Name: …… **ADM. No. ……**

School: …… **Candidate's Sign. …….....**

Date: …….....

233/1
CHEMISTRY FORM 4
PAPER 1
SEPTEMBER 2017
TIME: 2 HOURS

KIKUYU SUBCOUNTY JOINT KCSE TRIAL EXAMINATION SEPTEMBER 2017

Chemistry
Paper 1

INSTRUCTIONS TO CANDIDATES:-

- *Write your **name** and **index number** in the spaces provided above.*
- *Answer **all** the questions in the spaces provided.*
- *Mathematical tables and electronic calculators may be used form calcualaitons.*
- *All working **MUST** be clearly shown where necessary.*

Question	Maximum score	Candidate's score
1-30	80	

1. What name is given to elements found in group 7 of the periodic table.(1mk)

2. A mixture contains sodium chloride, ammonium chloride, and silver chloride. Explain how you can obtain pure samples of each salt. (3mks)

3. The table below shows the PH values of some solutions.

Solution	J	K	L	M	N
pH	6	13	2	10	7

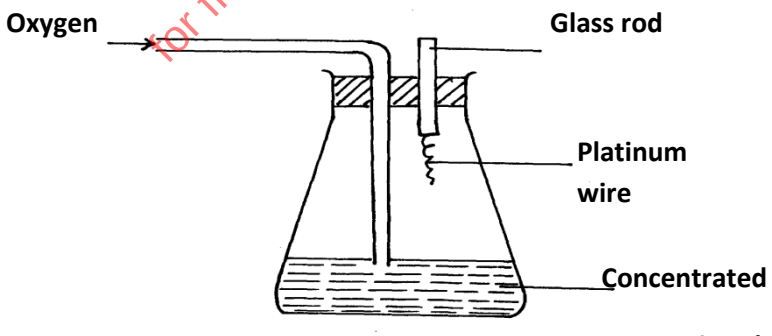
(a) Which solution is likely to be:

(i) Potassium hydroxide (1mk)

(ii) Lemon juice (1mk)

(b) Explain why a solution of hydrogen chloride gas in methyl benzene was identified as **N**. (1mk)

4. The catalytic oxidation of ammonia gas is done as per the set up below.



a) Name the catalyst used in the above reaction. (1mk)

b) After sometime, brown fumes are formed in the flask. Explain briefly how this observation occurs. (1mk)

c) Why does the metal catalyst stay red hot for some time? (1mk)

5. The compound A and B below are cleansing agents- Use it to answer the questions that follows.

A

$R\text{-}COO^{-}Na^{+}$

B

$R\text{-}OSO_3^{-}Na^{+}$

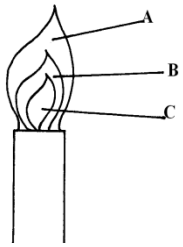
(i) Identify cleaning agents **A** and **B** (1mk)

A……

B……

(ii) State **two** disadvantages of cleansing agent **B** over **A**. (2mks)

6. The diagram below shows a Bunsen burner when in use



(a) Which of the labeled parts is used for heating? Give a reason (2mks)

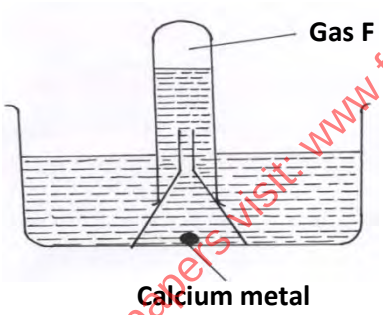
(b). Make a drawing of a splint to show how it would appear if it was briefly placed across zone C.

7. Iron is extracted from its ore, heamatite in the blast furnace. The main reaction during extraction is

$Fe_2O_{3(s)} + 3\ CO_{(g)} \longrightarrow 2Fe_{(s)} + 3\ CO_{2(g)}$

Calculate the mass of iron which will be produced from 320 tonnes of haematite.
(Fe= 56 O=16) (2mks)

8. The set-up below was used to collect gas F produced by the reaction between water and calcium metal.



(a) Name gas **F** (1mk)

(b) Give **one** laboratory use of the solution formed in the beaker. (1mk)

(c) After some time there was formation of a white precipitate formed at the top of the solution in the beaker. Explain this observation. (1mk)

