N5 Chemistry
Unit 1: Chemical Changes & Structure
Homework 1.15

1. Which of the following compounds is a base?

   A Magnesium chloride
   B Calcium carbonate
   C Sodium bromide
   D Iron(II) sulfate

   Answer _____

2. Which of the following combinations of solutions would react to produce a precipitate?
   (You may wish to refer to the data booklet.)

   A Copper(II) chloride & sodium bromide
   B Iron(II) bromide & sodium carbonate
   C Silver nitrate & potassium sulfate
   D Sodium bromide & zinc chloride

   Answer _____

3. In a reaction, 40 cm^3 of gas were collected in 20 s. The average rate at which gas was given off, in $cm^3\ s^{-1}$, was

   A 20
   B 1·0
   C 2·0
   D 0·5

   Answer _____

4. What is the relative formula mass of ammonium sulfate, $(NH_4)_2SO_4$?

   A 70
   B 118
   C 132
   D 228

   Answer _____

5. Hydrogen gas will

   A relight a glowing splint
   B turn lime water cloudy
   C burn with a pop
   D turn damp pH paper red.

   Answer _____

6. The gram formula mass of sodium carbonate is 106 g.
   How many moles are present in 5·3 g of sodium carbonate?

   A 0·05
   B 0·5
   C 2
   D 20

   Answer _____

7. Which of the following solutions, when added to copper chloride solution, produces a precipitate?

   A Calcium bromide solution
   B Lithium sulfate solution
   C Magnesium nitrate solution
   D Sodium hydroxide solution

   Answer _____

8. 0·5 mol of pure citric acid was dissolved in water and the solution made up to 250 cm^3. What was the concentration of the solution?

   A 0·25 mol l^{-1}
   B 0·5 mol l^{-1}
   C 1·0 mol l^{-1}
   D 2·0 mol l^{-1}

   Answer _____

9. $2K^+(aq) + 2I^-(aq) + Pb^{2+}(aq) + 2NO_3^-(aq)$

   $\downarrow$

   $Pb^{2+}(I^-)_2(s) + 2K^+(aq) + 2NO_3^-(aq)$

   The type of reaction represented by the equation above is

   A addition
   B neutralisation
   C precipitation
   D redox.

   Answer _____

10. Give the number of moles in each of the following solutions:

a) 200 cm^3 of 1 mol l^{-1} sulfuric acid

_____ moles 2

b) 50 cm^3 of 0·5 mol l^{-1} sodium hydroxide solution

_____ moles 2

c) 40 cm^3 of a 2 mol l^{-1} copper(II) sulfate solution

_____ moles 2

d) 5 cm^3 of a 0·1 mol l^{-1} solution of nitric acid.

_____ moles 2

e) 25 cm^3 of a 4 mol l^{-1} solution of hydrochloric acid.

_____ moles 2

11. Balance the following chemical equations.

a) $Na + O_2 \longrightarrow Na_2O$

b) $N_2 + H_2 \longrightarrow NH_3$

c) $NO_2 + H_2O \longrightarrow HNO_3 + NO$

d) $SiCl_4 + H_2O \longrightarrow HCl + SiO_2$ 4

12. Write the chemical formula for each of the following substances.

a) Calcium oxide _____ b) Barium carbonate _____

c) Sulfur trioxide _____ d) Iron(III) chloride _____

e) Lithium sulfate _____ f) Carbon tetrafluoride _____ 6

13. For each of the following molecules draw a diagram to show the **shape** of the molecules.

a) CCl_4 b) PH_3

c) SH_2 d) NF_3 4

14. Silicon forms compounds with chlorine and oxygen.

a) Draw a diagram using outer electrons only to show the bonds in the compound formed between silicon and chlorine, $SiCl_4$.

1

b) i) Draw a diagram to show the **shape** of the $SiCl_4$ molecule.

1

ii) What name is given to this shape of molecule? _____ 1

c) Silicon oxide has a melting point of 1713°C.
What type of covalent structure must this compound have? _____ 1

15. Metal salts can be produced by different methods.

a) Lead(II) iodide can be produced by reacting lead(II) nitrate solution with sodium iodide solution. The equation for this reaction is:

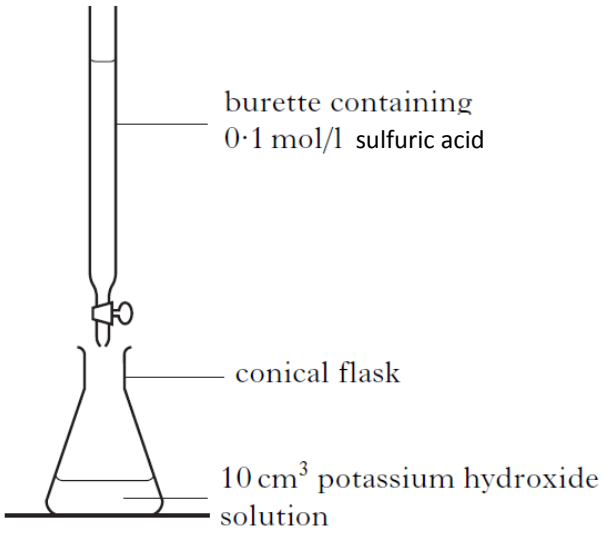
$$Pb(NO_3)_2(aq) + NaI(aq) \longrightarrow PbI_2(s) + NaNO_3(aq)$$

i) Balance this equation. 1

ii) What technique could be used to remove lead(II) iodide from the mixture?

_____ 1

b) Potassium sulfate can be produced by titrating potassium hydroxide solution with dilute sulfuric acid.



The equation for the reaction between sulfuric acid and potassium hydroxide is:

$$H_2SO_4 + 2KOH \longrightarrow K_2SO_4 + 2H_2O$$

i) What must be added to the conical flask to show the end-point of the titration?

_____ 1

ii) The average volume of sulfuric acid used in the titration is 20 cm^3.
Calculate the concentration of the potassium hydroxide.
Show your working clearly.

3

Total Marks 43