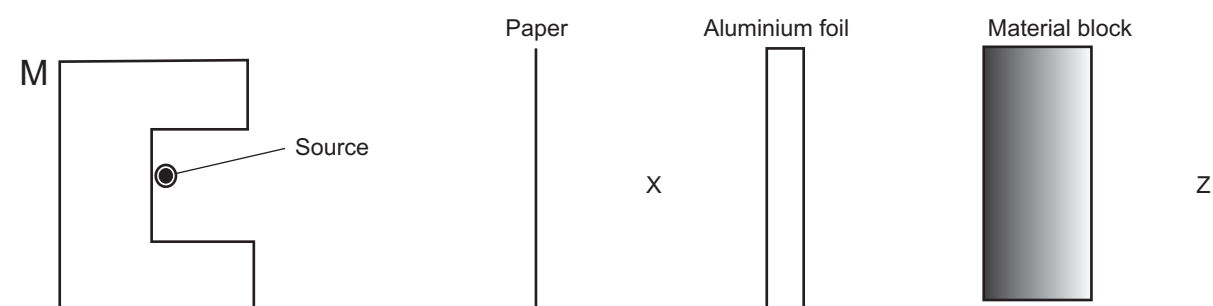


- a) Identify the strongest oxidising agent (1 mark)
- .....
- .....
- b) Which two half-cells would produce the highest e.m.f? (1 mark)
- .....
- .....
- c) Work out the voltage for cell in (b) above (1 mark)
- .....
- .....
- .....

27. The arrangement below was used to compare the penetrating power of emissions in a radioactive decay



- a) Name the radioactive that can be detected at X and Y (1½ marks)
- X .....
- Y .....
- b) Name material M. (½ mark)
- .....
- c) 100g of a radioactive substance was reduced to 125g in 4.2 hours. Calculate the half-life of the substance. (2 marks)
- .....
- .....
- .....
- .....

Name ..... Index No. ....

School ..... Candidates Sign: .....

Date: .....

233/1  
**CHEMISTRY**  
 Paper 1  
 (THEORY)  
 July/August 2015  
**Time: 2 Hours**

**NAROK SOUTH DISTRICT JOINT EVALUATION EXAMINATION**  
**Kenya Certificate of Secondary Education (K.C.S.E)**  
**CHEMISTRY**  
**PAPER 1**

**INSTRUCTIONS TO CANDIDATES**

- Write your name and index number in the space provided above.
- Sign and write the date of examination in the space provided above.
- Answer all the questions in the spaces provided.
- Mathematical tables and electronic calculators may be used.
- All workings must be clearly shown where necessary.

**FOR EXAMINER'S USE ONLY**

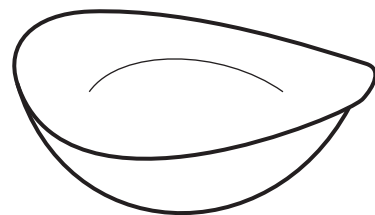
QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1 - 28	80	

This paper consists of 12 printed pages.  
 Candidates should ensure that all pages are printed as indicated and no questions are missing.

1. a) Give two reasons why most laboratory apparatus are made of glass. (1 mark)

.....  
 .....

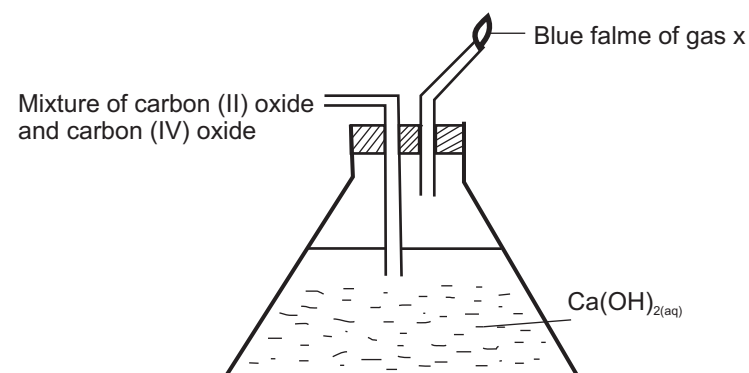
- b) The diagram below is of a common laboratory apparatus. Name the apparatus and state its use (1 mark)



Name .....

Use .....

2. A mixture of carbon (II) oxide and carbon (IV) Oxide was passed through calcium hydroxide solution as shown.



- a) State the observation made in the conical flask (1 mark)

.....  
 .....

- b) Write an equation for the reaction that takes place in

- i) In the flask (1 mark)

.....

- ii) In the burning of gas X (1 mark)

.....