9. The following reaction is in equilibrium in a closed container

$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2\ SO_{3\ (g)}\ \Delta H = -Ve$

(a) .State giving reasons how an increase in temperature would affect the amount of sulphur (VI) oxide gas. (2mks)

(b) An increase in pressure on position of the equilibrium. (1mk)

10. The following are half cell reactions and their reduction potentials. The letter are not the actual symbols of the elements)

		E^{θ}(volts)
(i) $Z^{2+}_{(aq)} + 2e^{-}$	$\longrightarrow Z_{(s)}$	- 0.76
(ii) $M^{2+} + 2e^{-}$	$\longrightarrow M_{(s)}$	- 0.13
(iii) $S^{+} + e^{-}$	$\longrightarrow S_{(s)}$	+0.80
(iv) $T^{2+} + 2e^{-}$	$\longrightarrow T_{(s)}$	+ 0.30

a) Write the cell representation for the electrochemical cell that would give the highest E^{θ} (1mk)

b) Calculate the E^{θ}value for the cell represented in (a) above. (2mks)

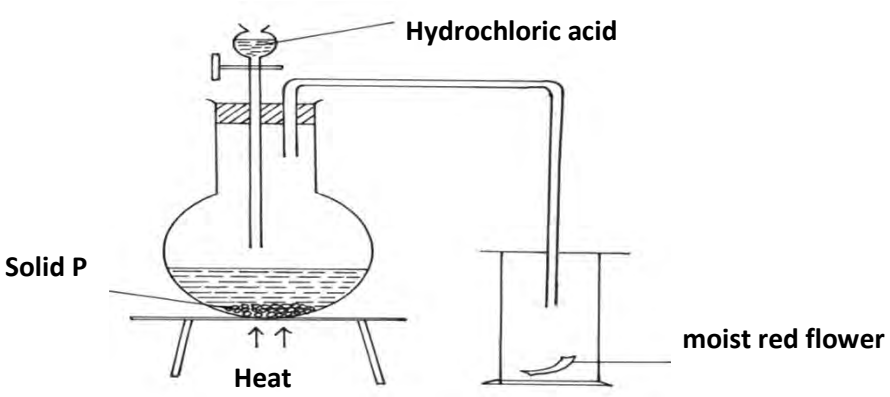
11. Define a strong acid (1mk)

12. The table below shows the relative molecular masses and boiling points of propan-l-ol and Ethanoic acid.

	Relative Molecular Mass	Boiling point (^{o}C)
Propan –l-ol	60	36
Ethanoic acid	60	118

Explain why the boiling point of Ethanoic acid is higher than that of propan –l-ol and yet they have same molecular mass. (2mks)

13. The diagram below shows the set-up that was used to prepare and collect sulphur (iv) oxide gas.



(a) Identify solid P (1mk)

(b) (i) Why is it possible to collect sulphur (IV) Oxide as shown? (1mk)

(ii) What happened to the red flower. (1mk)

14. In the industrial extraction of aluminium Metal, the ore is first heated at 160oC with concentrated Sodium hydroxide. The Solid mixture obtained is then filtered and treated with carbon (IV) oxide and diluted with water.

State the function of each of the following in this process. (3mks)

a) Concentrated Sodium hydroxide.

b) Carbon (IV) oxide

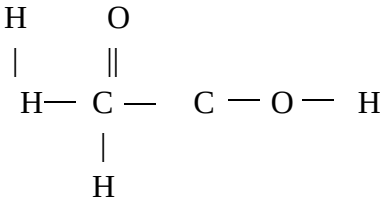
c) Water.

15. a) What Is meant by the term:

Half-life:- (1mk)

b)50g of a radioactive substance was reduced to 6.25g in 36.3years. Calculate that half-life of the substance. (2mks)

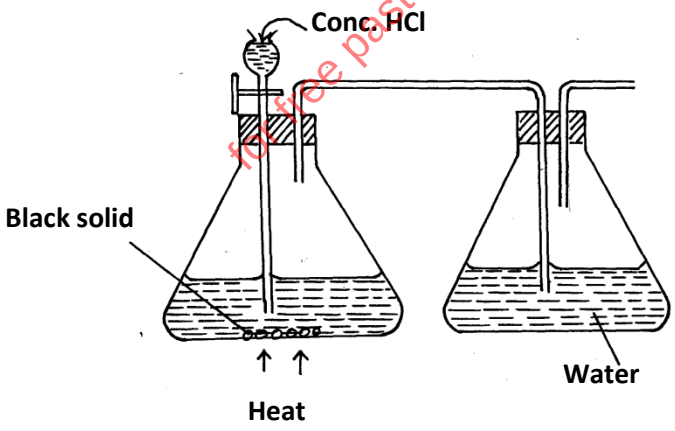
16. The structure below belongs to a member of alkanoic acid.



