Physics 112
Quiz #13
October 11, 1999

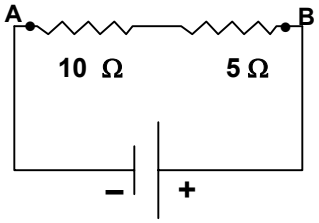
Name: _____

IF YOU WANT A QUESTION GRADED OUT OF THREE POINTS (–1 [MINUS ONE] FOR WRONG ANSWER!!) WRITE "3" IN SPACE PROVIDED ON EACH QUESTION.

1. A 27-C charge is fixed at the origin. When a 3-C charge is placed at point P, it experiences an electric ***potential*** of 9 V. If the 3-C charge is removed, what will be the electric ***potential energy*** of a 2-C charge placed at point P?

   A. 0 J
   B. 2.25 J
   C. 3.0 J
   D. 4.5 J
   E. 6 J
   F. 9 J
   G. 18 J
   H. 36 J

2. A 10-ohm and a 5-ohm resistor are connected in series to a battery as shown in the diagram. Consider the quantity $|V_A - V_B|$. What will happen to this quantity if the 10-ohm resistor is removed, and another resistor with resistance ***less*** than 5 ohms is put in its place? (No other changes are made to the circuit.)

   Then $|V_A - V_B|$:

   A. will increase.
   B. will decrease.
   C. will remain equal to 0 volts.
   D. will not change, but is not equal to 0 volts.
   E. might increase, decrease, or remain the same, depending on the precise value of the new resistance.

   Grade out of 3? Write "3" here: _____

3. A particle with charge $-q$ and mass m is held at a certain point in apparently empty space, and then released to move freely. It is observed to move with initial acceleration a toward the north. If a particle with charge $+q$ and mass $2m$ is now placed at the same point, it will:

   A. move with acceleration a towards the north.
   B. move with acceleration $0.5a$ towards the north.
   C. move with acceleration $2a$ towards the north.
   D. move with acceleration a towards the south.
   E. move with acceleration $0.5a$ towards the south.
   F. move with acceleration $2a$ towards the south.

   Grade out of 3? Write "3" here: _____

4. A 10-ohm and a 5-ohm resistor are connected in series to a 30-volt battery. How much power is dissipated in the 5-ohm resistor?

   A. 2 W
   B. 10 W
   C. 20 W
   D. 30 W
   E. 40 W
   F. 60 W