Name: ……..…… Index No: …….

Candidate's signature……

Date……

Muungano KCSE Trial Exam

233/1
CHEMISTRY
PAPER 1
July 2017
2 Hours

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INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the space provided
- Answer **All** the questions in the space provided
- Mathematical tables and electronic calculators may be used
- All working **must** be clearly shown where necessary.

For Examiner's Use Only

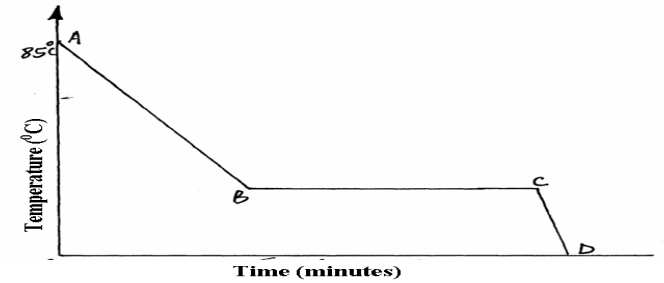
Section	Question	Maximum Score	Candidates Score
A	1 – 28	80	

This paper consists of 10 printed Pages

Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing

Turn Over

1. A Student in form four placed a thermometer in molten naphthalene at 85^0C and recorded the temperature and time until the naphthalene solidified. From the values obtained, the figure below was drawn.



(a) ***What name*** is given to such a figure? ..... (1mk)

(b) ***Which part*** of the figure represents the change of state of naphthalene? ..... (1mk)

(c) In terms of kinetic theory. ***Explain*** what happens to molecules along ***AB***. (1mk)

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2. In a certain reaction, 18.7cm^3 of a dibasic acid H_2X required 25cm^3 of 0.1M NaOH for complete neutralization.

(i) ***How many moles*** of Sodium hydroxide are contained in 25cm^3? (1mk)

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(ii) ***Calculate*** the molarity of the dibasic acid. (2mks)

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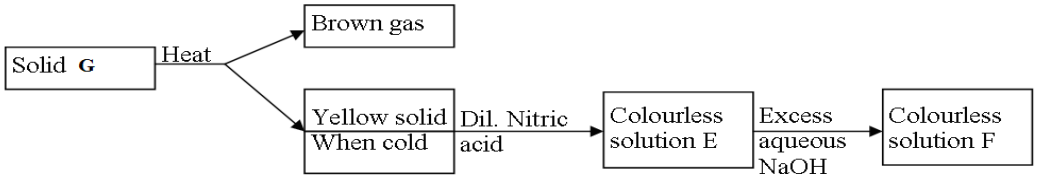
3. Study the flow chart below and answer the questions that follow.



(a) ***Identify*** solid ***G***…… (1mk)

(b) ***Write*** a balanced ***chemical equation*** between the yellow solid and dilute nitric acid. (1mk)

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(c) ***Write*** the formula of the complex ion in solution ***F*** and ***explain*** this observation. (1mk)

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4. ***Explain*** why when hydrogen chloride gas is dissolved in water, the solution conducts electricity while a solution of hydrogen chloride gas in methyl benzene does not conduct electricity. (3mks)

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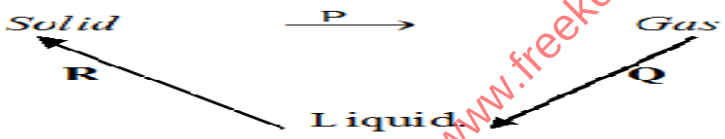
5. Matter exists in three states which can be related as shown in the diagram below.



Name processes: ***P***: …… (1mk)

R: …… (1mk)

Explain whether process ***Q*** is exothermic or endothermic (1mk)

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6. (a) ***What is*** meant by allotropy? (1mk)

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(b) ***Name two*** allotropes of carbon. (1mk)

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(c) ***Give one*** use of charcoal in the sugar refinery industry. (1mk)

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7. (a) ***State*** Graham's Law of Diffusion (1mk)

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(b) A given volume of ozone (O_3) diffused from a certain apparatus in 96 seconds. ***Calculate*** the time taken by an equal volume of carbon (IV) oxide to diffuse under the same conditions. *(C=12, O=16)* (2mks)

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8. (a) ***Name two ores*** from which copper is extracted. (1mk)

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(b) During the extraction of copper metal the ore is subjected to froth floatation. ***Give*** a reason why this process is necessary. (1mk)

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(c) One of the alloys of copper is brass. ***State*** its two uses. (1mk)

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9. ***Draw*** a dot (●) and cross (***X***) diagram to show bonding in sulphur (IV) oxide (3mk)

