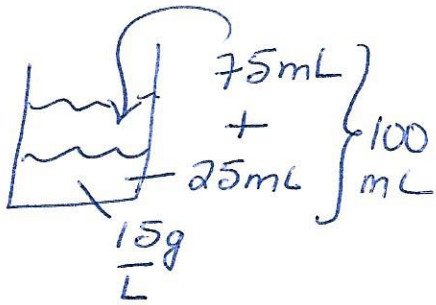
# Solution Review

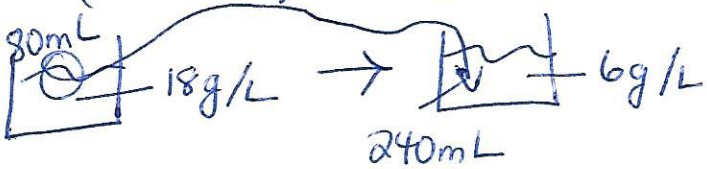
Answer Key

1. $6g \times \frac{1L}{30g} = 0.2L \rightarrow$ (200mL)

2. $\frac{C_1V_1}{V_2} = \frac{C_2V_2}{V_2}$ "Bad Mummy"

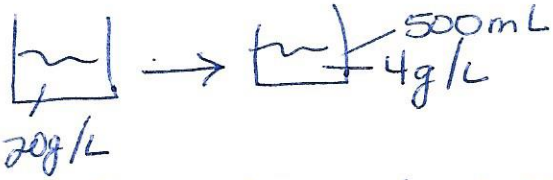



$\frac{(15g/L)(25mL)}{(100mL)} =$ (3.75g/L = $C_2$)

3. 


$\frac{C_1V_1}{C_1} = \frac{C_2V_2}{C} = \frac{(6g/L)(240mL)}{(18g/L)} =$ (80mL) $= V_1$

4. $250\cancel{mL} \times \frac{1L}{1000\cancel{mL}} \times \frac{10g}{1L} =$ (2.5g)

5. 

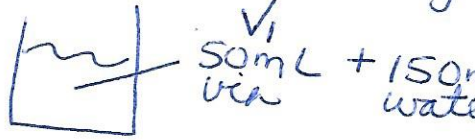

$\frac{C_1V_1}{C_1} = \frac{C_2V_2}{C_1}$

$V_1 = \frac{(4g/L)(500mL)}{(20g/L)} =$ (100mL)

(i) take out 100 mL of 20g/L soln
(ii) place in 500mL volumetric
(iii) add water to 500mL mark

6. $\frac{C_1V_1}{C_2} = \frac{C_2V_2}{C_2} = \frac{(100g/L)(50mL)}{(25g/L)} =$ (200mL = $V_2$)

7. $4.0g\ solute \times \frac{1L\ soln}{50g\ solute} = 0.08L =$ (80mL)

8. 


$C_1 = 50g/L$

$\frac{C_1V_1}{V_2} = \frac{C_2V_2}{V_2} = \frac{(50g/L)(50mL)}{(200mL)} =$ ($C_2 = 12.5\frac{g}{1L}$) $\times \frac{1mol\ CH_3COOH}{60g} =$ ($C_2$ = 0.21 mol/L)

9. $\frac{9\text{ g NaOH}}{250\text{ mL soln}} \times \frac{1\text{ mol NaOH}}{40\text{ g}} \times \frac{1000\text{ mL}}{1\text{ L}} = 0.9\frac{\text{mol}}{\text{L}} = C_1$

$V_1$

$C_2 = 0.5\frac{\text{mol}}{\text{L}}$ $\quad \frac{C_1V_1}{C_2} = \frac{C_2V_2}{C_2} = \frac{(0.9\frac{\text{mol}}{\text{L}})(250\text{mL})}{(0.5\frac{\text{mol}}{\text{L}})} = 450\text{mL}$ ($V_2$)

But!! asked for water added NOT final vol soln.

$450\text{mL} - 250\text{mL} = 200\text{mL } H_2O \text{ added}$

($V_2$ $\quad V_1$)

10. Cannot compare until all soln have same units.

your choice!

$Ca(OH)_2$: $40 + 16 + 1\times2 = 32 + 2$ } 58g/1 mol

A) 5% m/v $= \frac{5\text{g } Ca(OH)_2}{100\text{mL}} \times \frac{1\text{mol}}{74\text{g}} \times \frac{1000\text{mL}}{1\text{L}} = 0.68\frac{\text{mol}}{\text{L}}$

B) $0.5\frac{\text{mol}}{\text{L}}$

C) $\frac{3.7\text{g}}{100\text{mL}} \times \frac{1\text{mol}}{58\text{g}} \times \frac{1000\text{mL}}{1\text{L}} = 0.64\frac{\text{mol}}{\text{L}}$ could use $\frac{\text{g}}{\text{L}}$ also

D) $\frac{58\text{g}}{1\text{L}} \times \frac{1\text{mol}}{58\text{g}} = \frac{1\text{mol}}{\text{L}}$

11. $2\text{mol } Mg_3(PO_4)_2 \times \frac{262\text{g}}{1\text{mol}} = 524\text{g } Mg_3(PO_4)_2$

$24\times3 = 72$ $\quad 31\times2 = 62$

12. $250.0\text{mL} \times \frac{1\text{L}}{1000\text{mL}} \times 0.700\frac{\text{mol}}{\text{L}}\ K_2SO_3 \times \frac{158\text{g}}{1\text{mol}} = 27.65\text{g } K_2SO_3$

