + R_{20} = \boxed{34.17 [\Omega]}$$

Some students will see this all, more clearly, if we redraw the circuit one more time. So, if needed, we could draw:

See next page

Room for extra work

$$R_4 + R_{17} = 38.69 \{ \Omega \} = R_{22}$$



If this diagram helps you, you should draw it. It does not take much time.