- i) Which curve was obtained using 1.0M Hydrochloric acid? Explain (2 marks)

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

- ii) Determine the number of moles of hydrogen that would be produced in the reaction. (Mg = 24, H = 1, Molar gas volume = 24dm<sup>3</sup>) (2 marks)

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

24. Explain why 1.0M Hydrochloric acid has a PH of 1 while 1.0M ethanoic acid has a PH of 5 (2 marks)

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

25. In the extraction of aluminium from its ore, the ore is mixed with cryolite

- a) Name the major ore of aluminium (1 mark)

.....  
 .....

- b) What is the function of cryolite (1 mark)

.....  
 .....

- c) State two uses of aluminium (1 mark)

.....  
 .....

26. Below are half-cells and their standard electrode potentials (Letters are not actual chemical symbols)

	EO(v)
$A^{2+}_{(aq)} + 2e^{-} \longrightarrow A_{(s)}$	-0.76
$B^{2+}_{(aq)} + 2e^{-} \longrightarrow B_{(s)}$	-2.37
$C^{+}_{(aq)} + e^{-} \longrightarrow C_{(g)}$	+0.80
$D_{2(aq)} + 2e^{-} \longrightarrow 2D^{-}_{(aq)}$	+1.36

21. Using dots (•) and crosses (X) show bonding in;
- a) The compound formed between Phosphorous and Hydrogen. (P=15, H=1)
- .....
- .....
- .....
- b) Carbon (II) Oxide. (C=6, O=8) (1 mark)
- .....
- .....
- .....

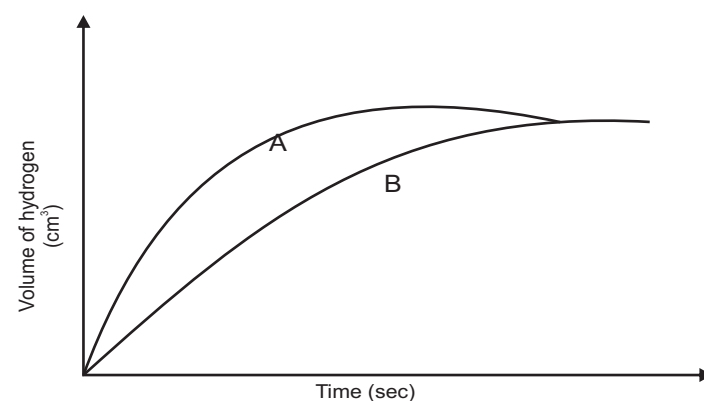
22. 6g of potassium nitrate solid were added to 120cm<sup>3</sup> of water in a plastic beaker. The mixture was stirred gently and the following results were obtained.

Initial temperature = 21.50C

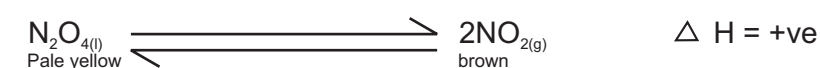
Final temperature = 17.00C

- a) Calculate the enthalpy change for the reaction.  
(Density of solution = 1g/cm<sup>3</sup>, C = 4.2J/kj/k) (2 marks)
- .....
- .....
- .....
- b) Calculate the molar enthalpy change for the dissolution of Potassium Nitrate  
(K = 39, N= 14, O=16) (2 marks)
- .....
- .....
- .....

23. In an experiment to investigate the rate of reaction 3g of a piece of Magnesium was allowed to react with excess 1.0M Hydrochloric acid. The results were used to draw a graph. The same experiment was repeated with 0.5M Hydrochloric acid and graph drawn.

