## PERFECT STEPS PUBLISHERS

END TERM EXAMS 2015

**0721 745374/ 0721 707626 NAIROBI**

233/1

CHEMISTRY PP1 2015

1. . A piece of burning Magnesium was introduced into a jar of nitrogen.
2. State what was observed. (1mk)

........................................................................................................................................................................................................................................................................................................

1. Write an equation for the reaction that took place. (1mk)

…………………………………………………………………………………………

1. Describe how a solid sample of dry Lead (II) Carbonate can be prepared using the following reagents: dilute nitric acid, lead(II) Oxide and Sodium carbonate.(3mks)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………...

1. Cyanogen is a gaseous compound of carbon and nitrogen only. On complete combustion is oxygen, 250cm3 of cyanogen from 500cm3 of Carbon (IV) Oxide and 250cm3 of nitrogen. Determine the formula of cyanogen. (2mks)

........................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................

1. Substance L, M, N and P has the following properties.

|  |  |  |  |
| --- | --- | --- | --- |
| Substance | M.P. | Solubility in water | Electrical conductivity |
| Solid state | Liquid state |
| L | Low  | Soluble  | Does not | Does not |
| M | High  | Soluble | Does not | Conducts |
| N | High  | Soluble | Conducts | Conducts |
| P | High  | Insoluble | Does not | Does not |

1. Select the letter which represents a substance which is suitable for making kettle handles (1mk)

……………………………………………………………………………………………………………………………………………………………………………………………………

1. Which letter represents a substance which is likely to be sodium chloride? (1mk)

…………………………………………………………………………………………………

1. Name the bond structure and bond type likely to be in L. (1mk)
2. Bond structure…………………………………………………………
3. Bond type ……………………………………………………………
4. (a) The atomic number of Sulphur, hydrogen and oxygen are 16, 1 and 8 respectively. Write the electron arrangement of Sulphur in the following substances.

 (i) H2S…………………………………………………………………… (1/2mk)

 (ii) SO32-……………………………………………………………………. .(1/2mk)

 (b) State the number of neutrons and electrons in the species of Aluminium shown below:

 

 Neutrons ……………………………………………………………

 (1mk)

 Electrons …………………………………………………………… (1mk)

1. The set-up **below** was used to prepare dry chlorine gas. Study and answer the questions that follow



1. Name reagents **M** and substance **L**  (2mks)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………....................

1. A warm red phosphorus was lowered into the gas jar of chlorine using a deflagrating spoon:
2. State any **one** observation made in this experiment. (1 mk)

……………………………………………………………………………………………………………………………………………………………………………………..

1. Identify the substance formed in the above reaction. (1 mk)

………………………………………………………………………………………..

1. Both substances in **(ii) above** undergo hydrolysis when exposed to air. Write an equation to show how anyone of them undergoes hydrolysis. (1mk)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. The set up of diagram shown **below** is used to prepare dry nitrogen gas from air. Study it and answer the questions that follow.

Burning candle

Sodium hydroxide

solution

Drying agent

Suction pump

1. What is the purpose of using:
2. A burning candle. (1 mk)

………………………………………………………………………………….

(ii) Sodium hydroxide solution. (1mk)

...........................................................................................................................................................................................................................................................................................................

1. Name:
2. **One** impurity present in nitrogen gas prepared. (1 mk)

…………………………………………………………………………………………………………………………………………………………………………………….

1. A suitable drying agent used (1mk).

…………………………………………………………………………………………...........................................................................................................................................

(i) Using a dot (**.**) and cross (x) show how  ion is formed from NH3 molecule and H+ ion. (2 mks)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

1. State the type of bond that exists between the NH3 and H+ ion. (1 mk)

……………………………………………………………………………………………………………………………………………………………………………………………………

 (iii) Molecular substances have low melting points. Give **one** reason why they have low melting points. (1 mk)

 …………………………………………………………………………………………………………………………………………………………………………………………………...

1. The following diagrams show the structure of two allotropes of carbon. Study them and answer the questions that follow.

 **A B**

 (a) Name the allotropes. A and B . (1mk)

 ……………………………………………………………………………………………………………………………………………………………………………………………………

 (b) Give **one** use of **A**. (1mk)

 ...........................................................................................................................................................................................................................................................................................................

 (c)Which allotrope conducts electricity? Explain. (2mks)

 ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Give **two** reasons why helium is used in weather balloons. (2mks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Ammonia is produced in large scale by Haber process.
2. Write an equation for the formation of ammonia gas (1mk).

……………………………………………………………………………………………………………………………………………………………………………………

1. State **two** optimum conditions for obtaining a high yield of ammonia in the process. (2 mks)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. When a hydrated sample of calcium sulphate CaSO4**.**xH2O was heated until all the water was lost, the following data was recorded:

 Mass of crucible = 30.296 g

 Mass of crucible + hydrated salt = 33.111 g

 Mass of crucible + anhydrous salt = 32.781 g

 Determine the empirical formula of the hydrated salt

 (CA = 40, S = 32, O = 16 H = 1) (3mks)

 ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Zinc reacts with both concentrated and dilute sulphuric (VI) acid. Write equations for the two reactions. (2mks)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. Samples of urine from three participants F, G and H at an international sports meetings were spotted onto chromatography paper alongside two from illegal drugs A1 and A2. A chromatogram was run using methanol. The figure below shows the chromatogram.



