**FORM 2**

**CHEMISTRY**

**END YEAR 2022 MARKING SCHEME**

1. Define the term Chemistry? (1mks)

**Chemistry is a branch of science that deals with the study of structure properties and composition of matter and changes that matter undergoes.**

1. An atom of element x is represented as shown below.

 23

 X

 11

1. Using dots or crosses diagrams draw the atom of element x. (2mks)=3
2. Show the electronic configuration of a stable ion formed by element x. (1mk)=4

 **2.8**

1. Define the following terms. (3mks)=7
2. Crystallization

 **Is the process of obtaining crystals from a saturated solution.**

1. Radical

 **Group of atoms that exist and react as a unit with a net positive charge**

1. Mixture

 **A combination of 2 or more substances which ca be separated by physical means.**

1. Study the diagram below and answer the questions that follow.

|  |  |  |
| --- | --- | --- |
|  |  | E |
| A | B |  | C |  |  |  | D |  |
|  | G | I |  |  |  | H |  |
| F |  |  |  |  |  |  |  |  |

(i) Write down the electronic configuration of element E. (1mk)=8

 **2**

(ii) Ion formed by element H. (1mk)=9

**2.8.8**

(iii) Formula or compound formed when G combines with D. (1mk)=10

**CD2**

1. By giving reason, identify the type of bond formed in a (iii) above? (2mks)=12

 **Ionic bond, there is complete transfer of electrons from one atom to anoth**er

1. Explain the differences in the melting points of A and B. (2mks)=14

 **B has a higher melting point than A; Atomic radius in B is smaller than that in A leading to stronger metallic bonds in B than in A which are more difficult to break.**

1. Compare the reactivity of element D and H. (2mks)=16

 **D is more reactive than H both react by electron gain; atomic radius of D is smaller than that of H. Hence D attracts electrons to its outermost energy level strongly than H. Accept D needs less energy to gain electrons in its outermost energy level than H.**

Name that particles that are responsible for electricity conductivity in ? (3MKS=19

1. Melts?

 **Mobile ions**

1. Solids?

 **Delocalized electrons**

1. Aqueous solutions?

 **Mobile ions**

1. (a) Give the chemical name of rust? (1mk)=20

 **Hydrated iron (iii) Oxide**

(b) Name 3 conditions necessary for rusting. (3mks)=23

 **Moisture**

 **Oxygen**

 **iron**

1. Distinguish the following terms: (6mks)=29
2. Allotropes and isotopes

 **Allotropes are different forms of an element at the same physical state.**

1. Isotopes

 **Atoms of the same element with same atomic number but different mass number.**

1. Hydroscopic and deliquescent salts.

 **Hygroscopic substances are those that absorb moisture from the atmosphere but do not dissolve to form solution**

 **Deliquescent substances are those that absorb water from the atmosphere and dissolve to form a solution**

1. Thistle funnel and separating funnel

 **Thistle funnel is used when delivering liquid and do not have a tap.**

 **Separating funnel is used to separate immiscible liquids and has a tap.**

1. Give two substances which can be separated by sublimation (2mks)=31

 **Iodine and common salt**

1. Is air a mixture or a compound? Explain. (2mks)=33

 **Air is a mixture of several gases which can be separated by physical means**

1. When magnesium is reacted with air, there is around 90% change in volume of air. With the help of chemical equations. Explain this. (4mks)=37

 **Magnesium reacts with both oxygen and Nitrogen to form Magnesium Oxide and Magnesium nitrude**

 **2mg(s) + oxygen (g) 2mgo(s)**

 **3Mg(s) + N2(g) Mg3N2(s)**

1. The graph below shows the changes that occur when solid A is heated. Study it and answer the questions that follow.

Temperature

 D

 B C

 A

 Time

1. What happens between points A and B. (2mks)=39

 **Temperature increases steadily. Heat energy supplied increases kinetic energy of particles making them to vibrate more vigorously.**

1. What happens between Point B and C. (2mks)=41

 **Temperature remains constant. Heat energy supplied is used to weaken forces of attraction holding solid particles together as result solid changes to liquid.**

1. What are the effects of impurities on the melting point and boiling point of substances? (2mks)=43

 **Impurities lower the melting point and increase the boiling point.**

1. The set up below shows laboratory preparation of carbon (ii) oxide gas.

 Concentrated sulphuric acid

Methanoic acid

1. Complete the diagram to show how carbon (ii) oxide gas is collected. (4mks)=47
2. Explain why carbon (ii) oxide gas is collected as shown above. (1mk)=48

**It is slighting soluble in water**

1. Write a chemical equation for the reaction above. (1mk)=49

 **Conc**

 **HCOOH (S) Co(g) + H2O (l)**

 **Sulphuric acid**

1. Name 2 other methods that ca be used to prepare carbon (ii) oxide gas. (2mks)=51

 **Dehydration of ethanedioic acid**

 **Passing carbon (iv) oxide gas over heated charcoal**

1. A charcoal Jiko should be left burning in poorly ventilated room. Explain. (2mk)=53

 **It produce carbon (ii) oxide which causes suffocation. It permanenting combines with haemoglobin to form carboxyl haemoglobin**

1. Study the set up below and answer the questions that follow.

 bulb

 Lead (ii) bromide

a) State one condition missing in the set up (1mk)=54

**heat**

b) What happens to lead (ii) Bromide and the bulb when the condition above is available. (2mks)=56

**lead (ii) bromide will be decomposed to lead ions and bromine ions. Lead metal will be deposited at cathode while bubbles of Bromine gas will be seen at the cathode. Bulb will also light.**

c) Write equations for the reactions occurring at (2mks)=58

(i) The cathode

**Pb2+(l) + 2e- Pb(s)**

(ii) The anode

**2Br –(l) Br2(g)+ 2e-**

1. The figure below shows a section of the solvary process.

 Substance B

Solid E and solid F

 Brine

 Calcium oxide

 Carbon (iv) oxide gas

1. Name substance B. (1mk)-59

 **Ammonia gas**

1. Where should the solvary process be carried out? Explain (2mks)=61

 **Near a river, to cool the Carbonator**

1. Name solids E and F. (2mks)=63

 **E- coke**

 **F limestone/calcium carbonate**

1. Name 3 substances recycled in the Solvary process. (3mks)=66

 **Water**

 **Ammonia gas**

 **Carbon(iv)oxide**

1. Give the method used to separate components of crude oil. (1mk)=67

 **Fractional distillation**

1. Give 2 applications of crystallization (2mks)=69

 **Extraction of salt from salty water**

 **Extraction of sugar from sugar cane**

1. Give the name of the following method of gas collection. (1mk)=70

 Gas P

 **Upward delivery(downward displacement of air.**