233/1

CHEMISTRY

PAPER 2

JULY/AUGUST 2015

2 hours

 ASUMBI GIRLS HIGH SCHOOL

 FORM 3 CHEMISTRY

 Cycle Two Term Two 2015

 (THEORY)

1.(a) Nitrogen and hydrogen are raw materials used in the industry manufacture of ammonia

 Name two sources of the hydrogen used in the process (1mark)

(b) The chart below shows a number of reactions starting with ammonia .Study it and answer the questions that follow

Solution c

ammonia

sulphur

Solution B

Nitric V acid

Compound A

S step 1 step II

S (i)Oxygen H2S(g)

 (ii) Water +catalyst Cu(s)

 Step III

 Ammonium solution

 (little until excess)

(i) Name the catalyst used in step 1 (1mk)

(ii)Write down the equation for the reaction that requires the catalyst in step 1 (2mks)

(iii) What observation is made in step III (1mk)

(iv) Write down the formular of the complex ion present in solution C (1mk)

(v) What property of concentrated nitric V acid is shown by the reaction in step II (1/2mk)

(vi) State one use of compound A (1mk)

(c) 1.8 litres of ammonia gas are bubbled through excess dilute nitric V acid at a room temperature and pressure.Calculate the mass product formed

(Molar gas volume at r.t.p=24.0dm3,N=14.0,O=16.0,H=1.0) (2mks)

(d) Between ammonium sulphate and ammonium phosphate (NH4)3PO4.Which is the best fertilizer(N=14,H=1,P=31,O=16,S=32) (2mks)

(e)The set up below is used to prepare nitric acid

 Glass cork

 Red brown fumes

Mixture X

(i) Name the reagent in the mixture X (1mk)

(ii) Write an equation for the reaction which takes place in the glass retort (1mk)

(iii) Give a reason why during preparation of nitric V acid all the apparatus are made of glass (1mk)

(iv) Explain why Nitric V acid is stored in dark bottles ( 1mk)

(v) Give one use of Nitric V acid(1mk)

2.(a) Sulphur is mined using the frasch process which uses super heated water at 1700C and hot compressed air

 (i) What is the role of superheated water (1mk)

(ii) State the role oof compressed air (1mk)

(b) Name two crystalline form of sulphur (1mk)

(d)The set up below was used by the student to prepare sulphur IV oxide gas in the laboratory.Study it and answer the question that follow

 Reagent T

 Sulphur IV oxide

 Potassium dichromate

 (VI)paper

 Solid y Concentrated sulphuric VI acid

(a) Identify any two mistakes in the set up (2mks)

(b) (i) Name reagent T and solid Y (1mk)

 Reagent T

 Solid Y

 (ii) Write the equation between the reagent T and solid Y (1mk)

(c) State the role of concentrated sulphuric VI acid (1mk)

(d)State and explain the observation made when:-

 (i) A piece of moisture blue litmus paper is dropped into gas jar of sulphur IV oxide gas (2mks)

(ii) Sulphur IV oxide gas is bubbled into 2cm3 of acidified potassium dichromate VI in test tube (2mks)

(iii) When a piece of burning magnesium ribbon is lowered in a gas jar full of sulphur (iv) oxide (2mks)

(e) Describe how Rhombic sulphur can be prepared in the laboratory (2mks)

3. Study the flow chart below and answer the question that follow

 Brine

filter

Solvay tower

Chamber D

 solid P

Chamber S

 Gas F liquid H

Chamber N

limestone

Na2CO3

(a)I dentify (3mks)

 (i) Gas F

 (ii) Liquid H

 (iii) Solid P

(b) State one use of calcium chloride (1mk)

(c) Give one reason why such a plant should be cited near a river (1mk)

(d) Write equations for the reaction occurring in chamber (2mks)

N

S

(e) Explain how ammonical brine is formed (1mk)

(f) State one use of sodium hydrogen carbonate (1mk)

4.(a) Study the diagram below

(i) Name the apparatus above (1mk)

 Separating funnel

(ii) Which types of liquids are separated by this method (1mk)

(b) Sate and explainthe observations that would be made when aqueous ammonia is added to iron II chloride solution till excess (1mk)

(c) Write ionic equation for (i) above (1mk)

5. An experiment was done between lead I nitrate solution and potassium iodide solution.10cm3 of 0.4M potassium iodide solution was put in 10 test-tube s and different volumes of 0.25M lead II nitrate added to the different test –tubes.A yellow precipipitate and colourless solution were formed each time.The tabe below gives the results obtained in each case

Height of precipitate (mm) 5 10 15 20 25 30 35 39 39 39

Volume of lead II nitrate (cm3 ) 1 2 3 4 5 6 7 8 9 10

(i) Draw a graph of height of precipitate (y-axis) against volume of lead (ii) nitrate solution added (3mks)

(ii) Name the precipitate formed during the experiment (1mk)

(iii) From the graph,determine the height of precipitate when 5.4 cm3 of lead II nitrate solution is added(1mk)

(iv) What volume of Lead II nitrate solution is required for complete reaction ?Explain(1mk)

(v) Determine the number of moles of Potassium iodide solution used (1mk)

(vi) Calculate the number of moles of lead II nitrate solution that reacted (1mk)

(vii) Write an ionic equationfor the reaction between lead II nitrate solution and potassium iodide solution (1mk)

(b) A certain carbonate with dilute hydrochloric acid according to the following equation

 XCO3(s)+2HCL(aq) XCl2(g)+H2O(l)+CO2(g)

1g of this carbonate was dissolved in 50g of 1M hydrochloric acid .After the reaction the solution needed 30cm3 of 1M sodium hydroxide for neutralization

(i) Calculate the number of moles of sodium hydroxide that reacted (1mk)

(ii) Determine the number of moles of hydrochloric acid used in the reaction with XCO3? (1mk)

(iii) Calculate the molecular mass of XCO3 and Hence the relative atomic mass of X

6.The diagram below shows part of the periodic table .The letter of the element shown in it do not represent the actual symbols of the elements

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

(I) How do the electrical conductivities of elements A and B compare ?Explain your answer (1mk)

(ii) Element E has two melting points explain this observation (1mk)

(iii) When 1.15g of element D was reacted with cold water 0.6dm3 of hydrogen was produced at r.t.p .From the resultd workout the realative atomic mass of D (3mks)

(molar gas volune =24dm3 at r.t.p)

(iv) Element F has atomic number 14 .show its position in the grid (1mk)

(v) State one use of element C (1mk)

(vi) What is the name given to elements that occupy the shaded part (1mk)

(vii) Write down the equation for the reaction between element B and oxygen (1mk)

(viii) Explain how the reactivity of element A and D with chlorine compare (2mks)