a) Give the name of the Structure. (1mk)

b) What is the total number of electrons used for bonding in a molecule of the structured named in (a) above. (1mk)

17. The diagram shows an incomplete set-up for the laboratory preparation and collection of chlorine gas. Study it and answer the questions that follow.

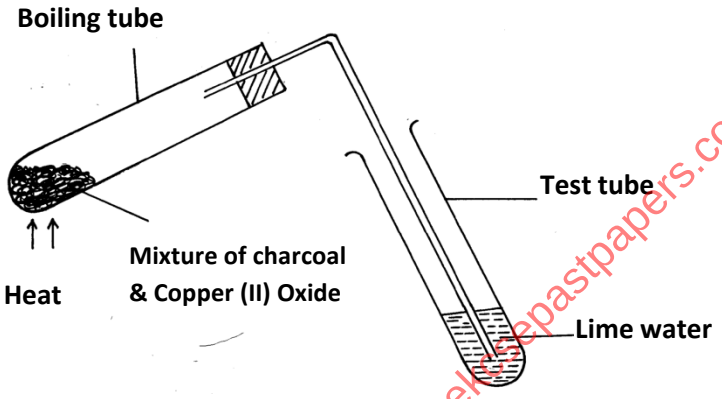


(a) Complete the set-up to show how dry chlorine gas is collected. (2mks)

(b) Name substance Q. (1mk)

18. When solid **W** is heated, it turns yellow. And when allowed to cool , it turns back to white. Identify solid **W**. (1mk)

19. The set up below was used to investigate a chemical property of carbon. Study it and answer the questions that follow.



(i) What observations were made on heating the mixture. (2mks)

(ii) What is the industrial application of carbon in terms of property investigated above. (1mk)

20. The grid below is part of the periodic table. Use it to answer the questions that follow. (The letters do not represent the actual symbols of elements.)

						R	**S**	
N	**Q**						**T**	**U**
P								

(a) Indicate in the grid the position of an element represented by letter **M**, whose atomic number is 16. (1mk)

(b) Select a letter which represents an element that forms an ion with +2 . (1mk)

(c) Element **P** has a larger atomic radius than **N**. Explin. (1mk)

21. How would you obtain a sample of pure iodine and barium sulphate from a mixture of the two. (3mks)

22. An element Q has a relative atomic mass of 88. when a current of 0.5 amperes were passed through the fused chloride of Q for 32 minutes and 10 seconds. 0.44g of Q were deposited at the cathode. Determine the charge on the ion of Q. 1 faraday = 96500 C) (3mks)

23 Chlorine reacts with methane as shown below.

$CH_{4(g)} + Cl_{2(g)} \longrightarrow CH_3Cl_{(g)} + HCl_{(g)}$

(a) What condition is necessary for this reaction to take place? (1mk)

