2B 2-26-14

QUIZ 19 CH. 19
QUIZ 19
SAMPLE EXAM 1 SP'11 SAMPLE EXAM2 SP'12
SELECTED DISCUSSIONS TO exercises/problems BELOW. YOU ARE RESPONSIBLE FOR ALL PROBLEMS EVEN THE ONES WITHOUT DISCUSSIONS, WHICH ARE DESIGNED TO HELP YOU DO RELATED EXERCISES.
CH. 19 MULTIPLE CHOICE TBA - Exercise/problems 2 , 5, 9, 10, 15, 21, 26, 27, 40, 42, 46, 49, 52, 57, 64, 65, 66
TURN IN: 2 (try 5), 10 (try 9), 15, 21, 26, 27, 40 (try 42), 52 (try 49 and 46), 57, 65 (try 64 and 66)
*** DISCUSSIONS PROVIDED.**
DISCUSSIONS
2. Q= I*t.
10. R = (Cu resistivity)*L/A and R ' = (Al resistivity)*L/A'. R/R' = (Cu resistivity)*A'/[(Al resistivity)*A] = (Cu resistivity)*d'^{2}/[(Al resistivity)*d^2] = 1. Find d given d' = 3.26 mm.
15. (a) I = 18.5 (A) = |change in V|/R , where R = (resistivity)*L/A at 20.0 degrees C. Find resistivity. (b) 17.2 (A)= |change in V|/R' , where R' = (resistivity')*L/A, where resistivity' = resistivity*[1 + alpha*change in temp]; change in temp = (92.0 - 20.0) degrees C and resistivity was found in part a. Find alpha.
21. I = |change in V|/R , where R varies between and 1 k -ohm and 500 k-ohm. Set R to the lowest value (when you are wet) and I = 5.0 mA to find |change in potential| .
26. 6.00 (V) = I*r + I*R = I*(r + R). Find r given R and I.
27. Open circuit (switch open) means I = 0. Then the voltmeter would read the voltage difference across the battery only since there is no voltage drop across the resistors r and R. That battery voltage = 3.08 (V). When switch is closed, use battery voltage to solve: battery voltage = I*r + I*R for r and R. Use 2.97 (V) = battery voltage - I*r. Find r from the latter equation and solve for R in the former equation. Note: I = 1.65 (A) when switch is closed.
40. (a) P = 540 (W) = V^2/R (b) I = V/R, where V is the magnitude of the voltage drop across R. (c) P*time*7.4 cents/KW-h = cost. Note: time = 1 h. Convert P = 540 (W) to (kW) = 1000 (W). (d) P = V^2/R . We assume R is constant though we know it'll change as the temperature varies.
49. (a) See Test #1, Problem 3(Sp 12) : 1/Rp = 1/40.0 + 1/90.0 so Rp = (40)*(90)/(40 + 90) which you should simplify. (b) I = 120 (V)/Rp (c) I_{90} = 120 (V)/90 and I_{40} = 120 (V)/40.

THESE COULD BE ON TEST 2

52. (a) Moving left to right on the bottom branch of circuit: $1/R_{p1} = 1/3.00 + 1/6.00$ and $1/R_{p2} = 1/12.0 + 1/4.00$.
Find $R_{p1} + R_{p2}$.
(b) Now, 60.0 (V) = I* ($R_{p1} + R_{p2}$). Find I. Then find I* R_{p1} and I* R_{p2}.
From these latter two values you can find each of 4 currents: $I_3 = I^* R_{p1}/3$, $I_6 = I^* R_{p1}/6$, $I_{12} = I^* R_{p2}/12$ and $I_4 = I^* R_{p2}/4$.

57. See example 11.
At top Node: $I = I_{30} + I_{20}$, where I flows through the 10.0 (V)-battery upward in the branch, and I_{30} and I_{20} flow downward in the branches for the 30 -ohm and 20.0 ohm resistor/5.00 (V)- battery, respectively.
You need two other equations from which to find I, I_{30} & I_{20}. They are, using the law that the sum of the voltage drops around an internal loop of the circuit is zero: clockwise in the left loop, 10.00 (V) - I_{30}*(30 ohm) = 0 and counterclockwise in the right loop, 5.00 (V) + I_{20}*(20 ohm) - I_{30}*(30 ohm) = 0.
Note the positive term I_{20}*(20 ohm) in the last equation due to the fact we are going counter clockwise in the right loop and thus *against* current I_{20}.

65. This is a very important problem which I will be sure to grade. It is an RC circuit from which we'll do a lab later this coming month.
(a) This is a charging process-Q on the capacitor's positive plate grows according to the second of equations 19.17.
$Q = Qm*(1 - e^{-t/RC})$. Note: Q_m = maximum charge at the end of the process - when current I = 0. $Q_m = C*V$, where V = 60.0 (V). Note RC is easily computed from the given info. Plug in various times into the formula and you will notice Q increases with time t.
(b) Plug in various times t into the first of equations 19.17: $I = Io* e^{-t/RC}$. You will notice I decreases with time t.
(c) Make a sketch. We 'll examine detailed graphs in upcoming RC lab.