**ST. JOSEPH`S SSS NAGGALAMA**

**S3 CHEMISTRY TRIAL QUESTIONS**

1. (a) Explain what is meant by the terms
   * 1. mass number
     2. atomic number

(b) An atom of an element is represented by the symbol

* + 1. State the mass number of the atom.
    2. What is the atomic number of the atom?
    3. How many neutrons are present in the atom?

1. The positions of the elements A, B, C, D, E and F are shown in the Periodic Table below. These are not the usual symbols for the elements.

I II III IV V VI VII VIII

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | | |  |
| A | B |  |  |  |  | D |  |  |
|  |  | C |  |  |  | E | F |

* 1. State the type of bonding in the compound formed between

(i) B and D.

(ii) E and C.

* 1. (i) Which one of the elements A and B reacts vigorously with cold water?

(ii) Write equation for the reaction between water and the element you have named in (b) (i).

1. The electronic structure of an element X is 2:8:6.
   1. Write the formula of the most common ion of X.
   2. To which group of the Periodic Table does X belong?
   3. Element X reacts with an element M (atomic number=12)

(i) Write the electronic structure of M.

(ii) State the type of bond that exists in the compound between M and X.

1. The number of protons and neutrons of atoms A, B, C and D are shown below

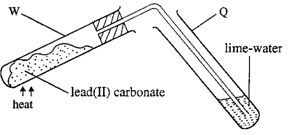
|  |  |  |
| --- | --- | --- |
| Atoms | Number of protons | Number of neutrons |
| A | 6 | 6 |
| B | 12 | 12 |
| C | 6 | 8 |
| D | 17 | 20 |

* 1. Which of these atoms are isotopes? Give a reason for your answer.
  2. Which one of the atoms is of an element in group II of the Periodic Table? Give a reason for your answer.
  3. Name the type of bond which is formed when B and D react.

1. 10g of a saturated sodium chloride solution was evaporated and 6g of solid sodium chloride was left. Calculate
   1. Solubility of sodium chloride
   2. The percentage of sodium chloride in a saturated solution
2. 75g of a saturated solution contains 30g of a salt. Calculate its solubility
3. The solubility of X is 40g/100g of water. Calculate the mass of X that can be dissolved in 60g of water to give a saturated solution
4. The table below shows the solubilities of salt P in water at different temperatures

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Temperature /oC | 10 | 20 | 30 | 40 | 50 | 60 |
| Solubilities (g/100g of solvent) | 18 | 20 | 24 | 30 | 38 | 50 |

1. Plot a graph of solubility of P
2. Use your graph to determine solubility of P at 25oC
3. Calculate the mass of P that would dissolve in 45g of water at 25oC
4. Draw a labeled diagram of the set-up of the apparatus that can be used to prepare a dry sample of carbon dioxide in the laboratory
   * 1. Write an equation that leads to the formation of carbon dioxide
     2. Write an ionic equation for the reaction leading to the formation of carbon dioxide
   1. Carbon dioxide was passed through calcium hydroxide solution. Describe and explain the reaction that took place.
      1. State what would be observed if burning magnesium ribbon was lowered into a jar of carbon dioxide
      2. Write equation for the reaction that takes place
   2. Describe the structure of graphite
   3. State two properties in which graphite differs from diamond
   4. Graphite was heated in excess air and the gas given off passed through aqueous calcium hydroxide for a long time
      1. State what was observed
      2. Write equations for the reaction (s)
5. The figure below shows an experimental setup to investigate the effect of heat on lead (II) carbonate.



1. Write the equation for the reaction taking place in test-tube W.
2. State what is observed in test-tube Q.
3. What is observed in test-tube Q if lead (II) carbonate is replaced with sodium carbonate? Give a reason for your answer.
4. (a) Write the equation for the reaction that would take place if
   1. Dilute hydrochloric acid is added to sodium hydrogen carbonate.
   2. Sodium hydrogen carbonate is strongly heated.

(b) State what would be observed and write equation for the reaction that would take place if magnesium sulphate solution is added to a solution containing

(i) Carbonate ions.

(ii) Hydrogen carbonate ions.

1. Calculate the relative formula masses or relative molecular masses of the following compounds (H=1, Cl=35.5, Cu=64, S=32, O=16, Na=23, C=12, Fe=56, Zn=65, N=14, Pb=207, Ag=108 )
2. Hydrogen chloride
3. Copper (II) sulphate
4. Sodium hydroxide
5. Sodium carbonate
6. Iron (II) sulphate
7. Copper (II) chloride
8. Zinc nitrate
9. Lead (II) carbonate
10. Silver chloride
11. Copper (II) sulphate pentahydrate
12. Sodium carbonate decahydrate
13. A compound contains 43.4% by mass of sodium, 11.3% carbon and 45.3% oxygen. Calculate the simplest formula of the compound (Na = 23, C = 12, O = 16)
14. A compound contains 40% carbon, 6.67% hydrogen, the rest being oxygen. The relative molecular mass of the compound is 180 (C=12, H =1, O = 16). Determine the empirical formula of the compound and the molecular formula of the compound
15. An oxide of an element X was made of 50% X. Calculate the simplest formula of the oxide (X = 32, O = 16)
16. A compound of molar mass 400 contains 28% iron, 48% oxygen and the rest being sulphur. Calculate the empirical formula and molecular formula of the compound. (Fe = 56, O= 16, S =32)
17. When hydrated sodium carbonate crystals (Na2CO3.xH2O) were exposed to air for a long time, there was loss of mass of 62.9%. What is the amount of the water of crystallisation? (Na=23, C=12, O=16, H=1)

Na2CO3.xH2O(s) → Na2CO3(s) + xH2O(l)

1. Ammonium chloride reacts with calcium hydroxide according to the equation

Ca(OH)2(s) + 2NH4Cl (aq)→ CaCl2(s) + 2NH3(g) +2H2O (l)

If 14.8g of calcium hydroxide was reacted completely with ammonium chloride, what mass of ammonia gas will be evolved? (H=1, N=14, O=16, Ca=40)

1. Calculate the loss in mass when 10g of calcium carbonate is heated to a constant mass. (Ca=40, C=12, O=16)

CaCO3(s)  CaO(s)  + CO2(g)

1. Calculate the mass of ammonium chloride that will just react completely with 14.8g of calcium hydroxide (N=14, H=1, Cl=35.5)

Ca(OH)2(s) + 2NH4Cl(s) CaCl2(s) + 2NH3(g) + 2H2O(l)

1. Ammonium chloride reacts with calcium hydroxide according to the equation

Ca(OH)2(s) + 2NH4Cl (aq)→ CaCl2(s) + 2NH3(g) +2H2O (l)

If 14.8g of calcium hydroxide was reacted completely with ammonium chloride, what volume of ammonia gas will be evolved? (H=1, N=14, O=16, Ca=40, I mole of gas occupies 24dm3 )

1. Carbon burns in oxygen according to the following equation

C (s) + O2 (g)→ CO2(g)

Calculate the volume of carbondioxide collected at s.t.p when 10g of carbon is burnt (c =12, O=16, one mole of a gas occupies 22.4l at s.t.p)

1. When heated strongly, potassium nitrate decomposes according to the equation

2KNO3(s) → 2KNO2(s) + O2(g)

Calculate the volume of oxygen evolved at s.t.p by heating 5g of potassium nitrate (K=39, N=14, O=16, 1mole of a gas occupies 22.4litres at s.t.p)