$39\times2 = 78$ $\quad 32$ $\quad 16\times3 = 48$ } $\frac{158\text{g}}{1\text{mol}}$

13. $250\text{mL} \times 0.50\frac{\text{mol}}{\text{L}} \times \frac{1\text{L}}{1000\text{mL}} \times \frac{74\text{g}}{1\text{mol}} = 9.3\text{g } Ca(OH)_2$

14. $0.2\text{mol solute} \times \frac{1\text{L}}{0.5\text{mol}} = 0.4\text{L}$

15. 5 wrong $H_2O$ = covalent

3 wrong

4 correct but NOT ionic $Cl_2$ is covalent } ∴ B

16. $400.\text{mL} \times \frac{1\text{L}}{1000\text{mL}} \times \frac{3.00\text{mol}}{1\text{L}} \times \frac{98\text{g } H_2SO_4}{1\text{mol}} = 118\text{g } H_2SO_4$

($H_2SO_4$: $1\times2=2$, $32$, $16\times4=64$)

17. $C_1V_1 = C_2V_2$ $\quad V_2$ = new vol of soln

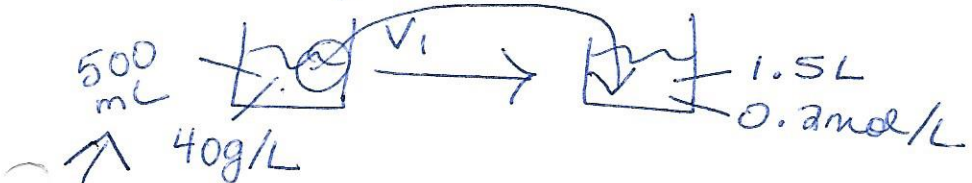
$$\frac{(75\text{mL})(0.4\text{mol/L})}{(2\text{mol/L})} = 15\text{mL}$$

• have 75mL → evaporate off 60mL of water !

18. $2\text{mol } (NH_2)_2CO \times \frac{60\text{g}}{1\text{mol}} = 120\text{g}$

($(NH_2)_2CO$: $14\times2=28$, $1\times4=4$, $12$, $16$)

19. 4# given 1 of the #'s doesn't belong!




not $V_1$! $V_1$ is what you use from the original.

$$C_1V_1 = C_2V_2 \quad \frac{}{C_1} \quad = \frac{(1.5\text{L})(0.2\text{mol/L})}{(40\text{g/L})} = 0.0075\text{L} = 7.5\text{mL of original soln}$$

- take out (pipet out) 7.5 mL of 40g/L soln
- put into 1.5L volumetric
- add water up to the 1.5L mark

20. molar concentration = $\frac{\text{mole solute}}{\text{L soln}} = \frac{\text{mol}}{\text{L}}$

A) $\frac{29.22\text{g NaCl}}{250\text{mL}} \times \frac{1000\text{mL}}{1\text{L}} \times \frac{1\text{mol}}{58.5\text{g}} = 1.998\frac{\text{mol}}{\text{L}}$

B) $\frac{0.5\text{mol}}{500\text{mL}} \times \frac{1000\text{mL}}{1\text{L}} = \frac{1\text{mol}}{\text{L}}$

C) $\frac{28.06\text{g KOH}}{1.0\text{L}} \times \frac{1\text{mol}}{56\text{g}} = 0.50\frac{\text{mol}}{\text{L}}$

D) $\frac{0.5\text{mol}}{1.5\text{L}} = 0.3\text{mol/L}$

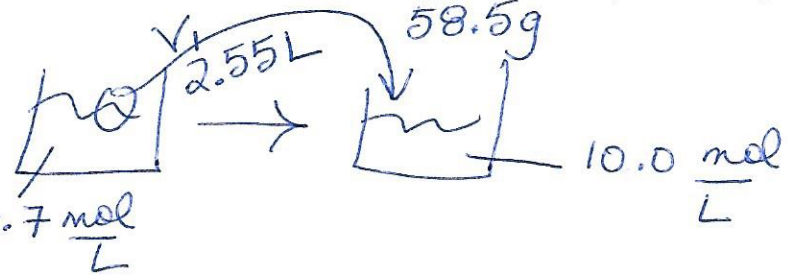
21. A) $100.\text{g } Al_2O_3 \times \frac{1\text{mol } Al_2O_3}{102\text{g}} = 0.980\text{ mol}$ ($27\times2=54$, $16\times3=48$, $54+48=102\text{g/mol}$)

B) $100.\text{g } CaF_2 \times \frac{1\text{mol } CaF_2}{78\text{g}} = 1.28\text{ mol } CaF_2$ ($40$, $19\times2=38$, $40+38=78$)

(C) $100.\text{g } H_2O_2 \times \frac{1\text{mol}}{34\text{g}} = 2.94\text{ mol } H_2O_2$

D) $100.\text{g NaCl} \times \frac{1\text{mol}}{58.5\text{g}} = 1.71\text{ mol NaCl}$

22.




$$\frac{C_1V_1}{C_2} = \frac{C_2V_2}{C_2} = \frac{\left(24.7\frac{\text{mol}}{\text{L}}\right)(2.55\text{L})}{\left(10.0\frac{\text{mol}}{\text{L}}\right)} = 6.30\text{L final vol } V_2$$

$$-\ 2.55\text{L } V_1$$

$$3.75\text{L water}$$

(C)