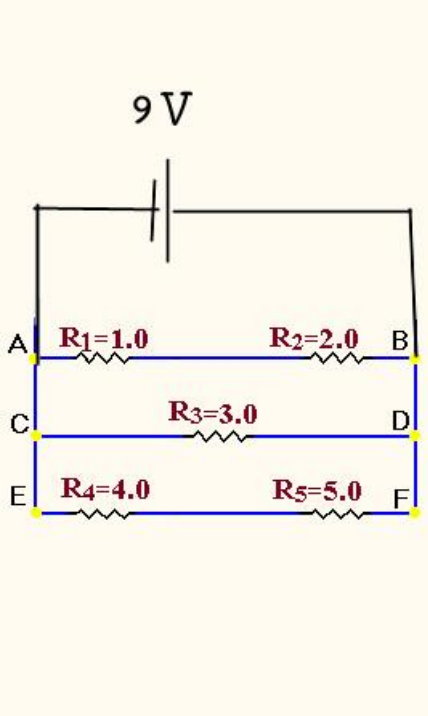
1. If you dissolve 2.0 grams of NaOH in 30.0 ml and then add 70.0 more ml of water, what will be the final concentration in moles/L?

2. 20.0 ml of a 2.0 g/L solution of HCl react with Na_3PO_4. How much H_3PO_4 in grams will be produced?

$$3\ HCl + Na_3PO_4 \rightarrow H_3PO_4 + 3\ NaCl$$



3. Refer to the circuit diagram.
   a) What is the equivalent resistance from A to B?

b) What is the voltage from E to F?

c) What is the total current?

d) What is V_4?

e) How much energy is consumed by the circuit each hour it's operating?

f) What is the power rating of R_5?

Solutions

1. 2.0 g NaOH (mole/40g) = 0.05 moles NaOH

C = n/V = 0.05/0.100 L = 0.50 moles/L

2. m = CV = 2.0 g/L(0.020 L) = 0.040 g HCl
   0.040 g HCl (mole/36.5 g) = 0.0011 moles HCl
   0.0011 moles HCl (1 H_3PO_4/3 HCl) = 0.000365 moles H_3PO_4/
   0.000365 moles H_3PO_4 * 98 g/mole = 0.036 g H_3PO_4

3. a) R_1 and R_2 are in series, so $R_{eq} = 1+2 = 3\ \Omega$.

b) AB, CD and EF are in parallel, so voltage is constant for these segments. 9V, but notice that V_4 and V_5 add up to 9V. Keep this in mind for (d)

c) First we need to calculate total R:

$R_{eq} = [(1+2)^{-1} + 3^{-1} + (4+5)^{-1}]^{-1} = 1.29\ \Omega$.

$It = V/Rt = 9V/1.29\ \Omega = 7.0A$

d) First we need the current flowing through segment EF.

$I_{EF} = V/R_{EF} = 9V/(4+5) = 1A$

$V_4 = I_{EF}R_4 = 1(4) = 4V$

e) $E = VIt$

$= 9\ J/C(7\ C/s)(3600\ s)$

$= 226\ 800\ J$ or $227\ kJ$.

e) Since $V_4 = 4\ V$, then $V_5 = V_t - V_4 = 9V - 4V = 5V$

$P_4 = V_4 I_{EF} = 5J/C(1C/s) = 5\ J/s = 5W$