

# PHYS 208 –FALL 2016 – All Sections

## Midterm Exam II

**Multiple Choice:** 1) C ; 2) A ; 3) E .

### **Problem 1:**

- a) Open switch, fully charged capacitors:  $V_{cd}=+140V$
- b) Closed switch, fully charged capacitors:  $V_1 = V_2 = V_3 = V_4 = 210V$
- c) When closing the switch, the charge flows from the high potential at the junction  $c$  to the low potential at the junction  $d$ :  $\Delta Q = 630\mu C$

### **Problem 2:**

- a) Indicate three currents on the diagram and label them like the resistor they are flowing through:

$$i_3 = i_1 + i_2$$

$$\varepsilon_1 = i_1(r_1 + R_1 + R_3) + i_2 R_3$$

$$\varepsilon_2 = i_1 R_3 + i_2(r_2 + R_2 + R_3)$$

- b)  $i_1 = -0.5A$  (away from junct. b)

$$i_2 = 1.5A \text{ (from a to b)}$$

$$i_3 = 1.0A \text{ (away from junct. b)}$$

$$P_{out,2} = 10.5 \text{ W}$$

- c) For the new circuit corresponding to the open switch situation:  $V_{ab} = \varepsilon_2 - \varepsilon_1 R_3 / (r_1 + R_1 + R_3)$

### **Problem 3:**

- a) Capacitors are fully charged and the switch is open:  $U = 5.3\mu J$
- b) Capacitors are fully charged and the switch closes:  $I = 60.7A$
- c) Capacitors are partially charged and the switch is closed:  $I = 27.1A$