1. Identify the athlete who had used an illegal drug. (1mk)

…………………………………………………………………………………………….

1. Which drug is more soluble in methanol? (1mk)

………………………………………………………………………………………………

1. Carbon (II) oxide is described as a “silent killer”.
2. State one physical property of carbon (II) oxide that makes it a “silent killer”. (1mk)

…………………………………………………………………………………………………………………………………………………………………………………………………...

1. State and explain one chemical property that makes carbon (II) oxide poisonous to human beings. (2mks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. The diagram below represents a set up for large scale manufacture of hydrochloric acid. Study it and answer the questions that follow.



1. Name substance X. (1mk)

……………………………………………………………………………………………………………………………………………………………………………………………………

1. What is the purpose of the glass beads?(1mk)

……………………………………………………………………………………………………………………………………………………………………………………………………

1. Give two uses of hydrochloric acid.(1mk) ……………………………………………………………………………………………………………………………………………………………………………………………………............................................................................................................................................................................................................................................................................................................

16. Study the figure below and answer questions that follow.



 Name the parts labelled **F** and **G**. (2mks)

 ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

17. The table below gives information on four elements represented by K, L, M and N. Study it and answer the questions that follow. The letters do not represent the actual symbols of the elements.

|  |  |  |  |
| --- | --- | --- | --- |
| **Element** | **Electron arrangement** | **Atomic radius** | **Ionic radius**  |
| K | 2, 8, 2 | 0.136 | 0.065 |
| L | 2, 8, 7 | 0.099 | 0.181 |
| M | 2, 8, 8, 1 | 0.203 | 0.133 |
| N | 2, 8, 8, 2 | 0.174 | 0.099 |

1. Which **two** elements have similar chemical properties? Explain.(2mks) …………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………....

18. Describe how a solid sample of Lead (II) Chloride can be prepared using the following reagents:

 Dilute Nitric Acid, Dilute Hydrochloric Acid and Lead Carbonate. (3mks) …………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………......

19.The diagram below shows part of Solvay Process.

M

K

N

Brine

with ammonia

Carbon (IV) Oxide

NH4Cl(aq)

NaHCO3 (s)

Solid P

Solid Y

1. Name solid P ( 1 mk)

……………………………………………………………………………………………………………………………………………………………………………………………………

1. State the process taking place in chamber N. (1mk)

…………………………………………………………………………………………………………………………………………………………………………………………………….

1. State two uses of calcium chloride which is a by-product in this process.(1mk)

…………………………………………………………………………………………………………………………………………………………………………………………………….

20.100cm3 of methane gas diffused through a porous partition in 40 seconds. How long would it take 90cm3 of ozone gas to diffuse through the same partition?( C = 12, H = 1, O = 16) (3mks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

21.Calculate the volume of oxygen produced when 10g of silver nitrate was completely decomposed by heating at s.t.p (Ag = 108, N = 14, O = 16) Molar gas volume at s.t.p = 22.4dm3) (3 mks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

22.The scheme below shows some reactions starting with ethyne. Study it and answer the questions that follow.

CHBrCHBr

HC≡CH

CH2CH2

Substance N

Conc.

H2SO4

Substance X

1 mole

HBr (g)

Reagent M

Pt (s)

+

Reagent Y (1 Mole)

1. Name substance X and N (2marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

1. Name reagent M ( 1 mk)

…………………………………………………………………………………………………………………………………………………………………………………………………...

1. Ethene undergoes polymerization to form a polymer. Give an equation for the reaction and name the product.(2mks)
2. Equation; ………………………………………………………………….

 (ii) Name: ………………………………………………………………………

23. The table below gives some properties of three elements X,Yand Z.

|  |  |  |  |
| --- | --- | --- | --- |
| ELEMENT | Atomic No. | Meeting point(0C) | Boiling Point (0C) |
| X | 53 | 114 | 184 |
| Y | 35 | -7 | 58.8 |
| Z | 17 | -101 | -34.7 |

1. Which element is in liquid form at room temperature? Give reason. (1mk) ………………………………………………………………………………………………

 ………………………………………………………………………………………………

1. Explain why the boiling point of element X is higher than that of element Z.(2mks) ……………………………………………………………………………………………… ………………………………………………………………………………………………….

24.. The diagram below is a set up for the laboratory preparation of dry oxygen gas.

Sodium peroxide

Liquid X

Liquid Y

1. Name:
2. Liquid Y (1/2 mk)

…………………………………………………………………

1. Liquid X (1/2 mk)

…………………………………………………………………….

1. Write an equation for the reaction that took place in the flask.(1mk)

……………………………………………………………………………………………………………………………………………………………………………………

 (c) Complete the diagram to show how dry oxygen can be collected. (1mk)

 (Do it on the diagram)

25. The graph below shows how the PH value of soil in a farm changed over a period of time.

PH

2

4

6

A

B

C

D

E

Time

1. Describe how the PH of the soil can be determined.(2mks)

…………………………………………………………………………………………………………………………………………………………………………………………………...

