

Name..... Index No.....
School..... Candidate's sign.....
Date.....

233/1
CHEMISTRY
Paper 1
July/August 2010
2 Hours

BURETI DISTRICT JOINT EVALUATION TEST – 2010
Kenya Certificate of Secondary Education (K.C.S.E)

233/1
CHEMISTRY
Paper 1
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INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above
2. All working must be clearly shown
3. Mathematical tables and electronic calculators may be used.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1 – 29	80	

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

1. a) Complete the table below.

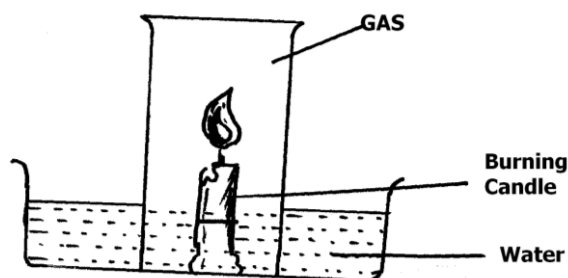
	Number of neutrons	Number of electrons
${}^3_2\text{He}^{2+}$		

(1mk)

- b) An element A has atomic number 15. Given that it forms two ions A^{3-} and A^+ . Identify the stable ion. Explain your answer (A is not actual symbol of the element) (2mks)

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2. A student set up the following apparatus below to investigate the percentage of oxygen gas in air.



- a) With the help of a diagram, explain what was expected by the student. (2mks)

3. A certain indicator was added to a solution. The PH value on the scale that was used with this indicator was read as 6.5

- a) Name the indicator (1mk)

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- b) State the nature of the solution (1mk)

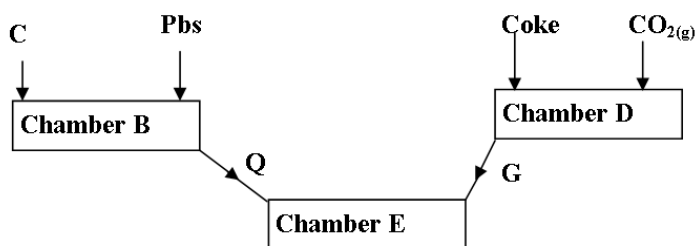
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- c) Why is the above indicator a better indicator than other common indicators used in the laboratories? (1mk)

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4. During electrolysis of aqueous magnesium sulphate solution a current of 0.72 A was passed through the electrolyte for 15 minutes. Calculate the volume of the gas produced at the anode. (1 faraday 96500 Coulombs, molar gas volume is 24000cm³ at room temperature.) (3mks)

5. The flow chart below shows some processes involved in the extraction of lead metal. Study it and answer the questions that follow



- a) Name substance C fed into chamber B. (1mk)
-
- b) Write an equation for the reaction that take place in chamber B. (1mk)
-
- c) Give one use of lead metal. (1mk)
-
6. Use the bond energies below to find the heat of reaction. (2mks)

$C_2H_4(g) + H_2(g)$	$C_2H_6(g)$	
Bond		$kJ\ mol^{-1}$
C – C		346
C = C		598
C – H		413
H – H		436

7. When a hydrocarbon was completely burnt in oxygen 4.2g of carbon (IV) Oxide and 1.71g of water were formed
- $H = 1.0$ $C = 12.0$ $O = 16.0$
- a) Determine the empirical formula of the hydrocarbon. (2mks)
-
-
-
- b) If the molar mass of the hydrocarbon is 70, determine its molecular formula. (1mk)
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-
8. Describe how a solid sample of lead (II) sulphate would be prepared using the following reagents. Dilute nitric, solid lead (II) carbonate. (3mks)
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-
-
-
9. Butane (C_4H_{10}) has molecular mass of 58 while Ethanol (C_2H_5OH) has molecular mass of 46, but boiling point of ethanol is by far very high compared to Butane Explain. (2mks)
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-
10. The solubility of lead nitrate salt in water at $60^\circ C$ is 103g/100g of water and its solubility at $20^\circ C$ is 40g/100g of water. Determine the amount of crystals that will be formed if saturated solution of the salt is cooled from $60^\circ C$ to $20^\circ C$. (3mks)
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-

