Name: ....   Class: .... Adm.No. ....

CHEMISTRY
THEORY
Paper 1
March – April 2017
Time: 2 hours

MOKASA JOINT EXAMINATION

MARCH – APRIL 2017

Kenya Certificate of Secondary Education
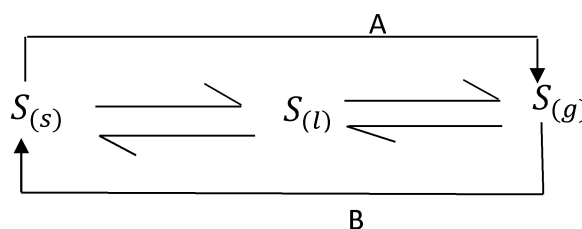
CHEMISTRY

PAPER 1

INSTRUCTIONS TO CANDIDATES

- *Answer **ALL** the questions in the spaces provided.*

- *Electric calculators fx – 82 ms is allowed.*

- *All working must be clearly shown.*

FOR EXAMINER USE ONLY

Question	Maximum score	Candidate's score
1 – 31	**80**	

1. When Sulphur is heated the following reaction takes place.

$$S_{(s)} \rightleftharpoons S_{(l)} \rightleftharpoons S_{(g)}$$

with process A over the top and process B along the bottom.

   (a) Name process A and B. **(1 mark)**

   A ....

   B ....

   (b) State one application of the process A. **(1 mark)**

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   (c) Name one common characteristic of salts which undergo process A when they are heated in a boiling tube. **(1 mark)**

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2. (a) A student was stung by a bee outside the chemistry lab. The teacher applied a solution of ammonia to the place. Explain why. **(2 marks)**

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   (b) Explain why it is not advisable to use a solution of potassium hydroxide. **(1 mark)**

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3. A sample of water in a beaker was found to boil at $105\,^0C$ at sea level. Explain this observation. **(1 mark)**

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4.	State the mode of conduction of electricity in the following substances.	**(2 marks)**

    (i)	Copper rod.	....

    (ii)	Molten copper (II) oxide	....

5.	Dry ammonia was passed over heated copper (II) oxide in a combustion tube.

    (a)	State and explain the observation that was made.	**(2 marks)**

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    (b)	Write a balanced chemical equation for the reaction above.	**(1 mark)**

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6.	An element X has 2 isotopes ^{62}X and ^{65}X. If their percentage abundance is 69% and 31% respectively find the R.A.M of X.	**(2 marks)**

7.	The melting point of phosphorous trichloride is -91^0C and that of sodium chloride is 801^0C. Explain the huge difference in their melting points.	**(2 marks)**

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8.	Explain how the "greenhouse effect" occurs.	**(2 marks)**

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9. Use dots (•) or crosses (x) to show bonding in the following molecules. **(2 marks)**

(a) Silicon hydride

(b) hydroxonium ion

10. Starting with copper (II) oxide describe how CRYSTALS of copper (II) sulphate can be made. **(3 marks)**

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11. The table below shows the first ionization energies of element X and Y.

Element	Ionization energy kJ/mole
X	494
Y	736

(a) Define the term first ionization energy. **(1 mark)**

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(b)   Compare the reactivity of X and Y. Explain your answer.   **(2 marks)**

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12.   (a)   Write the chemical formular of the main compound in Bauxite.   **(1 mark)**

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(b)   Name the chief impurities found in chief ore of aluminium.   **(1 mark)**

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13.   (a)   Explain why it is not proper to cook using charcoal in an enclosed room.

          (2 marks)

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(b)   When carbon (IV) oxide is bubbled through calcium hydroxide for a long time two
         types of reactions occur; write the equation for each of the reaction.   **(2 marks)**

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14.   A jar full of moist chlorine was inverted over a jar of hydrogen sulphide as shown below.