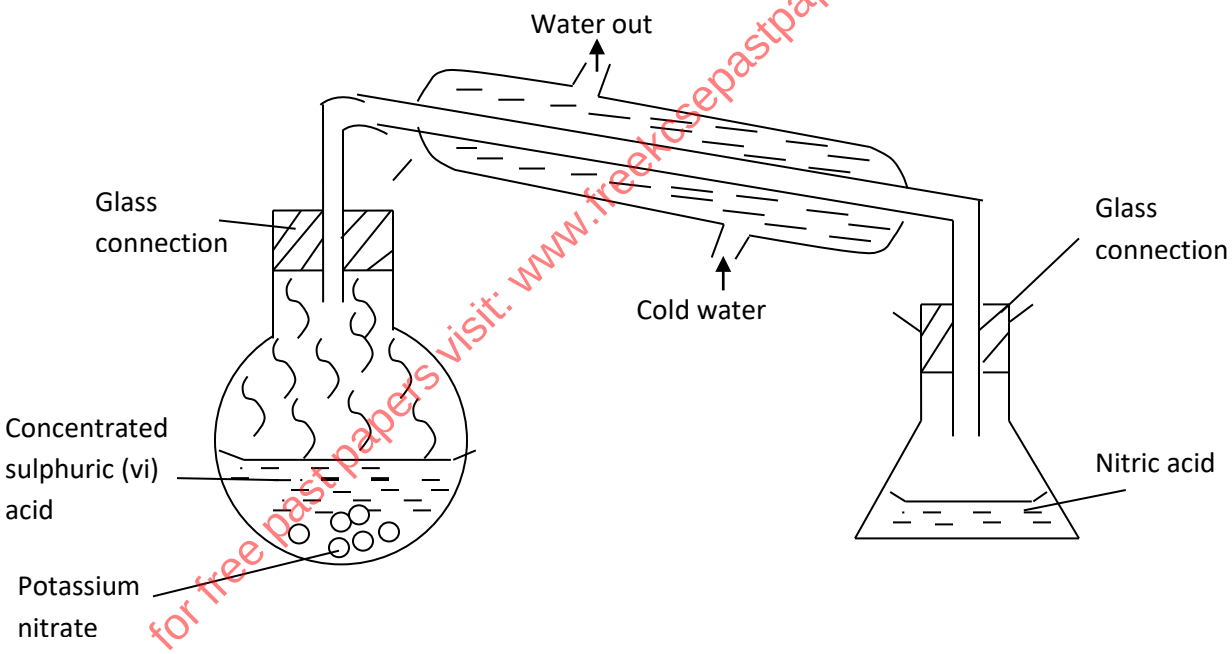
(b) Identify the bonds which are broken and those that rare formed.

(i) Bonds broken. (1mk)

(ii) Bonds formed. (1mk)

24. 15.8g of Sodium nitrate saturated 29.3cm^3 of water at 32^{0}C. Determine the solubility of Sodium nitrate at 32^{0}C. (Density of water =1g/cm^3). (3marks)

25. The apparatus below was used to prepare a sample of nitric acid in a laboratory.



i) Identify one mistake in the set-up. (1mark)

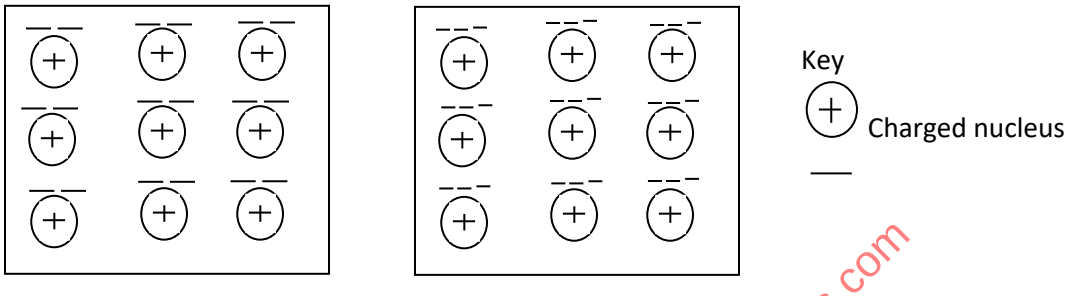
ii) Why are all the apparatus made of glass? (1mark)

iii) Why is cold-water put from the bottom instead of from the top? (1mark)

26. Carbon II oxide isconsidered as a respiratory poison. Explain. (1mark)

27. The structures below are sections of models of the structures of elements P and Q.

PQ



i) In which group of the periodic table do the elements belong?

I. **P** (1mark)

II. **Q** (1mark)

ii) Which of the two elements is a better conductor of electricity? Explain. (1mark)

28. Name the process that takes place when:

i) Fats or oils are hydrolyzed using an alkali (1mark)

.

ii) A heavy nuclide is broken by fast moving neutron. (1mark)

.

iii) Sulphur is heated with natural rubber. (1mark)

.

29. (a) Hydrogen gas is the lightest gas known but its not used in Observation balloons. Explain (2mks)

(b). Describe the laboratory test for Hydrogen. (1mk)

30. A mass of 3.2g of XOH reacts completely with $20cm_3$ of 2M sulphuric (vi) acid. (O=16, H=1)

(i) Write the equation for the reaction. (1mk)

(ii) Calculate the relative atomic mass of X in the formula XOH. (2mks)