11. Chlorine may be prepared in the laboratory by the action of concentrated hydrochloric acid on manganese (IV) Oxide.

a) What is the role of manganese (IV) oxide in the reaction. (1mk)

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b) Write the chemical equation for the reaction taking place. (1mk)

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12. Explain why burning magnesium continues to burn in a gas jar full of sulphur (IV) oxide while a burning splint will be extinguished. (2mks)

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13. In an experiment, soap solution was added to three separate samples of water. The table below shows volumes of soap(in cm³) solution required to form leather with 100cm³ of water before and after heating.

	Sample I	Sample II	Sample III
Volume of soap before water is boiled	30.0	4.5	10.0
Volume of soap after water is boiled	30.0	4.5	3.0

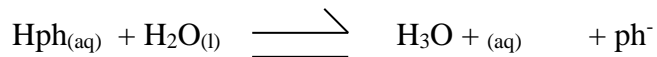
a) Which sample is likely to be permanent hard water. (1mk)

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b) Explain the change in volume of soap in sample II. (2mks)

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14. The equation below shows the reaction between phenolphthalein indicator and water.



Indicate the base in the forward reaction.

Explain.

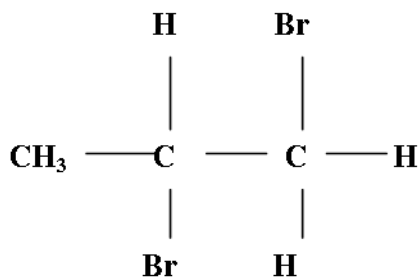
(2mks)

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15. Compound Y decolourises bromine liquid and forms a compound Z whose structural formula is



a) Give the name of compound Z.

(1mk)

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b) Write down the structural formula of compound Y.

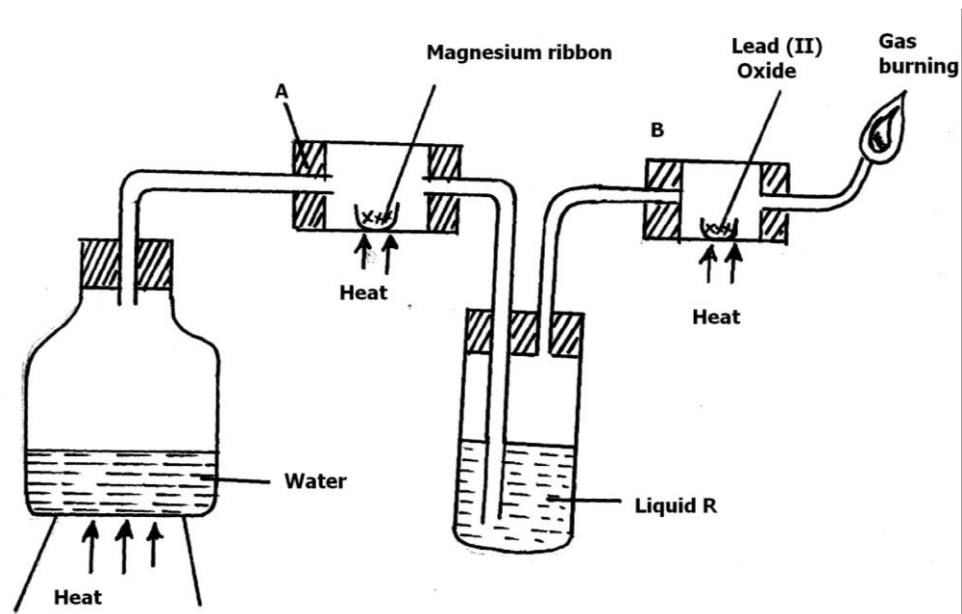
(1mk)

c) What is the name of the homologous series to which Y belong.

