## Year 11 Chemistry

NAME $\qquad$

## Chemical Calculations Assignment 2

## Concentration

1. 

(a) Use a diagram to show the difference between a concentrated and a dilute solution.
(b) Explain, using an example, how two solutions with different volumes can have the same concentration.
2. Convert the following concentrations to $\mathrm{mol}^{-1}$.
(a) $57 \mathrm{~g} \mathrm{~L}^{-1}$ ammonium chloride $\left(53.49 \mathrm{~g} \mathrm{~mol}^{-1}\right) \quad / 1$
(b) $15 \mathrm{~g} \mathrm{~L}^{-1}$ sulfuric acid $\quad$ /2
(c) $0.93 \mathrm{~kg} \mathrm{~L}^{-1}$ potassium chromate $\left(194.19 \mathrm{~g} \mathrm{~mol}^{-1}\right) \quad / 2$
3. Convert the following concentrations to $\mathrm{g}^{-1}$.
(a) $2.0 \mathrm{~mol} \mathrm{~L}^{-1}$ nitric acid ( $63.01 \mathrm{~g} \mathrm{~mol}^{-1}$ ) $\quad / 1$
(b) $5.0 \times 10^{-2} \mathrm{~mol} \mathrm{~L}^{-1}$ calcium bicarbonate $\quad / 2$
(c) $1.5 \times 10^{-3} \mathrm{~mol} \mathrm{~mL}^{-1}$ sodium hydroxide $\left(39.997 \mathrm{~g} \mathrm{~mol}^{-1}\right) \quad / 2$
4. Suggest one problem that could occur in an experiment if the wrong units were written for a concentration. Write an example to show how this could happen.
5. Calculate the concentration for the following:
(a) 0.020 mol in $1.0 \mathrm{~L} \quad / 2$
(b) 2.61 g in $0.500 \mathrm{~L} \quad / 2$
(c) 0.12 g in $100 \mathrm{~mL} \quad / 2$
(d) 65 mg in $1.5 \mathrm{~L} \quad / 2$
6. Describe why $C=\frac{n}{V}$ and $C=\frac{m}{V}$ cannot be used for the same things. /2
7.
(a) Calculate the concentration in $\mathrm{mol} \mathrm{L}^{-1}$ if 3.0 g of NaOH is dissolved in 0.10 L of water. /3
(b) Calculate the concentration in $\mathrm{g} \mathrm{L}^{-1}$ if 0.00850 mol of hydrogen chloride $\left(36.46 \mathrm{~g} \mathrm{~mol}^{-1}\right)$ is dissolved in 500 mL of water.
8. Describe the method you would use to rearrange $C=\frac{\text { solute }}{\text { volume }}$ :
(a) To calculate quantity of solute, given concentration and volume. /2
(b) To calculate volume, given volume and quantity of solute. /2
9. Calculate the volume of $22 \mathrm{~g} \mathrm{~L}^{-1}$ solution that would contain 5.0 g of solute. /2
10.
(a) Calculate the number of moles of solute in 0.150 L of $0.100 \mathrm{~mol} \mathrm{~L}^{-1}$ solution.
(b) Hence calculate the mass of $\mathrm{AgNO}_{3}$ needed to make 0.150 L of $0.100 \mathrm{~mol} \mathrm{~L}^{-1}$ solution. 2
11. Calculate the volume of water that would make a $3.0 \mathrm{~mol} \mathrm{~L}^{-1}$ solution from 5.0 g of NaOH .

