**NAME...................................................................................ADM NO………...........CLASS……..............**

**DATE.......................**

**GATITU MIXED SECONDARY SCHOOL**

**CHEMISTRY**

**FORM FOUR**

**FOR EXAMINER’S USE ONLY**

**Question (50 MARKS) TOTAL SCORED**

**1 - 13**

**(Theory)**

**MID TERM 1 EXAM 2015**

**TIME: 1⅟2 Hours**

**INSTRUCTIONS TO CANDIDATES**

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

1. State two differences between luminous and non-luminous flames. (2 marks)

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1. Write balanced chemical equations for the reaction between; ( 3 marks)
2. Sodium carbonate and nitric acid

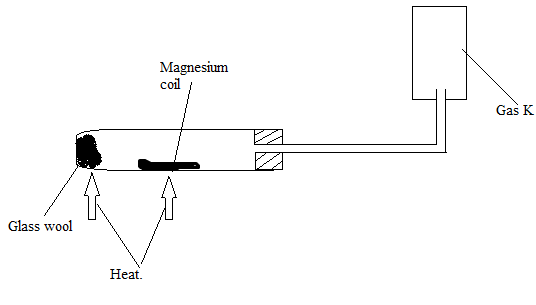
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1. Calcium metal and steam

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1. Oxygen gas and hydrogen gas

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1. A student set up the experiment below to collect gas K. The glass wool was heated before heating the magnesium coil.
2. Explain why it is necessary to heat the moist glass wool before heating the magnesium. (1 mark)

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1. Identify gas K (1 mark)

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1. What property of gas K makes it possible to be collected as shown. (1 mark)

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1. Using dots (.) and crosses (x) to represent the outermost electrons, draw diagrams to show bonding in SO2 and H3O+ (S=16, 0= 8, H=1)
   1. SO2 (1 mark)
   2. H3O+ (1 mark)
2. When 2MHCl was reacted with an alkaline solution of sodium hydroxide, a salt was formed.
3. Name the salt formed. (1 mark)

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1. Give two uses of the salt named above. (1 mark)

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1. Name the reaction above. (1 mark)

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1. Calculate the number of moles of sodium hydroxide that reacted with the acid. (2 marks)

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1. Magnesium Chloride is insoluble in Methylbenzene while Aluminium chloride is fairly soluble. Explain. (2 marks)

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1. An element Y has electronic configuration 2, 8, 5
   1. Write the formula of the oxide of Y (1 mark)

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* 1. Give the nature of the oxide of Y. (1 mark)

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1. When magnesium reacts with hydrochloric acid, a salt is formed and hydrogen gas.
2. Define an acid. (2 marks)

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1. Write the chemical formulae of the salt formed. (1/2 mark)

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1. Explain how hydrogen gas is formed. (2 marks)

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1. Write a balanced chemical equation for the reaction that took place. (1/2 mark)

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1. List three substances that can react as a base and an acid. (1⅟2 marks)

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1. What is a strong acid? (1/2 mark)

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1. Study the reaction scheme below.

HCl (aq)

SOLID N

SOLUTION P

STEP I +Gas R which burns

with a pop sound

STEP II Few drops of NH3 (aq)

WHITE PRECIPITATE

STEP III Excess NH3 (aq)

Colourless solution Q

1. Identify: (i) Solid N (1/2 marks) (ii) Gas R (1/2 marks)

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1. State the observation made in Steps I and II (2 marks)

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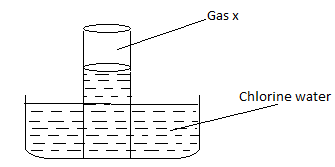
1. Write the equations for the reactions in step I, II and III (3 marks)

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1. Calculate the mass of sulphur which on complete combustion would yield 7dm3 of sulphur (IV) oxide measured at 182oc and 722 mm Hg pressure. (0=16, S=32, molar gas volume = 24dm3 at r.t.p) (3 marks)

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



a) Name gas x…………………………………………………………………………………...... (1 mark)

b) State the condition which is not indicated on the diagram for gas x to be formed. (1 mark)

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1. Temporary water hardness can be removed by boiling
   1. What is hard water? (1 mark)

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* 1. Write a balanced chemical equation that occurs when removing water hardness by boiling (1 mark)

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* 1. State two advantages of hard water. (2 marks)

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1. (a) Differentiate the following
2. Molar heat of solution and enthalpy change. (2 marks)

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1. Hydration and lattice energy (2 marks)

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(b) (i) Use the following bond energies to determine whether the reaction below is endothermic or exothermic. (2 marks)

H2 (g) + Cl2 (g) 2HCl (aq)

**Bond Energy in kJ mol-1**

H-H +436

Cl-Cl +244

H-Cl +432

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(c) When 2g of ammonium nitrate is dissolved in 100ml distilled water, the temperature rises from 200C to 21.50C. Calculate the molar enthalpy of ammonium nitrate solution. (Density of water = 1g/cm3, specific heat capacity = 4.2kJ Kg-1 K-1) (3 marks)

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**“It is the theory that decided what can be observed” Albert Einstein (Theoretical Scientist) Wishing you success Mr. Chihi**