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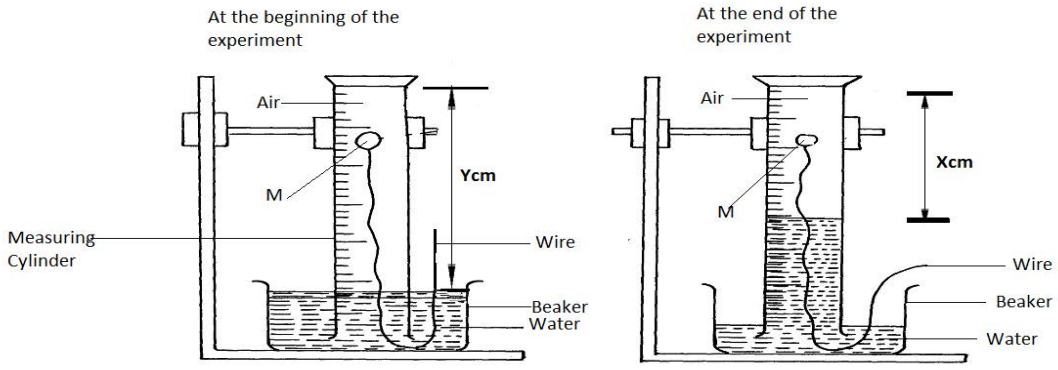
10. A form one class carried out an experiment to determine the active part of air. The diagram below shows the set-up of the experiment and also the observation made.



(i) ***Identify*** substance ***M*** …… (1mk)

(ii) ***State two reasons*** for the suitability of substance M for this experiment. (2mk)

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(iii) ***Write*** the equation for the reaction of substance ***M*** and the active part of air. (1mk)

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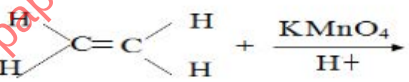
11. (a) ***Complete*** the following equation (1mk)



(b) ***Name*** the homologous series to which the following compounds belong?

(i) CH_3CCH…… (1mk)

(ii) CH_3CH_2OOCC…… (1mk)

12. The table below shows the pH values of solutions ***J*** to ***N***

Solution	***J***	***K***	***L***	***M***	***N***
pH	5	13	2	10	7

(a) Which solution contains the largest concentration of hydroxides ions? ..... (1mk)

(b) Which solution is likely to be a solution of acetic acid? ..... (1mk)

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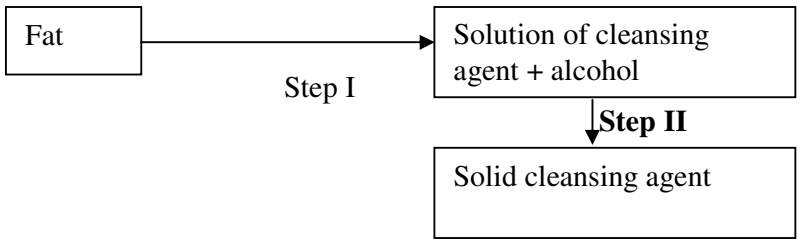
13. The scheme below was used to prepare a cleansing agent. Study it and answer the questions that follow.



(i) ***What name*** is given to the type of cleansing agent prepared by the method shown in the scheme? …… (1mk)

(ii)***Name one*** chemical substance added in step II (1mk)

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(iii) ***What is*** the purpose of adding the chemical substance named in *(ii)* above. (1mk)

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14. a) ***Define*** half-life of radio isotopes. (1mk)

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b) Z grams of a radioactive isotope take 100 days to decay to 20gms. If the half-life of the element is 25 days, ***calculate*** the initial mass of ***Z*** of the radio isotope. (2mks)

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15. Magnesium was burnt in air forming a white residue ***T***. When put in a boiling tube with water effervescence was noticed and colourless gas ***D*** with a characteristic pungent smell was evolved. The gas turned a wet red litmus paper blue. ***Identify***

Residue ***T*** ……. (1mk)

Gas ***D***……. (1mk)

Write an equation for liberation of gas ***D***. (1mk)

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16. The table below shows tests that were carried on three portions of a solution and the results obtained. Study it and answer the questions that follow:

	TESTS	***OBSERVATION***
1	Addition of aqueous ammonia to portion 1	White ppt soluble in excess
2	Addition of a few drops of acidified barium nitrate to portion 2	White precipitate formed
3	Addition of few drops of lead (II) nitrate to portion 3	A white precipitate formed

a) ***Identify*** the

i) Anion present..... (1mk)

ii) Cation present..... (1mk)

b) ***Write*** ionic equation for test 3. (1mk)

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17. 50cm³ of carbon (IV) oxide diffuses through a porous plate is 15 seconds. ***Calculate*** the time taken by 75cm³ of Nitrogen (IV) oxide to diffuse through the same plate under similar conditions. (*C = 12, O=16, N=14*) (3mks)