State one factor that may have been responsible for the change in the soil PH in the time interval AB. (1mark)

…………………………………………………………………………………………………………………………………………………………………………………………………….

26. A student put calcium carbonate and calcium hydrogen carbonate in separate test tubes and performed

 the tests as shown in the table below. Complete the table by giving the expected observations.(2mks)

|  |  |  |
| --- | --- | --- |
| Salt | Adding water  | Heating |
| Calcium Carbonate |  |  |
| Calcium hydrogen carbonate |  |  |

**This is the last printed page.**

233/1 CHEMISTRY PP1 MARKING SCHEME 2015.

1.(a) Magnesium continued to burn with a brilliant flame producing a white ash. (1mk)

 (b) 3Mg(s) + N2(g) …………………> Mg3N2(s)

 (c) Take 50cm3 of nitric acid and react it with excess Lead (II)Oxide

 Filter to get the filtrate

 To the filtrate add Sodium Carbonate and filter to obtain Lead (II)Carbonate as the residue. (3mks)

**2.** 2.Cx Ny(g) + 2O(g) …………….> 2CO2(g) + N2(g)

 250cm3 : 500cm3 500cm3 : 250cm3

 1 vol : 2 vol 2Vol : 1 Vol

 XC = 2C

 X = 2

 yN = 2N

 y= 2

 Formula of Cyanogen C2 N

**3.** (i) P ✓1

 (ii) M ✓1

 (iii) a) Simple molecular ✓1/2

 b) Covalent bonds ✓1/2

**4.**  (a) (i) S16 = 2.8.6 ✓ 1/2

 (ii) S12 = 2.8.2 ✓ 1/2

 (b) (i) Neutron – 14 ✓1

 (ii) Electron - 10 ✓1

5.**.** (a) M – Concentrated hydrochloric acid 1mk

 L – Concentrated sulphuric (VI) acid 🗸1

 (b) (i) It catches fire, or presence of fumes. 🗸1

 (ii) PCl3 or PCl5 Phosphorus (III) chloride or phosphorus (V) chloride 🗸1

 (c) 🗸1

 Or 

**6.** (a) (i) It is used to remove oxygen from air. 🗸1

 (ii) It removes CO2 produced by the burning candle and also from air. 🗸1

 (b) (i) Argon/Neon/Krypton 🗸1

 (ii) Concentrated sulphuric (VI) acid //  🗸1

H



XO

 H

 H

 N

XO

O+

 O

 H+



**7.** (i)

 🗸1mk

H

••

 X

 •

X•H

 X

 •

A H

B H

 +

1. Dative bond/co-ordinate bond. 🗸1

Weak intermolecular forces 🗸1

1. The molecules are held by weak van de waals forces.

**8.** A – Diamond 🗸1

 B – Graphite 🗸1

 (b) - Drilling metals. Any 🗸1

 - Jewelling.

 (c) B 🗸1 Existence of developed electrons 🗸½ when transfer electricity. 🗸½

**9.** Its light/less dense. 🗸1

 It’s inert/unreactive. 🗸1

**10.** (a) N2(g) + 3H2(g) $\rightarrow $ 2NH3(g)

 Pressures of 200 atms

 Temperature of 450 $℃ $to 500$℃$

 Finely divided iron (any two)

**11.** Mass of CaSO4 = 32.781 – 30.296

 = 2.485 g

 Mass of H2O = 33.111 – 32.781

 = 0.33 g

 CaSO4 H2O

 2.485 0.33

 40+32+16x4 1x2+16

 2.485 = 0.0183 0.33 = 0.0183

 136 18

 0.0183 = 1 0.0183 = 1

 0.0183 0.0183

 E.F = CaSO4.H2O

**12.** Zn(s) + H2SO4(aq) ZnSO4(aq) + H2(g)

 (dilute)

 Zn(s) + 2H2SO4(l) ZnSO4(aq) + 2H2O(l) + SO2(g

**13.**  (a) G

(b) A1

**14**. (a) It has no smell.

 (b) It combines with haemoglogin to form stable carboxyhaemoglobin.This prevents the transportation of oxygen by the

 haemoglobin. The victim dies as a result of lack of oxygen.

15. (a) Hydrogen gas

 (b) The glass beads increase the surface area over which absorption of hydrogen chloride gas in water takes place.

 (c) To standardize pH of beers and wines.

 - In pickling of metals

 - Manufacture of dyes and drugs

 - Manufacture of photographic materials

 (any one collect as above)

16.F – Thin outer region.

G – Colourless region.

(b) A2B3

17.K and N (must state two otherwise penalize). They have the same number of electrons in he outermost energy level.

- Both react by losing two electrons.

18.- Add lead (II) carbonate to nitric acid and filter.

* + - * 1. Add sulphur (VI) acid to the filtrate.
				2. Filter and dry the residue which is PbSO4 between two filter papers.

