KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

BAHATI GIRLS
CHEMISTRY
PAPER 1
TIME: 2 HOURS

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233/1
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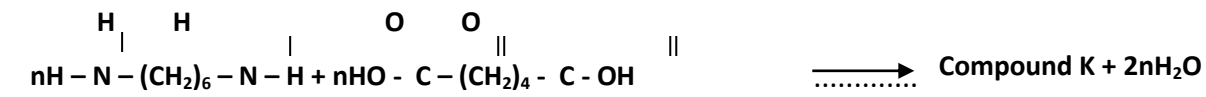
BAHATI GIRLS KCSE TRIAL AND AND PRACTICE EXAM 2016

INSTRUCTIONS TO CANDIDATES:

- Write your name and Index number in the space provided above.
- Answer ***all*** the questions in the spaces provided.
- All working **must** be clearly shown where necessary.
- Mathematical tables and electronic calculators can be used.

Question	**Maximum score**	**Candidate's score**
Score 1 - 29	80	

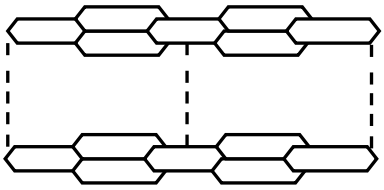
1. The atomic number of sulphur is 16. Write the electron arrangement of sulphur in the following: (2 Marks)
   (a) H_2S;
   (b) SO_3^{2-};
2. State **one** use of sodium hydrogen carbonate. (1 Mark)
3. Calcium oxide can be used to dry ammonia gas.
   (a) Explain why calcium oxide is not used to dry hydrogen chloride gas. (2 Marks)
   (b) Name **one** drying agent for hydrogen chloride gas. (1 Mark)
4. Using dots ( ) and crosses (x) to represent electrons, show bonding in the compounds formed when the following elements react: (Si=14, Na=11, Cl=17).
   (a) Sodium and chlorine. (1 Mark)
   (b) Silicon and chlorine. (1 Mark)
5. Zinc oxide reacts with acids and alkalis.
   (a) Write the equation for the reaction between zinc oxide and:
      (i) Dilute sulphuric acid. (1 Mark)
      (ii) Sodium hydroxide solution. (1 Mark)
   (b) What property of zinc is shown by the reactions in (a) above? (1 Mark)
6. Determine the oxidation state of sulphur in the following compounds. (2 Marks)
   (a) H_2S
   (b) $Na_2S_2O_3$
7. A certain carbonate XCO_3 , reacts with dilute hydrochloric acid according to the equation given below:
   $XCO_{3(s)} + 2HCl_{(aq)} \longrightarrow XCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$
   If 4g of the carbonate reacts completely with $40cm^3$ of 2M hydrochloric acid, calculate the relative atomic mass of X. (C=12.0 ,O=16.0, Cl=35.5). (3 Marks)
8. (a) Distinguish between a deliquescent and a inflorescent substance. (2 Marks)
   (b) Give **one** use of hygroscopic substances in the laboratory. (1 Mark)
   (a) What is meant by the terms: (2 Marks)
   (i) Isotopes
   (ii) Mass number
   (b) The formulae for a chloride of phosphorus is PCl_3. What is the formula of its sulphide? (1 Mark)
9. What is the name given to each of the following:
   (a) Ability of a metal to be made into a sheet; (1 Mark)
   (b) Minimum energy required for a chemical reaction to start; (1 Mark)
   (c) Type of force that holds molecules of argon together? (1 Mark)
10. Draw the structures and give the names of three alkanes having molecular formula of C_6H_{12}. (3 Marks)
11. A beaker contained $95.0cm^3$ of aqueous copper (ii) sulphate at 43.7^0C. When a scrap iron metal was added to the solution, the temperature rose to 49.6^0C.
   (a) Write an ionic equation for the reaction that took place. (1 Mark)
   (b) Given that the mass of copper deposited was 5.83g, calculate the molar enthalpy change in $KJmole^{-1}$. (Specific heat capacity of solution = $4.2Jg^{-1}k^{-1}$, density of solution = $1.0gcm^{-3}$, Cu=63.5). (2 Marks)
12. a) Draw the structure of compound K formed in the following reaction. (1 Mark)



   b) Give **one** use of compound K. (1 Mark)

13. a) What is meant by allotropy? (1 Mark)

b) The diagram below shows the structure of one allotropes of carbon.



i) Identify the allotrope (½ Mark)

ii) State **one** property of the above allotrope and explain how it is related to its structure. (1½Mark) .