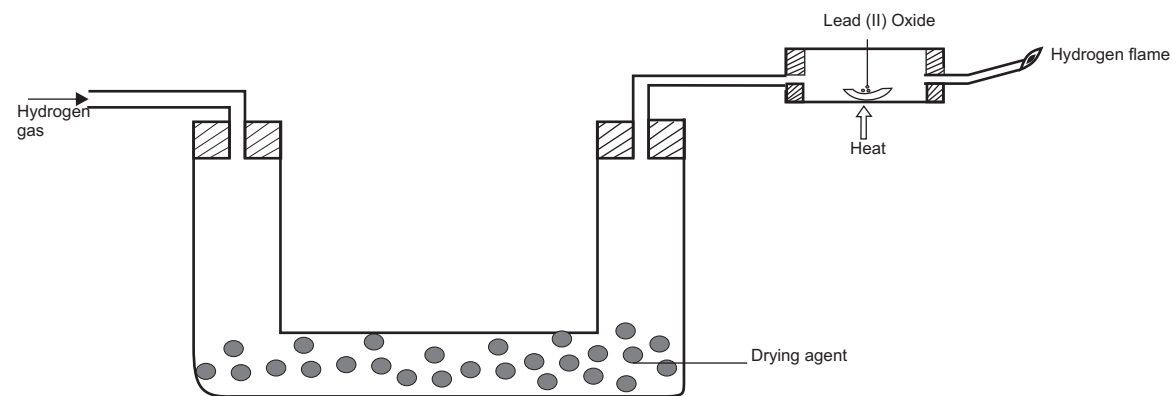


3. The element P and Q have atomic numbers 17 and 20 respectively.
- a) Write the formula of the compound formed when P and Q react (1 mark)
- .....
- b) The compound formed in (a) above conducts electricity when in molten state. Explain the difference in mode of conduction between it and copper. (2 marks)
- .....
- .....
- .....
- .....
4. Name the process that takes place when
- a) Sulphur is added to natural rubber and heated to form cross links. (1 mark)
- .....
- b) A red litmus paper turns white when dropped into chlorine water (1 mark)
- .....
- c) Propene gas molecules are converted into giant molecule (1 mark)
- .....
5. At room temperature and pressure an equilibrium mixture of the following gas is established as shown below



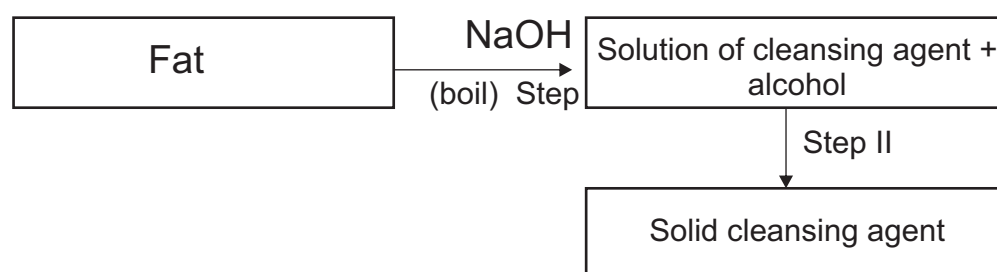
- a) State and explain what is observed when the equilibrium mixture is heated (2 marks)
- .....
- .....
- .....
- .....
- b) Explain what is the effect of increase in pressure in the above equilibrium (1 mark)
- .....
- .....
- .....

6. The set-up below was used to investigate the properties of hydrogen gas



- Name a substance that could be used as the drying agent (1 mark)  
.....
- Write an equation for the reaction taking place in the combustion tube (1 mark)  
.....
- Give one use of hydrogen (1 mark)  
.....

7. The scheme below was used to prepare a cleansing agent. Study it and answer the questions that follow



- What name is given to the type of cleansing agent prepared by the method shown above (1 mark)  
.....
- State the chemical substance added in Step II (1 mark)  
.....
- What is the purpose of adding the chemical substance named in Step II above (1 mark)  
.....

18. A gas Y has the following characteristics

- Less dense than air
- Very soluble in water
- Turns red litmus paper blue
- Has a pungent smell
- It is colourless

- What is the possible identity of gas Y (1 mark)  
.....
- Draw a diagram showing how you would collect a dry sample of gas Y (2 marks)

19. Anhydrous Copper( II) Sulphate crystals were left exposed on a watch glass for two days

- State the observation made on the crystals after two days (1 mark)  
.....  
.....  
.....
- What property of salts was being investigated in the above experiment (1 mark)  
.....

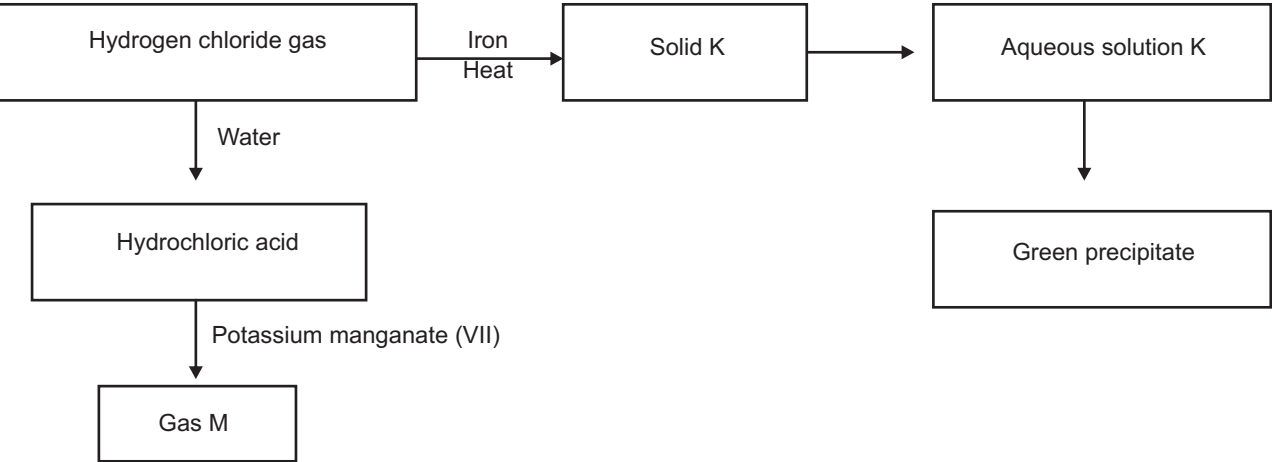
20. A student was given four carbonates labelled A, B, C and D to heat and test for carbon (IV) oxide gas. He obtained the following results.

