NAME:.. ADM NO...................

CLASS ....

233/1
CHEMISTRY
Paper 1

Time: 2 Hours

ALLIANCE HIGH SCHOOL
FORM FOUR CHEMISTRY
CAT 1 TERM 1 2016
Kenya Certificate of Secondary Education (K.C.S.E)

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INSTRUCTIONS TO CANDIDATES
1. Write your name and index number in the spaces provided above
2. Write the school, date and sign in the spaces provided above
3. ALL workings must be clearly shown
4. Answer All the questions in the spaces provided.
5. Mathematical tables and electronic calculators may be used

For Examiner's Use Only

Question	Maximum Score	Candidate's Score
1 – 30		

1. Give the chemical name of the following compounds
   a) Brine

   b) Slaked lime   (2 mks)

2. Caesium (Cs) is an element in the same group as sodium and potassium on the periodic table
   a) How many electrons are there in the outermost shell of Caesium?   (1 mk)

   b) Write the formula of the most stable ion of Caesium.   (1 mk)

   c) Calculate the mass of Caesium carbonate which is present in $100cm^3$ of 2.0M solution of Caesium carbonate   (2 mks)
   (R.A.M Cs. 133   C = 12   0 = 16)

3. Explain in terms of structure and bonding why methane is a gas at room temperature while water is a liquid.   (2 mks)

4. Name a suitable solvent for extracting oil from nuts.   (1 mk)

5. The diagram below is a representation of an industrial process for the manufacture of bleaching powder.
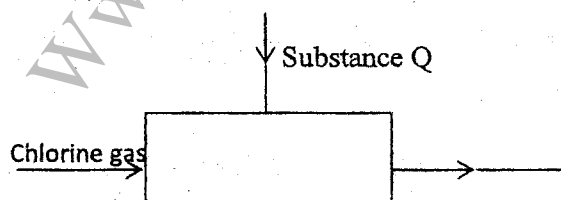
   Name substance Q   (1 mk)

6. When 1.44g of element X was heated in air, 2.08g of the oxide was formed.
   Determine the molecular formular of the oxide if its molecular mass is 208.
   (R.A.M. of x = 72, 0 = 16)   (3 mks)

7. Study the table below of certain properties of substances A,B,C and D.

	Melting points	Solubility in water	Electrical conductivity
A	-119°C	Soluble	Solution does not conduct
B	1020°c	Soluble	Solution conducts
C	1740°c	Insoluble	Conducts at room temperature

Which of the substances
i) Is a metal_____

ii) Has a simple molecular structure_____

iii) Has giant ionic structure_____

iv) Has giant covalent structure ·_____

(2 mks)

8. a) Give the the names of the following compounds

i)

$$CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_3$$_____
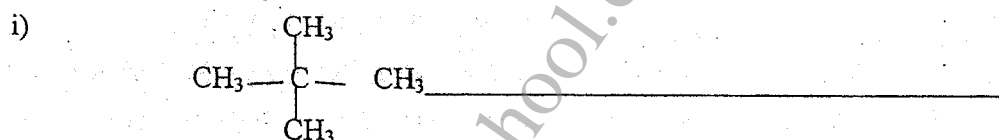
ii) CHC CH₂CH₃ _____(2 mks)

b) How would the two compounds respond to acidified potassium manganate
(VII) (2 mks)

9. a) Explain why hydrogen gas has been replaced by helium in filling aeroplane
tyres. (1 mk)

b) Hydrogen gas is bubbled through oil in presence of a catalyst to yield fats.
i) Name a suitable catalyst used in the above process. (1 mk)

iii) What name is given to the above process (1 mk)

10. i) Describe how a solid sample of calcium carbonate can be prepared starting
with magnesium oxide. (3 mks)

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ii) State one use of calcium carbonate. (1 mk)

11. When a substance V was reacted with water it gave off oxygen gas. Substance V gave a yellow flame when burnt.

a) Identify substance V (1 mk)

b) Write an equation for the reaction between V and water. (1 mk)

12. a) State Charles' Law. (1 mk)

b) A given sample of oxygen gas occupies $16cm^3$ at $7^\circ c$ and 335 mmHg pressure. At what temperature will it occupy $10cm^3$ at 670mmHg pressure. (2 mks)

13. A mixture containing equal volumes of ammonia and sulphur (IV) oxide was introduced at the end of a long tube. At the end was placed moist blue and red litmus paper as shown below.

Dry ammonia and sulphur (IV) oxide

Moist red and blue litmus papers
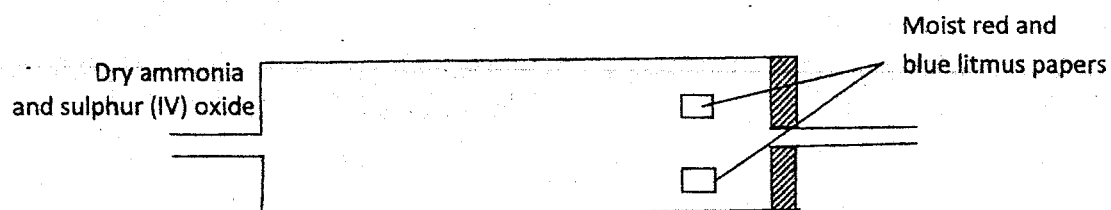
a)   State the observations made after the introduction of the mixture in the tube.