(1mk)

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16. The set – up below was used to prepare the gas and investigate its properties.



a) Write a chemical equation for the reaction in combustion tube A that lead to the formation of the gas. (1mk)

b) Identify liquid R. Why is it used? (1mk)

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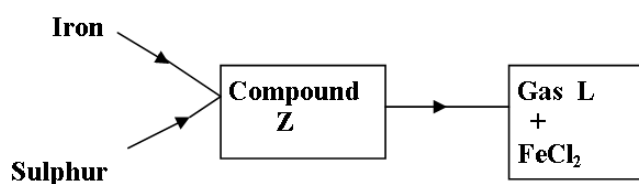
c) State the observation made at the end of the reaction in combustion tube B. (1mk)

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



a) Name compound Z. (1mk)

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b) Write an equation for the reaction that forms Z. (1mk)

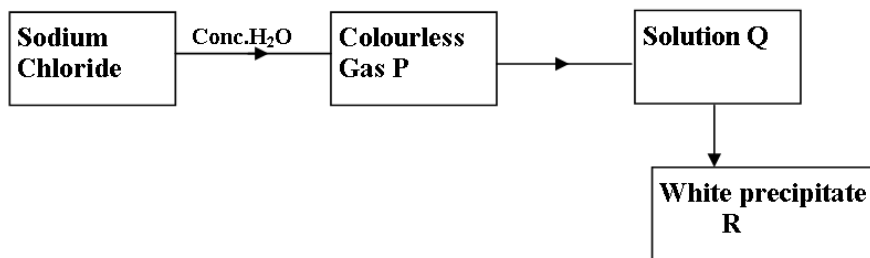
c) State the observation made when a gas containing moist sulphur (IV)) Oxide was inverted over gas L. Explain the observation using an equation. (1mk)

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18. A fixed mass of a gas occupies 200cm^3 at a temperature of 296 k and 740mmHg pressure. Determine the volume this gas would occupy at S.T.P. (3mks)

19. The flow chart below shows some reactions involving Sodium Chloride.



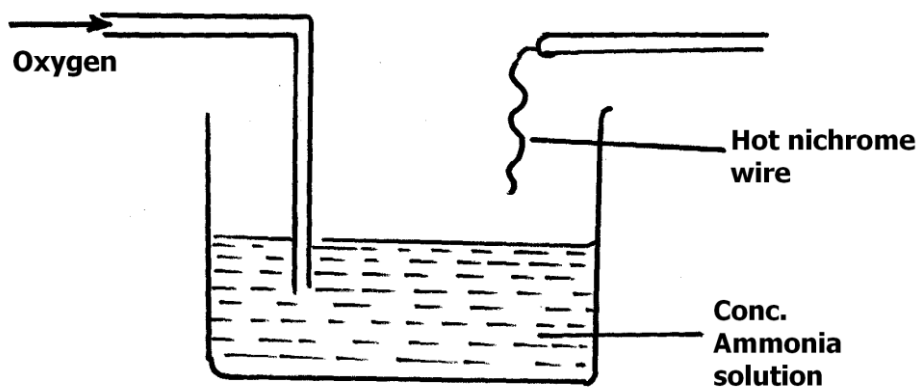
- a) Identify substances
- i) P (1mk)
- ii) R (1mk)
- b) Write the ionic equation leading to the formation of white precipitate R. (1mk)
- c) Describe chemical test for colourless gas P. (1mk)