Carbonate	Colour before heating	Colour after heating	Test CO <sub>2</sub>
A	White	White	Negative
B	White	Yellow	Positive
C	Green	Black	Positive
D	White	Red	Positive

- Which carbonate can be used to soften water? Explain your answer (2 marks)

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

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



- a) Identify,  
Solid K ..... ( 1 mark)  
Solid M ..... ( 1 mark)
- b) Write an equation for the formation of the green precipitate (1 mark)  
.....

16. Give the IUPAC name of the following compounds (2 marks)

- i)  $\text{CH}_3\text{CH}=\text{CHCH}_3$  .....  
ii)  $\text{CH}_3\text{CH}_2\text{OOCH}_3$  .....

17. An alkanol has the following composition by mass carbon 52.17%, hydrogen 13.04% and oxygen 34.78%.

- a) Determine the empirical formula of the alkanol. (C=12, H=1, O=16) (2 marks)  
.....  
.....  
.....  
.....
- b) Given that the empirical formula and the molecular formula of the alkanol are the same, draw the structure of the alkanol (2 marks)

8. In an experiment 1.9g of magnesium chloride was dissolved in water. Silver nitrate solution was added to the magnesium chloride solution till in excess.

- a) Calculate the mass of silver nitrate that was needed for complete reaction (3 marks)  
.....  
.....  
.....  
.....  
.....
- b) Write ionic equation for the reaction above (1 mark)  
.....

9. The table below gives the number of protons, electrons and neutrons of elements P, Q and R. Study it and answer the questions that follow

Element	Protons	Neutrons	Electrons
P	10	10	10
Q	8	10	10
R	8	8	8

- a) Which letter represent an ion? (1 mark)  
.....
- b) Which of the elements are isotopes? Give reason (2 marks)  
.....  
.....  
.....  
.....

10. a) State Boyle's law (1 mark)  
.....  
.....  
.....

- b) A certain mass of nitrogen (IV) oxide occupies a volume  $256\text{cm}^3$  at  $750\text{mmHg}$  and  $311\text{K}$ . What will be its temperature if the volume is increased to  $632\text{cm}^3$  and pressure of  $532\text{mmHg}$ ? (2 marks)

.....

.....

.....

.....

11. The following diagrams show the structures of two allotropes of sulphur. Study them and answer the questions that follow



- a) Name the allotropes (1 mark)
- A .....
- B .....

- b) Give one use of sulphur (1 mark)
- .....

- c) Explain why a piece of burning magnesium continues to burn in a gas of sulphur (IV) oxide (2 marks)

.....

.....

.....

12. a) Magnesium metal is harder to cut with knife than sodium metal. Explain this reference to structure and bonding (2 marks)

.....

.....

.....

- b) Sodium metal burns with a yellow flame in excess oxygen forming a yellow solid. The yellow solid liberates oxygen gas on reacting with water

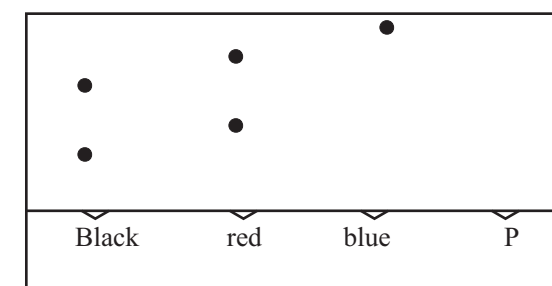
- i) Name the yellow solid (1 mark)

.....

- ii) Write an equation for the reaction of the yellow solid with water (1 mark)

.....

13. The figure below is a chromatogram for three different dyes



- a) Which ink is pure? Explain (1 mark)

.....

.....

.....

- b) Dye P is a mixture of red and blue. Mark on the diagram the chromatogram of P (1 mark)

.....

.....

14. Describe how you would prepare lead(II) nitrate crystals from lead (II) oxide (3 marks)

.....

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