19.(a) Calcium oxide//Quickline ✓ 1 Mark

(b) Filtration//Fractional crystallization/crystallisation of NaOH3✓ 1

(c) - In the extraction of sodium metal

 - Pickling

 - As a drying agent

 - Anti microbial agent

 - Anti cracking agent

 (Any to correct answers award ½ mark each)

20.Rate of diffusion of methane gas = $\frac{100cm^{3}}{40 sec}$ = 2.5cmsec-1 ✓ ½ mark

Let rate of diffusion of ozone be $\frac{90}{t} $= R

 Molar mass of CH4 = 12 + 4 = 16 ½ mark

 Molar mass of O3 = 16 x 3 = 48

 ∴ $\frac{Rmethane}{ROzone}$= $\frac{\sqrt{MMO\_{3}}}{\sqrt{MMCH\_{4}}}$

 $\frac{2.5}{R}$ = $\frac{\sqrt{48}}{\sqrt{16}}$ ✓ ½ mark

 ∴R = $\frac{2.5 x \sqrt{16}}{\sqrt{48}}$ = 1.4434cm3/sec ✓ ½ mark

 ∴ $\frac{90}{t}$ = 1.4434 ✓ ½ mark

 ∴ t = $\frac{90}{1.4434}$

 = 62.3528sec ✓ ½ mark

21.2AgNO3 (s) 2Ag(s) + 2NO2(g) + O2(g) (1mk)

 MM

 2(108 + 14 + 16 x 3) Volume of O2 22.4dm3

 = 340 ✓ ½ mark

 340g of silver nitrate releases 22.4dm3 of O2 ✓ ½ mark

* 10g of silver nitrate releases $\frac{22.4dm^{3}}{340g}$ x 10g ✓ ½ mark

 = 0.6588dm3 ✓ ½ mark

22.(i) X – Bromo ethene ✓ 1 mark

 N – Ethyl hydrogen sulphate ✓ 1 mark

1. M – Bromine gas ✓ 1 mark

 (c) $\begin{matrix}H&H\\C&C\\H&H\end{matrix}$ $\begin{matrix}H&H\\C&C\\H&H\end{matrix}$ ✓ 1 mark

=

n

=

n

 Polyethene ✓ 1 mark

23.aY-At room temperature (250c) Y is a liquid since its M.P and B.P lie between -7oc and 58.80c OR

 (room temperature is between M.P and B.P.)

 b) The molecular mass of x is higher🗸1 than that of Z; the Vander Waals forces are stronger 🗸in X molecules than in Z molecules hence X has a higher boiling point than Z.

24.a) I water 🗸 ½ mk

 II concentrated sulphuric acid🗸 1/2 mk

1. 2Na2O2(s) +2H2O(l) 4NaOH(aq) +O2(g)  🗸 1

(c)

**Gas jar🗸**1/2 **mk**

**Cardboard with a hole in it.🗸**½ **mk**

25a) Add distilled🗸1/2 water to the soil sample and stir. Add 2 drops of universal indicator🗸1/2 to the

 mixture and compare with the PH chart🗸1

* Extensive use of acidic fertilizers
* Pollution by acid rain. (any 🗸1

|  |  |  |
| --- | --- | --- |
| Salt | Adding water | Heating |
| Calcium carbonate | Does not dissolve | Forms a white solid |
| Calcium hydrogen carbonate | Dissolves to form a colorless solution | Forms a white solid and a colourless liquid form on the upper cooler parts of the apparatus |

26.

END M/S.

## PERFECT STEPS PUBLISHERS

END TERM EXAMS 2015

**0721 745374/ 0721 707626 NAIROBI**

233/2 CHEMISTRY PP2 FORM 3 2015.

1.The diagram below shows the effect of heat on hydrated copper (II) sulphate.



I. (a) State the observations made in tube G. (2 marks)

 ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

  (b) Identify substance F. (1 mark)

 …………………………………………………………………………………………………

  (c) Explain the use of the following in the above set up

 (i) Ice cold water. (1 mark)

 ………………………………………………………………………………………………………………………………………………………………………………………………………….......

 (ii) Salt in ice cold water. (1 mark)

 ……………………………………………………………………………………………………………………………………………………………………………………………………………...

 (iii) Boiling tube G kept at a slanting position. (1 mark)

 ………………………………………………………………………………………………………………………………………………………………………………………………………………

  (d) Describe a chemical test for substance F. (1 mark)

 ……………………………………………………………………………………………………………………………………………………………………………………………………

1. 12.5g of hydrated copper (II) sulphide were heated to constant mass 8.0g of solid residue was formed. Determine the formula of the hydrated salt. (Cu=63.5, S=32.0, O=16.0, H=1.0)(3 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

2. (a) Distinguish between a thermoplastic and a thermosetting polymer. (2 marks)

 ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

  (b)(i) Classify the following Terylene, cellulose, perspex, proteins as either Natural polymers or synthetic polymers.

  I. Natural polymers………………………………………………………..(1 mark)

 II. Synthetic polymers……………………………………………………(1 mark)

 (ii) Identify an addition polymer from the list given. (1 mark)

 …………………………………………………………………………………………………….

  (c) Study the scheme below and answer the questions that follow.



  (i) Identify substances.

  A …………………………………………………………………… (1 mark)

 C……………………………………………………………………. (1 mark)

 (ii) Name processes.

  II……………………………………. \_ (2 marks)

  III……………………………………

  (iii) Name a reagent used in step I. (1 mark)

 ……………………………………………………………………………………………….