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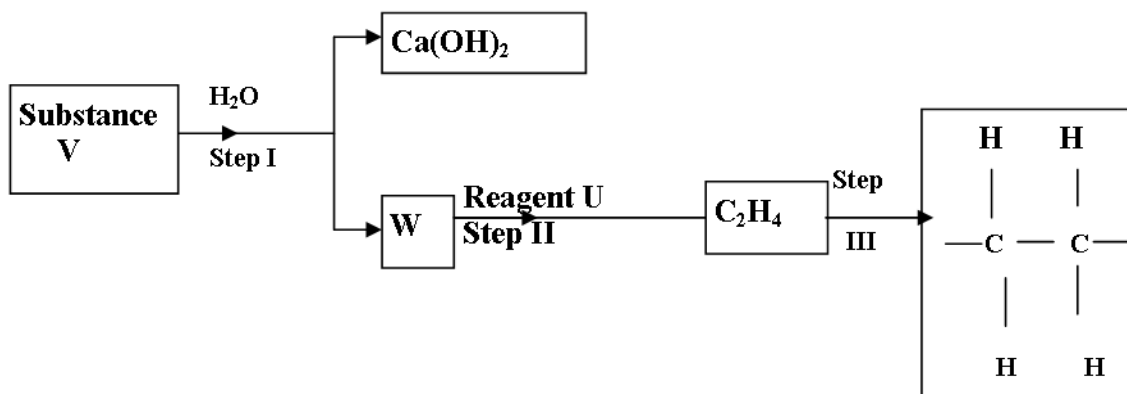
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20. The apparatus below was set – up to show the catalytic oxidation of ammonia. Study the diagram and answer the questions that follow.



- a) State what would be observed in the experiment above. Explain. (1mk)
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- b) Write the equation for the reaction that takes place during oxidation of ammonia. (1mk)
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- c) Write the formula of the complex ion formed when excess Ammonia gas passed through a solution containing Zn^{2+} . (1mk)

21. Study the flow chart below and used it to answer the questions that follow.



a) Identify. (2mks)

i) V.....

ii) W.....

iii) Reagent U.....

iv) Products in Step III

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22. The following are electrode potentials of the half cells.

<u>Half cells</u>	<u>E^θ(volts)</u>
M ²⁺ /M _(s)	-0.76
C ²⁺ _(aq) / C	+ 0.34

a) Calculate the potential difference of the cell formed by connecting the two half – Cells. (1mk)

b) Draw an electro chemical cell for the above cell. (2mks)

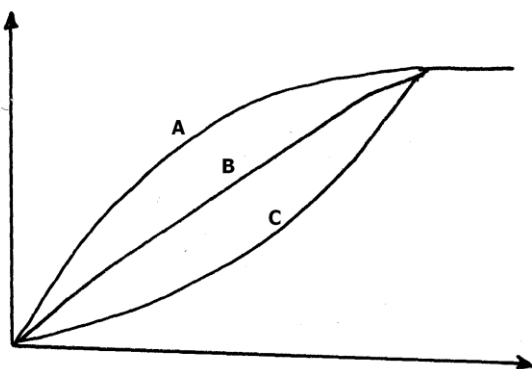
23. a) Define the term isomerism. (1mk)

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b) Draw and name two isomers of butane. (2mks)

24. Using dots (•) and crosses (x) to represent electrons, shows bonding in the compounds formed below when the elements carbon and oxygen combine to form carbon (II) oxide. (3mks)

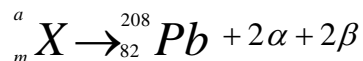
25. The figure below shows the result of an experiment during the reaction between marble chips and dilute hydrochloric acid large, small and fine powders were used.



Which curve represents the reaction with fine powder? Explain. (3mks)

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26. Find the value of a and m in the nuclear equation below (2mks)



27. Nitrogen reacts with oxygen according to the equation



What is the effect of increase in the following on the position of the equilibrium? Explain (3mks)

i) Pressure

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ii) Temperature

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28. One mole of butane (C₄H₁₀) burns completely in oxygen and liberates 2877kJ

a) Write the equation for the combustion of butane . (2mks)

b) Draw an energy level diagram for the reaction. (2mks)

29. Sodium hydrogen carbonate is obtained from trona which is it found combined with sodium chloride in the same lake in the Rift Valley.

(a) State the method used to separate trona from the mixture with sodium chloride (1mk)

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(b) Give one use of sodium hydrogen carbonate. (1mk)

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