14. Pentane and ethanol are miscible. Describe how water can be used to separate a mixture of pentane and ethanol. (3 Marks)

15. In the redox reaction below:

$2H^{+}_{(aq)} + Cr_2O_7^{2-}{}_{(aq)} + 3SO_{2(g)} \longrightarrow Cr^{3+}_{(aq)} + 3SO_4^{2-}{}_{(aq)} + H_2O_{(aq)}$

Identify the reducing agent, explain your answer. (2 Marks)

16. $60cm^3$ of oxygen gas diffused through a porous hole in 50seconds. How long will it take $80cm^3$ of sulphur(iv)oxide to diffuse through the same hole under the same conditions (S=32.0 , O=16). (3 Marks)

17. Calculate the heat of formation of propane from the following data. (2 Marks)

$C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)}$, $\Delta H = -406 KJmol^{-1}$

$H_{2(g)} + ½\ O_{2(g)} \longrightarrow H_2O_{(l)}$, $\Delta H = -286 KJmol^{-1}$

$C_3H_{8(g)} + 5O_{2(g)} \longrightarrow 3CO_{2(g)} + 4H_2O_{(l)}$, $\Delta H = -2209 KJmol^{-1}$

18. a) Find the value of A and B in the following equation. (1 Mark)

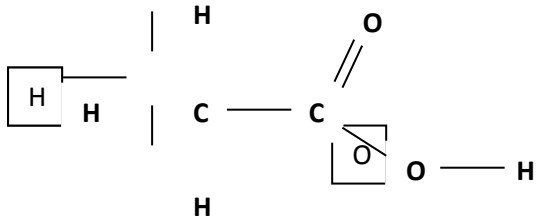
$^{234}_{90}X \longrightarrow {}^{A}_{B}Y + -1e^{-}$

b) A certain radioactive element has a half-life of 6000 years. How long did it take to decay until only 25% of the original amount remained? (2 Marks)

19. a) Differentiate between thermosoftening and thermosetting plastics. (1 Mark)

b) In the test for the chloride was in solution, a littler nitric acid is added followed by silver nitrate solution. Why is nitric acid added? (1 Mark)

The structure of ethanoic acid is:



What is the total number of electrons used for bonding in a molecule of ethanoic acid? Give reasons. (2 Marks)

20. When a few drops of aqueous ammonia were added to copper(ii) nitrate solution, a light blue precipitate was formed. On addition of more aqueous ammonia, a deep blue solution was formed. Identify the substance responsible for the:

(a) Light blue precipitate (1 Mark)

(b) Deep blue solution (1 Mark)

21. When a current of 0.82A was passed for 5 hours through an aqueous solution of metal Z, 2.65g of the metal was deposited. Determine the charge on the ions of metal Z. (1 faraday=96500coulombs; relative atomic mass of Z=52). (3 Marks)

22. The standard reduction potentials of two half cells are:

$Ag^{+}_{(aq)} + e^{-} \longrightarrow Ag_{(s)}$; $E^{i} = 0.86V$

$2H_2O_{(l)} + 2e^{-} \longrightarrow H_{2(g)} + 2OH^{-}_{(aq)}$; $E^{i} = 0.89V$.

(i) Calculate the e.m.f of the cell formed by the above two half-cells (1 Mark)

(ii) Draw a labelled diagram of an electrochemical cell that can be constructed using the two half-cells. (3 Marks)

23. The ionisation energies for three elements X,Y, and Z are shown in the table below:

Element	X	Y	Z
Ionisation energy (KJ/mole)	419	318	394

(a) What is meant by ionisation energy? (1 Mark)

(b) Which element is the strongest reducing agent? Give a reason. (2 Marks)

24. a) What condition is necessary for an equilibrium to be established? (1 Mark)

b) When calcium carbonate is heated, the equilibrium shown below is established

$CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$

How would the position of the equilibrium be affected if a small amount of dilute potassium hydroxide is added to the equilibrium mixture? Explain. (2 Marks)

25. Some animal and vegetable oils are used to make margarine and soap. Give reagents and conditions necessary for converting oils into:

(a) Margarine (2 Marks)

(b) Soap (1 Mark)

26. Classify the following processes as either chemical or physical. (3 Marks)

Process	Type of change
(a) Souring of milk	
(b) Obtaining butane from crude oil	
(c) Heating copper(ii)sulphate crystals	

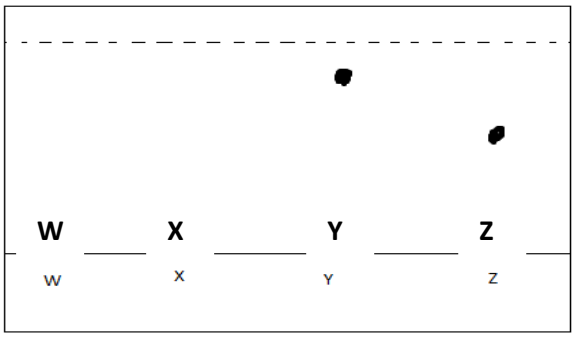
27. A sample of fertiliser is suspected to be calcium ammonium nitrate. Describe chemical tests for each of the following ions in the sample.

(a) Calcium ions (2 Marks)

(b) Ammonium ions (1 Mark)

28. State the **two** ions that cause hardness in water. (1 Mark)

29. The diagram below represents an incomplete paper chromatogram of pure dyes X, Y, Z and mixture W.



Mixture W contains dyes Y and Z only. Complete the chromatogram to show how mixture W separates. (2 Marks)