Solutions to End Of Year Review Exercises

1. MgS Mg, a metal, has two valence electrons. Sulfur, a non metal has six. Each magnesium atom gives two electrons to a sulphur atom to create the neutral MgS.

2. The total current is 40/10 = 4 A. But R_1 only receives (100 – 40)V/ 20 Ω = 3A.
   So R_2 receives 4A – 3A = 1 A.

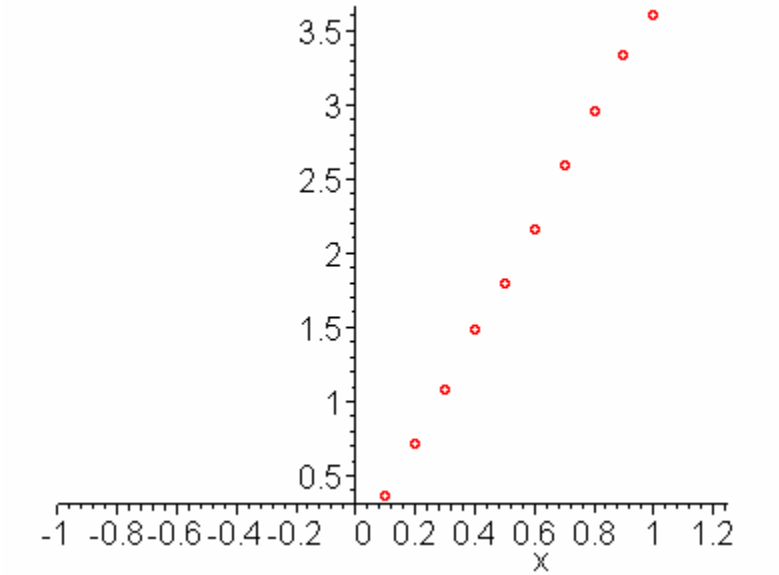
3. B That way each piece can obtain 12 V.

4. V = IR
   = 2(5) = 10 V
   VIt = mcΔT
   10(2)(5 min) (60s/min) = m(4.19)(26-20)
   m = 238.7 g

5. filter 2 (density = 1 g/ml) and pure water is a very poor conductor of electricity.

6. THEY INVERTED THE TABLE OF VALUES. If voltage was controlled, then V should be the x value.

Current(A)



Voltage (V)

b) $G = \Delta I/\Delta V = 3.66$ S

I asked my computer to find the slope. You can ask the little computer that's in your pretty/handsome head to do likewise.

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with(stats):
> fit[leastsquare[[x,y]]]([[.10, .20, .30, .40, .50, .60, .70, .80, .90, 1], [.37,
.72, 1.08, 1.48, 1.80, 2.16, 2.59, 2.96, 3.33, 3.6]]);
                y = -.005333333333 + 3.662424242 x
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7. With time, the sugar particles get statically charged as they constantly make contact with the sifter. Since the sifter and sugar have opposite charges, they attract one another.

8. 8 (note you can use the formula: $2n^2$ to get the maximum number of electrons per shell)

9. $12V/(1+2+3)\ \Omega = 2$ A

10. As pH increases we get more OH^- and less H^+.
$[OH^-]\ [H^+]$ always = 10^{-14}.

11. a) 2 and 3

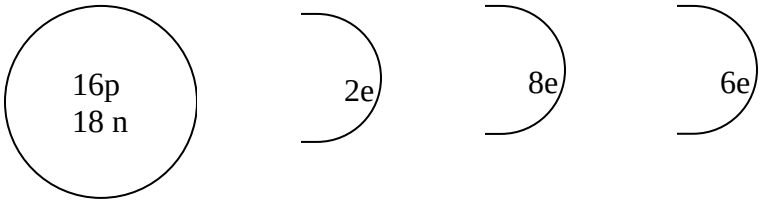
b) 2

12. 18

13. (1) Ne
(2) Mg
(3) Si
(4) K

14. It conducts electricity.
It conducts heat.
It will react with acid.
It is malleable.
Metals react with nonmetals.

15.



16. 2 Al + 3 $CuCl_2$ → 2 $AlCl_3$ + 3 Cu

17. E = Pt
= 1.5 kW(1h/time)(5 time/week)(50 weeks) = 375 kWh

C = E* rate
= 375 kWh($0.05/kWh) = $18.75

18. n = VC = 0.500 L (0.50 mole/L) = 0.25 moles
0.25 moles(58.5 g/mole) = 14.75 grams

19. Series in circuit 1: $V_3 = V_t = V_2 + V_1$
$V_1 = 6V - 2V = 4$ V

Parallel(circuit 2): $V_2 = V_1 = V_3 = 6.0$ V

20. $C_1V_1 = C_2V_2$

2.0(0.300) = 0.50V2
V_2 = 1.2 L, so he must add 1.2 – 0.3 = 0.9 L of water.

21. G = ΔI/ΔV = (2 - 1.5)/(6 - 4.5) = 0.33 S

22. $C_2H_6 + 3.5\ O_2$ → $2\ CO_2 + 3\ H_2O$

32 moles $CO_2 \left[\frac{3.5\ O_2}{2\ CO_2}\right]$ = 56 moles O_2

56 moles O_2 (32 g/mole) = 1792 g of O_2

23. $Fe_2O_3 + 3\ C \rightarrow 2\ Fe + 3\ CO$

50 moles Fe $\left[\frac{1\ Fe_2O_3}{2\ Fe}\right]$ = 25 moles of Fe_2O_3

25 moles of Fe_2O_3(2*56+ 3*16 g)/mole = 4000 g of Fe_2O_3

24. 1/50 Ω + 1/200 Ω = 1/R

4/200 + 1/200 = 5/200 = 1/R

R = 200/5 = 40 Ω.

25. oops! We don't have the answer sheet!

26. R_2 and R_3, which add up to 40 Ω , experience a total of 100 V – 60 V = 40 V.
I = V/R = 40V/40 Ω = 1A.

27. #4

28.

	malleability	**acid**	**conductivity**
metal	bends easily	fizzes	Conducts
metalloid	brittle	No reaction	Semi-conductor
nonmetal	brittle, liquid or gas	No reaction	Poor conductor

Out of the three groups, only a metalloid is a semiconductor that will not react with acid. When we obtained that combination of results, we knew we had a metalloid. Otherwise it was either a metal or a nonmetal.