   (iv) Draw and name the structural formula of B. (2 marks)

 ……………………………………………………………………………………………………..……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**3.** The grid below shows part of the periodic table. Letters given are not the actual symbols of the element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   | P | Q | R |
| S | T |   |   |   |   | U |   | V |
| W |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |   |

  (i) Identify an element with largest atomic radius. Give your reason. (2 marks)

 ……………………………………………………………………………………………………..…………………………………………………………………………………………….

 (ii) Atom V is heavier than atom R. Explain. (1 mark)

 …………………………………………………………………………………………………..…………………………………………………………………………………………………

   (iii) Give the electron arrangement of

  W……………………………………………………………………… (1mark)

  V……………………………………………………………………….. (1mark)

 (iv) Element X is in period IV and group VII

  I. Indicate its position in the grid. (1 mark

  II. State the oxidation number of its ion. (1 mark)

 …………………………………………………………………………………………………………………………………………………………………………………………………..

1. Write the formula of compound formed when X is reacted with Aluminium metal.

(1 mark)

………………………………………………………………………………………………………………………………………………………………………….

  (v) Write an equation of the reaction between S and Q. (1 mark)

 ………………………………………………………………………………………………….

 **4.** The diagram below shows a set-up that was used to prepare and collect sulphur (IV) oxide gas. Study it and answer the questions that follow.

  

  (a) (i) Name substance R. (1 mark)

 ……………………………………………………………………………………………

  (ii) Name apparatus M. (1 mark)

 ……………………………………………………………………………………………

 (iii) Write a balanced equation for the reaction between R and Sodium sulphite.(2 marks)

…………………………………………………………………………………………………………………………………………………………………………………………………….

  (iv) Why is sulphur (IV) oxide not collected by over water methods. (1 mark)

 …………………………………………………………………………………………..

  (v) (i) Identify substance K. (1 mark)

 ……………………………………………………………………………………………

(ii) What is the function of substance K. (1 mark)

 ……………………………………………………………………………………………

  (b) Sulphur (IV) oxide and hydrogen sulphide react according to the equation shown below. The gases were moistened first.

  (i) Identify the oxidizing reagent. Explain your answer. (2 marks)

…………………………………………………………………………………………………….…………………………………………………………………………………………….

  (ii) What precaution should be taken during this reaction. Explain. (2 marks)

……………………………………………………………………………………………….…………………………………………………………………………………………………………………………………………………………………………………………………….

**5.** The following diagram shows the effects of heat on the physical states of substances.

(a) Identify the processes represented by the letters A, B, C, D, E and F (3 marks)

 ....................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................

  (b) Name two substances that undergo the process labelled E and F. (2 marks)

……………………………………………………………………………………………………………

(c) Name a method that can be used to extract the following:-

 (i) Common salt from a salt solution. (1 mark)

…………………………………………………………………………………………

(ii) Paraffin from crude oil. (1 mark)

………………………………………………………………………………………..

(d) A student separated liquid P (B.P 78°C) and liquid Q (B.P 100°C) wring the apparatus shown below.



  (i) Name the apparatus labelled

 (a) M .......................................................................................................(1 mark)

  (b) R.........................................................................................................(1 mark)

  (ii) State one function of the glass bead in apparatus labelled R (1mark)

……………………………………………………………………………………………………………………………………………………………………………………………………

 (iii) What is the reading on the thermometer when the first jar drops of the distillate appeared in the beaker. (1 mark)

 …………………………………………………………………………………………………..

  (iv) Which of the liquids remains in the flask. (1mark)

 …………………………………………………………………………………………………..

6.**(**a) Fractional distillation of liquid air usually produces nitrogen and oxygen as the major products.

(i) Name one substance that is used to remove carbon (IV) oxide from the air before it is changed into liquid. (1 mark)

……………………………………………………………………………………………

  (ii) Describe how nitrogen gas is obtained from the liquid air. (Boiling point nitrogen =-196°C, oxygen =-183°C) (3 marks)

…………………………………………………………………………………………………..…………………………………………………………………………………………………………………………………………………………………………………………….............

1. Study the flow chart below and answer the questions that follow.



(i) Name element M. (1 mark)

…………………………………………………………………………………………

(ii) Why is it necessary to use excess air in step 4? (1 mark)

…………………………………………………………………………………………

(iii) Identify gas Q (1 mark)

…………………………………………………………………………………………

(iv) Write an equation for the reaction in step 7. (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………..

(v) Give one use of ammonium nitrate. (1 mark)

…………………………………………………………………………………………….

  (**c)** State and explain the observation that would be made if a sample of sulphur is heated with concentrated nitric acid. (3 mark)

……………………………………………………………………………………………………..…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**7.** Study the information in the table below and answer the questions that follow. (The letters are not the actual symbols of the element.)

|  |  |  |
| --- | --- | --- |
|  **Element** | **Electronic configuration** | **Ionisation energy KJmol-1** |
| J | 2 : 1 | 519 |
| K | 2 : 8 : 1 | 494 |
| L | 2 : 8 : 8 : 1 | 418 |

1. (i) What is the general name of elements J, K and L (1 mark)

………………………………………………………………………………………………………………………………………………………………………………………….