Moist chlorine

Hydrogen sulphide
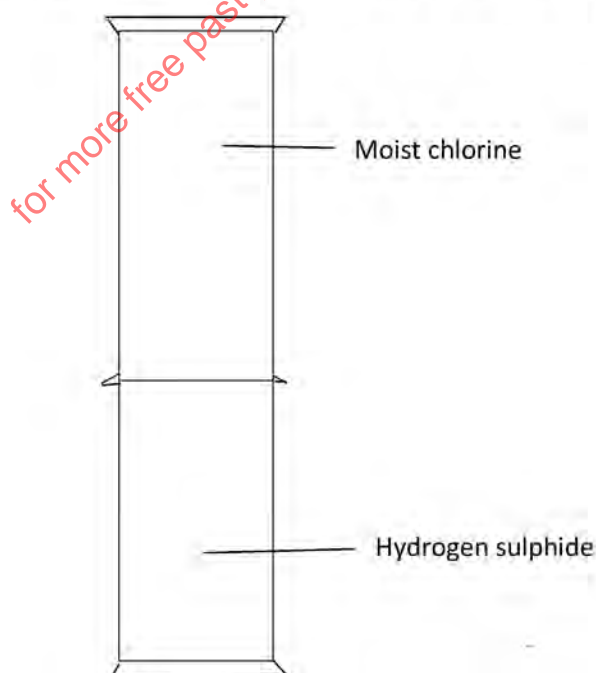
(a)   State the observation made.   **(1 mark)**

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(b)   Write the equation for the reaction and show using oxidation no. that the reaction above is a redox.   **(2 marks)**

15.   Chlorine was bubbled through a solution of potassium iodide;

(a)   State the observation made.   **(1 mark)**

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(b)   Write an ionic equation for the above reaction.   **(1 mark)**

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16.   The solubility of Iron (II) sulphate at 22^0C is 15.65/100g of water. Calculate the mass of Iron (II) sulphate crystals in 90g of saturated Iron (II) sulphite solution.   **(3 marks)**

17.   The diagram below was used to electrolyze molten copper (II) chloride using graphite electrodes at s.t.p.
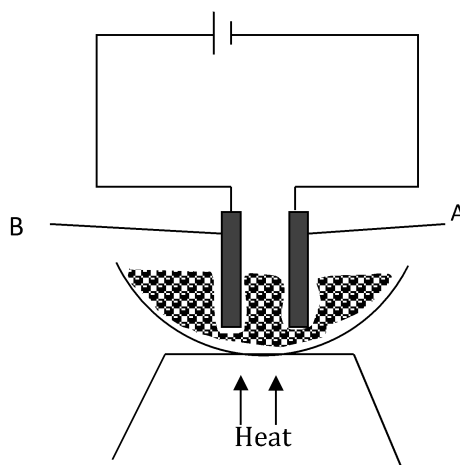
(a) Explain the role of heat on the above set up. **(1 mark)**

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(b) Name electrode A and B. **(1 mark)**

A ....

B ....

(c) If 96500 C of electricity was used during electrolysis of molten copper (II) chloride above. Work out the volume of chlorine liberated at s.t.p. (IF =96500C). **(3 marks)**

18. Copper (II) sulphate reacts with Barium chloride according to the following equation:

$$BaCl_{2(aq)} + CuSO_{4(aq)} \longrightarrow BaSO_{4(s)} + CuCl_{2(aq)}; \Delta H = -17.7kJ/mole$$
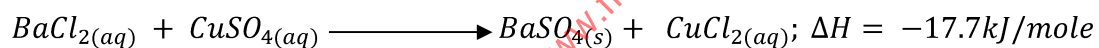
Calculate the temperature change when 900cm³ of $1M BaCl_2$ and 600cm³ of 1M copper (IV) sulphate were reacted. (s.h.c = 4.2kJ/kg/K. **(3 marks)**

19. When 17.2 g of hydrated calcium sulphate was heated to a constant mass, 13.6g of the residue was obtain. Find the value of n in $CaSO_4 \bullet nH_2O$. **(2 marks)**
($Ca = 40$, $S = 32$, $O = 16$, $H = 1$)

20. (a) Define the term allotropes. **(1 mark)**

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(b) Explain how diamond and graphite can be proved to be allotropes. **(2 marks)**

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21. In an experiment, ammonium chloride was heated in a boiling tube with a moist red and blue litmus paper at the mouth of test tube. State and explain the observation made.

