ANESTAR SCHOOLS

FORM 2 CHEMISTRY

OPENER EXAM

MARKING SCHEME

1. Iron (III) oxide was found to be contaminated with copper (II) sulphate. Describe how a pure sample of iron (III) oxide can be obtained. (3mks)

***Add water to the mixture then stir for all the Copper (ii) sulphate to dissolve. Filter the resulting mixture to obtain Iron (iii) oxide as the residue. Wash the residue and dry it between filter papers***

1. The electronic structures of five atoms, A, B, C, D and E, are shown.



Answer the following questions about these structures. Each structure may be used

once, more than once or not at all. State which structure, A, B, C, D or E, represents:

 (5mks)

1. An atom of a metallic element

***C***

1. An atom with a proton number of 13

***C***

1. An atom of phosphorus.

***E***

1. An atom with only two shells of electrons.

***D***

1. An atom which forms a stable ion with a single negative charge

***A***

1. Element **E** has an atomic number of 5. In a sample of **E** there are two isotopes. One isotope has a mass number of 10 and the other isotope has a mass number of 11.
2. Explain, in terms of subatomic particles, what is meant by the term isotopes. (2mks)

***Atoms of the same element with the same atomic number (same number of protons) but different mass number (different number of neutrons)***

1. Element **X** has an atomic number of 18. (1mks)

State the electronic configuration of an atom of element **X**

***2.8.8***

1. In an experiment, a piece of magnesium ribbon was cleaned with steel wool. 2.4g of

***The*** clean magnesium ribbon was placed in a crucible and completely burnt in oxygen.

After cooling the product weighed 4.0g

1. Explain why it is necessary to clean magnesium ribbon

***To remove the top layer on the magnesium ribbon which magnesium oxide to attain accurate results***

b) What observation was made in the crucible after burning magnesium ribbon?

 (1mk)

***Formation of a white powder***

c) Why was there an increase in mass? (1mk)

***Magnesium metal combined with oxygen to form magnesium oxide***

d) Write an equation for the major chemical reaction which took place in the crucible

 (2mks)

***2Mg(s) + O2(g) 2MgO(s)***

1. The figure below shows an atom with two energy levels (shells).



a. Complete Figure 1 to show the electronic structure of a boron atom. (1mk)

c. What does the central part labelled Z represent in the figure above?

***Nucleus***

d. Name the sub-atomic particles in part Z of a boron atom and give the relative charges of these sub-atomic particles (3mks)

***Neutrons – neutral***

***Protons – positively charged***

6. Complete the sentences.

a. The atomic number of an atom is the number of (1mk)

***Protons in the nucleus of an atom***

b. The mass number of an atom is the number of (1mk)

***The sum of protons and neutrons in an atom of an element***

1. Explain why an atom has no overall charge. Use the relative electrical charges of subatomic particles in your explanation. (2mks)

***The number of protons which are positively charged is equal to the number of electrons which are negatively charged***

d. Explain why fluorine and chlorine are in the same group of the periodic table.

Give the electronic structures of fluorine and chlorine in your explanation. (2mks)

***Chlorine and Fluorine have electron arrangements of 2.8.7 and 2.7 respectively. They have the same number of electrons in the outer most energy level***

1. The diagram below shows students set-up for the preparation and collection of oxygen gas

X

 

 SODIUM PEROXIDE

(a) Name substance **X** used (1mk)

***Water***

(b) Write an equation to show the reaction of sodium peroxide with the substance named in **1a (2mks)**

***2Na2O2(s) +2H2O(l) 4NaOH(aq) + O2(g)***

1. A) State what is observed when solid iodine is heated (2mks)

***Shiny black crystals of iodine turn into a purple vapour***

b) Name the process that iodine undergoes when heated (1mk)

***Sublimation***

c) State two other substances that undergo the same process as b) above (2mks)

***Benzoic acid***

***Dry Ice***

1. A student set the experiment below to investigate the percentage of oxygen in air



1. Use the findings above to calculate the percentage of air used in combustion (3mks)

 ***Change in volume : 45-36=9cm3***

***9 /45= O.2***

 ***0.2×100= 20%***

1. If the percentage of oxygen in air is theoretically 20.9%, give two reasons why the value in a) above is different. (2mks)
* ***The sodium hydroxide solution may not have absorbed all the carbon (iv) oxide gas***
* ***The candle may have gone off before all the oxygen is used up due to the build-up of carbon (iv) oxide***
1. Why is concentrated sodium hydroxide preferred to water in the above experiment (1mks)

***It absorbs Carbon (iv) Oxide that was initially in the gas jar and that which is produced during combustion***

1. A) State the meaning of the term radical. (2mks)

***This is a group of atoms with a net charge and that react as a unit during a chemical reaction***

b) Name and write the chemical formular of two radicals with a charge of 2+ and 1+ (2mks)

***Sulphate ions SO42-***

***nitrate ions NO3-***

1. The set up below was used prepare hydrogen gas. Study it and answer the questions that follow.



1. Identify and explain the mistake in the above experiment (2mks)

***The method of collection should have been upward delivery because hydrogen gas is less dense than air***

1. What would be liquid Y (1mk)

***Concentrated sulphuric (vi) acid***

1. Write a word equation for the reaction between hydrogen gas and lead oxide (1mks)

***Zinc metal + Dilute Hydrochloric acid Zinc Chloride + Hydrogen gas***

1. What is the test for Hydrogen gas? (1mks)

***It burns with a pop sound***