(ii) What is ionisation energy ? (1 mark)

………………………………………………………………………………………………………………………………………………………………………………………………………………

(iii) Explain why element L has lowest ionisation. (1 mark)

………………………………………………………………………………………………

(iv) When a piece of element K was placed on water, it melts a hissing sound was produced as it moves on the surface of the water. Explain these observations. (3marks)

...........................................................................................................................................................................................................................................................................................................................................................................................................................................................................................

  (v) Write an equation for the reaction between L and water. (1 mark)

…………………………………………………………………………………………………………………………………………………………………………………………………

  (b) One method of preparing salt is called neutralisation.

  (i) What is neutralization reaction. (1 mark)

…………………………………………………………………………………………………….………………………………………………………………………………………………………………………………………………………………………………………………….

 (ii) Describe how you would prepare crystals of sodium nitrate starting with 200cm³ of 2M sodium hydroxide. (3 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

 (iii) Write an equation for the reaction that takes place when a solid sample of sodium nitrate is heated. (2marks)

 …………………………………………………………………………………………………..…………………………………………………………………………………………………………………………………………………………………………………………………

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## PERFECT STEPS PUBLISHERS

END TERM EXAMS 2015

**0721 745374/ 0721 707626 NAIROBI**

233/2 CHEMISTRY PP2 MARKING SCHEME

1. a) Blue copper (II) sulphate turned to white.

 - Colourless liquid condenses on the cooler parts of the apparatus.

  b) Water

  c) i) Condense the vapour

  ii) Salts acts as an impurity lowers the freezing point of ice.

  iii) To prevent the condensing water from running back into the hot boiling tube and

crack it.

  d) Take a sample of substance F and add it to blue anhydrous cobalt (II) chloride which will turn to

pink.

 NB: Anhydrous white copper (II)( sulphate can also be used.

II. Mass of water = 12.5 - 8.0= 4.5g ½



 CuSO4.5H2O

**2.** (a) Thermoplastics are polymers which soften on heating and regain their original properties on cooling while Thermosetting polymers are changed irreversibly into hard and rigid materials on heating.

(b) (i) I. Natural polymers - cellulose, ½ proteins ½

 II. Synthetic polymers - Terylene, ½ Perspex ½

  (ii) Perspex 1

  (c) (i) A - sodium propoxide 1

 C - propane 1

  ii) II- polymerization 1

 III- - cracking 1

  iii) Hydrogen bromide gas. 1

 iv)

 1

propene 1

 **3.** i) W, 1has more energy levels than others. 1

  ii) V has more protons and neutrons than R.1

  iii) W - 2.8.8.1 1

 U - 2.8.6 1

  iv) i) Indicated two steps below Q 1

  ii) - 1 1

  iii) AlX3 1

  v) 1

**4.** a) i) dilute hydrochloric acid. 1

 ii) dropping funnel 1

  iii)

 iv It is soluble in water. 1

  v) Concentrated sulphuric (VI) acid 1

 /H2SO4(l)

  ii) To dry sulphur (IV) oxide gas. 1

  b) (i) Sulphur (IV) oxides 1 - it gives oxygen to hydrogen sulphide oxidising it to water 1 and sulphur.

  (ii) The reaction should be done in the fume Chamber.

**5**a) A - melting ***½***

 B - freezing ***½***

 C - evaporation // boiling ***½***

 D - condensation ***½***

 E - Deposition ***½***

 F - Sublimation ***½***

 ***award ½ mark for each correct answer***

(b) Iodine

 Ammonium chloride

 Solid carbon (IV) oxide

 ***any two correct for two marks.***

c) i) Simple distillation // evaporation method ***½***

 ii) Fractional Distillation of crude oil ***1***

d) i)

 a) M - Lie big condenser ***1***

b) R - fractionating column ***1***

 ii) Glass beads increase surface area ***1*** in the fractionating column.

 iii) 78°C ***1***

iv) Water ***1***

 **6.**a) (i) KOH/NaOH /Caustic potash / soda. ***1***

(ii) - Heat / warm / ***1*** raise temperature

for the liquid air.

- Nitrogen comes out ***1*** first // distils first as it has a lower ***1*** boiling tube.

 b) (i) Hydrogen / H2 ***1***

(ii) So that all ammonia reacts ***1 //*** oxidised // to increase the yield of NO.

 iii) Nitrogen (II) oxide // NO ***1***

(iv) NH3(g) + HNO3(aq) NH4NO3(aq)

 (v) - Used as fertilizer ***1***

- Manufacture of explosives

 (c) Brown ***½*** gas which is NO2 white sulphur dissolves ***1***

***-*** Sulphur is oxidized ***½*** to SO2 / HSO4 ***½*** while HNO3 is reduced to NO2 ***½***

 ***Equation can explain***

**7. (**a) (i) Alkali metals

**(**ii) Enthalpy change when 1 mole of electrons is removed from 1 mole of gaseous atom. ***1***

(iii) It has largest atomic radius hence the outermost electrons one less attracted to the nucleus requires little energy.

(iv) Melts, because the reaction is very exothermic

* + Hissing sound, due to production of hydrogen gas.
	+ Floats on water, has low density as compared to water.

(v)

  (b) (i) Neutralization reaction is a reaction between an acid and base whereby equal moles react completely.