(3 marks)

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22. $100cm^3$ of gas R diffuses through a porous pot in 110 seconds while some volume of CO_2 diffuses through in 165 seconds. Find the R.M.M of gas R. (C = 12, O = 16) **(3 marks)**

23. $250cm^3$ of 1M HCl was reacted with 5cm of magnesium ribbon. The resulting solution required $15.0cm^3$ of IM Na OH for complete neutralization. Determine the mass of Magnesiumribbon used. (Mg = 24). **(3 marks)**
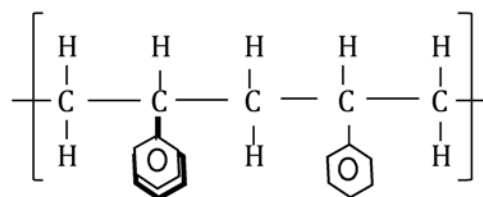
24. Name the process that takes place when;

    (a)   fat or oils are boiled using alkalis. **(1 mark)**

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    (b)   chlorine is reacted with methane **(1 mark)**

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25. Ethanol and dimethylether have formulae C_2H_6O. Explain why ethanol C_2H_6OH boils at 78.2^{0}C and dimethyl ether CH_3OCH_3 has a boiling point -24^{0}C. **(2 marks)**

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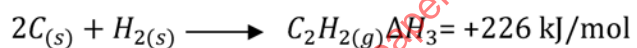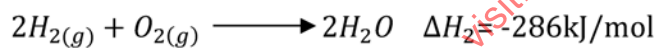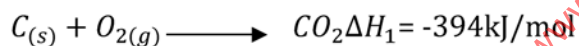
27. Below is part of a synthetic polymer.

Determine the number of monomers in the polymer above give the RFM of the polymer is 208000 &has a formular of C_6H_5. **(3 marks)**

$(C = 12, H = 1)$

28. Calculate the enthalpy change for the combustion of ethyne using the equations below.

(3 marks)

$C_{(s)} + O_{2(g)} \longrightarrow CO_2 \Delta H_1 = -394kJ/mol$

$2H_{2(g)} + O_{2(g)} \longrightarrow 2H_2O \quad \Delta H_2 = -286kJ/mol$

$2C_{(s)} + H_{2(s)} \longrightarrow C_2H_{2(g)} \Delta H_3 = +226 \ kJ/mol$

29. (a) A mass of X grammes of radioactive isotope active decay to 5 grams in 100 days. If the half-life is 25 days, calculate the initial mass. **(2 marks)**

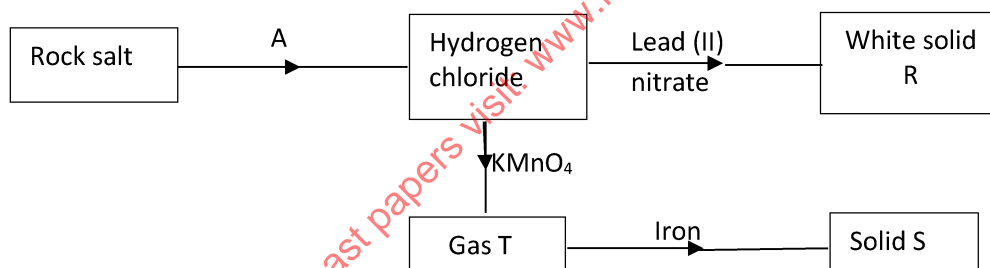(b) State two applications of radioactivity. **(2 marks)**

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30. State one way of disposing radioactive substances. **(1 mark)**

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31. Study the chart below and answer the questions that follow.

(a) Name reagent used in step A. **(1 mark)**

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(b) Write the ionic equation for formation of white solid R. **(1 mark)**

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(c) Write an equation for formation of solid S. **(1 mark)**

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