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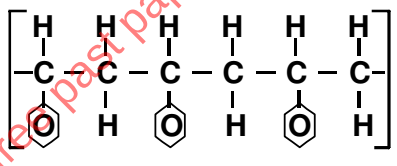
18. The formula given below represents a portion of a polymer.



a) ***Give***

i) The ***name*** of the polymers. (1mk)

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ii) The ***structure*** and the ***name*** of the monomer from which the polymer is formed. (1mk)

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b) ***State*** one disadvantage of the continued use of the polymer. (1mk)

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19. During purification of copper by electrolysis, 1.48g of copper was deposited when a current was passed through aqueous copper (II) sulphate for two and half hours. ***Calculate*** the amount of electricity that was passed. (*Cu=63.5, 1 Faraday = 96500C*) (3mks)

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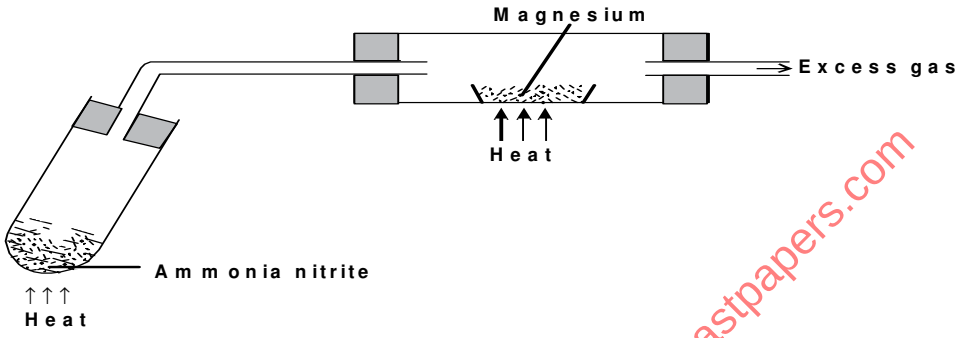
20. The set-up below shows how gas A was prepared and reacted with heated magnesium



a) ***Give*** a reason why it is not advisable to heat magnesium before heating ammonium nitrite. (1mk)

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b) i) ***Identify*** gas A ..... (1mk)

ii) ***Write*** a chemical equation for the reaction between gas ***A*** and magnesium (1mk)

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21. A student burnt magnesium ribbon in a gas jar full of sulphur (IV) oxide gas.

i) ***State two observation*** made in the gas jar. (2mks)

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

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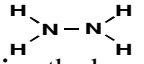
22. Hydrazine gas  burns in oxygen to form nitrogen gas and steam according to the equation below. ***Using*** the bond energies given below, ***calculate*** the enthalpy change for the reaction in the above equation (3mks)

Bond	***Bond energy (KJ/mol)***
N □N	944
N - N	163
N - H	388
O = O	496
H - O	463

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23. 5.0g of calcium carbonate were allowed to react with 25cm³ of 1.0M hydrochloric acid until there was no further reaction. ***Calculate*** the mass of calcium carbonate that remained unreacted. (3mks)

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24. In the extraction of iron metal, limestone is added at a certain stage.

i) ***Explain*** the main role of limestone. (1mk)

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ii) ***Name*** two reducing agents in the extraction of iron. (1mk)

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iii) ***State one*** way in which impurities affect properties iron. (1mk)

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25. a) The formula for cane sugar is ($C_{12}H_{22}O_{11}$). Use an equation to ***show*** what happens when sugar is added to conc. Sulphuric (VI) acid. (1mk)

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b) ***What name*** is given to the type of reaction above? (1mk)

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c) ***Calculate*** the oxidation state of sulphur in sodium thiosulphate ($Na_2S_2O_3$) (1mk)

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26. You are given the following half equations.

$I_{2(S)} + 2e^-$ $2I^-_{(aq)}$ $E^\theta = +0.54$

$Br_{2(S)} + 2e^-$ $2Br^-_{(aq)}$ $E^\theta = +1.09V$

a) ***Write*** an overall equation for the cell reaction. (1mk)

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b) ***Calculate*** the E$^\ominus$ value of the cell. (1mk)

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c) ***Name*** the oxidizing agent. (1mk)

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27. A hydrocarbon gas Y in which the percentage of hydrogen by mass is 14.3% occupies a volume of 2.24dm³ at s.t.p and weighs 7g

i) ***Determine*** the empirical formula of Y. (C=12, H=1.0) (2mks)

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ii) ***Give*** the structural molecular formula of ***Y***. (1mk)

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28. ***State two*** application of electrolysis. (2mks)

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29. ***Using*** reagents provided (*Zinc powder, Nitric (V) acid (dilute), Water, Solid sodium carbonate*) only, ***explain*** how you could prepare solid Zinc carbonate. (2mks)

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