(ii) Add 200 cm³ 2m HNO3 into 200cm³ 2M NaOH for complete neutralization evaporate // heat to concentrate the solution // saturate ***½*** Allow the mixture to cool for crystals to appear.Filter or decant to obtain crystals or any other correct method e.g. titration method.

 iii) 2NaNO3(S) 2NaNO2(S) + O2(g)

## PERFECT STEPS PUBLISHERS

END TERM EXAMS 2015

**0721 745374/ 0721 707626 NAIROBI**

233/3 CHEMISTRY PP3 FORM 3 2015 (PRACTICAL)

**CONFIDENTIAL**

**EACH STUDENT REQUIRES THE FOLLOWING IN ADDITION TO THE FITTINGS AND CHEMICALS FOUND IN CHEMISTRY LAB.**

100cm3 of solution A.

100cm3 of solution B.

200cm3of solution C.

1 burette.

1 pipette and pipette filler.

3 conical flasks.

50 mls measuring cylinder.

500cm3 distilled water.

1g solid K provided in a stoppered container.

1 boiling tube.

1 filter paper.

1 filter funnel.

1g solid X.

PH indicator paper and chart.

1 red and 1blue litmus paper.

6 test tube in a test tube rack.

Phenolphthalein indicator.

ACCESS TO:

2M sodium hydroxide.

2M Ammonia solution.

Acidified potassium manganite VII.

Barium chloride solution.

Potassium iodide solution.

2M nitric acid.

**Preparations.**

1.solution A is prepared by dissolving 6.4g oxalic acid in 700cm3 of distilled water and adding water to make 1 liter of solution.

2.Solution B is 0.01M sulphuric acid.

3.Solution C is 0.1M sodium hydroxide.

4.Solid X is Succinic acid.

5.Solid K is a mixture of ZnCO3 and AgNO3 in the ratio 2:1.

## PERFECT STEPS PUBLISHERS

END TERM EXAMS 2015

**0721 745374/ 0721 707626 NAIROBI**

233/3 CHEMISTRY PP3 (PRACTICAL) 2015

1.

You are provided with

 Solution A containing 6.4g/l of a dibasic acid A.

 Solution B containing 0.98g per litre of solid B.

 Sodium hydroxide solution C.

  You are required to:

* Determine concentration of sodium hydroxide solution C.
* Determine relative molecular mass of solid B.

 Procedure I

 Place solution A in a clean burette.

 Using pipette and pipette filler place 25.0cm³ of solution C in a 250cm³ conical flask.

 Add 2 drops of phenolphthalein indicator and titrate with solution A.

 Record your results in table 1. Repeat the titration to complete the table.

|  |  |  |  |
| --- | --- | --- | --- |
|  **Table 1** | I | II | III |
| Final burette reading cm³ |   |   |   |
| Initial burette reading cm³ |   |   |   |
| Volume of solution A used cm³ |   |   |   |

 (4mks)

 Calculate

 (i) Average volume of solution A used. (1mark) ……………………………………………………………………………………………………………………………………………………………………………………………………

  (ii) Concentration in moles per litre of the dibasic acid in solution A. (1mark) (Relative molecular mass of A = 126)

 …………………………………………………………………………………………………………………………………………………………………………………………………….

 (iii)Moles of the dibasic acid used. (1mkark)

 ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

* + 1. Moles of sodium hydroxide that reacted with the dibasic acid. (1 mark)

......................................................................................................................................................

.......……………………………………………………………………………………………..

1. Concentration of sodium hydroxide in moles per litre. (1 mark)

……………………………………………………………………………………………………………………………………………………………………………………………………

 PROCEDURE II

 Using a measuring cylinder place 25cm³ of solution B in a conical flask. Using a pipette and pipette filler add 25cm³ of solution C. Into solution B in the conical flask (NaOH is added in excess)

Add 2 drops of phenolphthalein indicator to the contents of the conical flask and titrate with solution A.

 Record your results in table 2.

 Repeat the procedure two more times to complete the table 2 below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 2** | I | II | III |
| Final burette reading cm³ |   |   |   |
| Initial burette reading cm³ |   |   |   |
| Volume of solution A used cm³ |   |   |   |

 (4 marks)

 Calculate:

1. Average volume o0f solution A used. (1 mark)

……………………………………………………………………………………………………………………………………………………………………………………

1. Moles of the dibasic acid used. (1 mark)

…………………………………………………………………………………………………………………………………………………………………………………….

1. Moles of sodium hydroxide that reacted with the dibasic acid. (1 mark)

……………………………………………………………………………………………………………………………………………………………………………………

1. Moles of sodium hydroxide that reacted with 25.0cm³ of B in solution. (1 mark)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

  (b) Given that 1 mole of B reacts with 2 moles of sodium hydroxide, calculate.

1. Number of moles of B in 25cm³ of solution B. (1 mark)

………………………………………………………………………………………………………………………………………………………………………………

1. Concentration in moles per litre of solid B in solution B. (1 mark)

………………………………………………………………………………………………………………………………………………………………………………

1. Relative molecular mass of B. (1 mark)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**2.** You are provided with solid K. Carry out the following tests in order to determine the cations or anions present in solid K. Record your observations and inferences in the spaces provided.

1. Place all solid K provided in a boiling tube. Add about 10cm³ of distilled water, shake well and filter the mixture and, retain both the filtrate and the residue.

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| ( 2½ Mk) | (1½ Mk) |

(b) Divide the filtrate into two portions

  (i) To the 1st portion add potassium iodide solution (1 to 2 drops)

|  |  |
| --- | --- |
|  **Observations** | **Inferences** |
| ( 1 Mk) | ( 1 Mk) |

 (ii) To the 2nd portion add 3 drops of barium chloride solution followed by excess ammonia solution

|  |  |
| --- | --- |
|  **Observations** | **Inferences** |
| ( 1 Mk) | ( 1 Mk) |

1. Transfer all the residue into a boiling tube and add about 10cm³ of dilute nitric acid, and divide the resulting mixture into 2.

 (i) To portion 1 add sodium hydroxide dropwise till in excess.

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| ( 1 Mk) | ( 1 Mk) |

 (ii) To portion 2 add aqueous ammonia dropwise till in excess.

|  |  |
| --- | --- |
|  **Observations** | **Inferences** |
| ( 1 Mk) | ( 1 Mk) |

**3.** You are provided with solid X. Carry out the following tests and fill your observations and inferences in the table below.

  (a) Put all solid X into a boiling tube and add about 10cm³ of distilled water. Divide the solution into 3 portions.

|  |  |
| --- | --- |
|  **Observations** | **Inferences** |
| ( 1 Mk) | ( 1 Mk) |

 (i) Test portion 1 with litmus papers

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| ( 1 Mk) | ( 1 Mk) |

 (ii) Test the pH of portion 2

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| ( 1 Mk) | ( 1 Mk) |

 (iii) To portion 3 add two to three drops of acidified potassium manganate VII.

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| ( 1 Mk) | ( 1 Mk) |

233/3 CHEMISTRY PP3 MARKING SCHEME

* + - 1. **TABLE 1** . . . . . . . . . . . (4 marks)

Distributed as follows.

 (a) Complete table . . . . . . . . .(1 mark)

 Penalise wrong arithmetic, inverted table and burette readings beyond 50cm³ unless explained or burette readings below 0.1 cm³

 For each penalise ½ mark to a maximum of ½ mark

 (b) Decimal . . . . . . . . . (1 mark)

 (Tied to 1st and 2nd rows only)

 Conditions

 Accept either 1 or 2 dp used consistently

 If 2dp and 2nd d.p should be 0 or 5

 Accept inconsistency in the use of zero i.e. 0.0, 0.00

 (c) Accuracy . . . . . . . . (1 mark)

 Compare the students readings with teacher's values (S.V)

 If at least one reading ± 0.1 to S.V. . . . . 1

 - If not with ± 0.2 of S.V. . . . . . . 0 mark

mark

 If any reading is within ± 0.2 of S.V . . . . . ½ mark

 If none of the reading is within ±0.2 of S.V. . . . . . 0 mark

 (d) Principle of averaging . . . . . . . .(1 mark)

 Values averaged must be ± 0.2 of each other otherwise award 0 mark

 One titration done . . . . . 0 mark

 Answer must be given to at least 2.d.p

 If values averaged are inconsistence . . . . . 0 mark

 If there is wrong arithmetic in the table used credit the correct value.

  Final accuracy . . . . . .. (1 mark)

 Compare candidates correct average titre with S.V and award as follows.

 - If within ± 0.1 of S.V. . . . . . . .(1 mark)

 - If not within ± 0.1 is S.V . . . . . . (1 mark)



b



2.

|  |  |
| --- | --- |
| OBSERVATION | INFERENCES |
| a) |   | Colourless filtrate ***½*** white residue***½***  | K. Contains a ***½*** soluble - and insoluble salt ***½*** ***2 marks*** |
| b) | i) | No yellow ppt formed ***1*** | Pb2+ absent ***1 2 marks*** |
|   | ii) | White ppt :***½*** ppt dissolve in excess ammonia solution ***½***  | Ag+ present ***1 2 marks*** |
| c) |   | Bubbles // Effervescence fizzing ***1*** | CO2-3 ***1*** present ***2 marks*** |
|   | i) | White ***½*** ppt soluble in excess ***½***  | Zn2+, Al3+, Pb2+ presentAll 3 ***1Only 2 ½Only 1 - 0 mark 2 marks*** |
|   | ii) | White ppt, ***½*** soluble in excess ***½***  | Zn2+ present ***2 marks*** |

3.

|  |  |  |
| --- | --- | --- |
|   | OBSERVATIONS | INFERENCES |
| a) | Dissolve to form a colourless solution  |  -Polar compound ***1*** // soluble organic compound **2** |
| i) | Blue litmus turn paper turn to red ***½*** Red litmus paper remain red ***½***  | H+ // H3O+ // Acidic solution ***1* 2** |
| ii) |  pH 5 ***1***  |  Weakly ***1*** acidic reject weak acid. ***1* 2** |
| iii) |  Potassium managanate (VII) is decolourised ***1 //*** Potassium manganate VII turn from purple to colourless |   ***½***  - C=C-,-C=C-R - OH ***½*** Present. **2** |