(2 mks)

b)   Explain the observation made in (a) above.   (2 mks)

14. Describe one method that can be used to distinguish between sodium sulphate and sodium hydrogen sulphate.   (2 mks)

15. Write a balanced equation for decomposition of
     a)   Ammonium nitrate solid   (1 mk)

     b)   Iron (II) sulphate solid.   (1 mk)

16. a)   State two physical properties of sulphur that makes it possible for it to be extracted by Frasch process.   (2 mks)

     b)   State the observation made when a few drops of concentrated sulphuric (VU) acid are added to crystals of sugar? Explain your answer.   (2 mks)

17. a)   State two uses of carbon (II) oxide   (2 mks)

     b)   Give one reason why carbon (IV) oxide is used as a refrigerant.   (1 mk)

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18. Bromine and krypton are put on opposite sides of a dry tube and allowed to diffuse under the same conditions.

   a) Find the relative rate of diffusion for gases.
      (Br = 79.9, Kr = 83.8)   (2 mks)

   b) If bromine gas moves $10cm^3$ in the dry tube what distance will krypton move.
                                                                 (1 mk)

19. Using dots (•) and crosses (x) draw the structure for the following compounds.
      a)   Water

      b)   Hydroxonium ion

      c)   Hydrogen fluoride   (3 mks)

20. State whether the following salts are soluble or insoluble
   i)   lead carbonate_____
   ii)   sodium chloride_____
   iv)   silver chloride _____
   v)   copper (II) nitrate _____

                                                                 (2 mks)

21. Give the differences between the following terms

    a)   (i)   Isotopes and isomer

           (ii)   distillate and filtrate.   (2 mks)

    b)   (i)   Define allotropy   (1 mk)

           (ii)   Other can carbon, identify another element that exibits allotropy.
                                                        (1 mks)

22. While giving a reason, describe how nitric (v) acid is stored in a laboratory. (2 mks)

23. An organic compound has the following composition : 37.21% carbon, 7.75 hydrogen and the rest chlorine. Determine the molecular formula of the compound, given that the molecular mass of the compound is 65. (C = 12 H = 1.0 cl = 35.5) (3 mks)

24. $100cm^3$ of 0.05M sulphuric (VI) acid were placed in a flask and a small quantity of anhydrous sodium carbonate added. The mixture was boiled to remove carbon (IV) oxide. $25cm^3$ of the resulting solution required $18cm^3$ of 0.1M sodium hydroxide to neutralize. Calculate the mass of sodium carbonate added. (4 mks)

25. State Gay Lussac's Law. (1 mk)

26. A sample of sodium chloride in water conducts electricity while the same put in methylbenzene does not conduct. Explain. (2 mks)

27. The flow chart below shows a reaction scheme starting with solution K. Study it and answer the questions that follow;
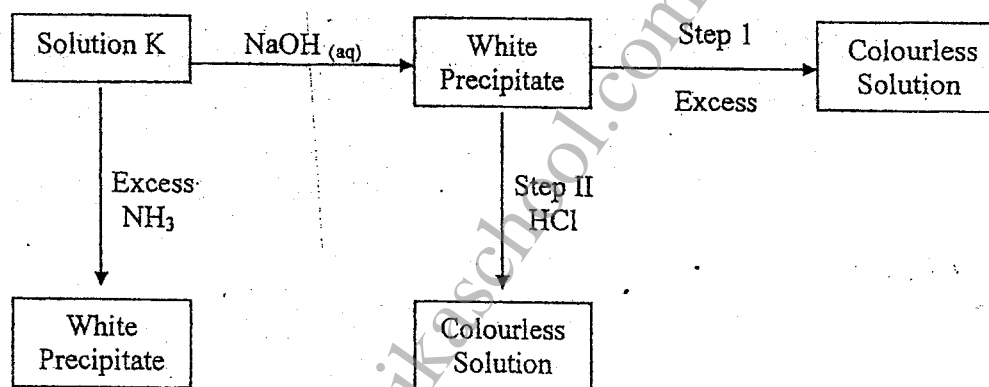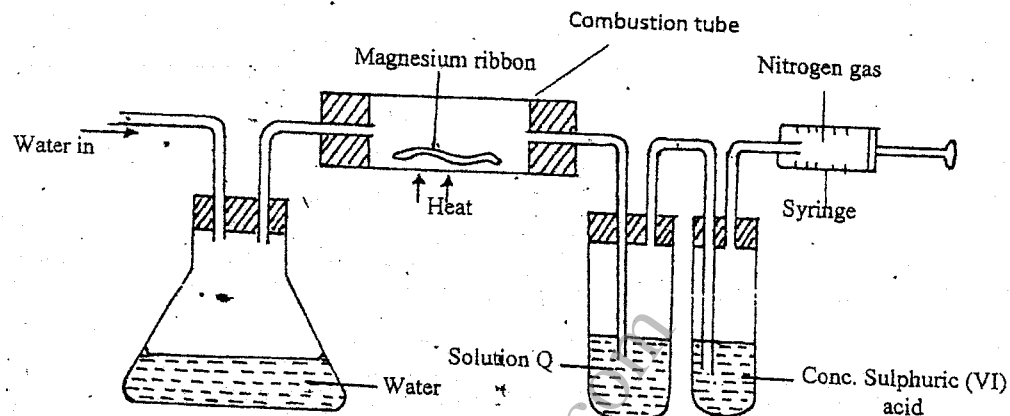

i) Identify the metal ions in solution K. (1 mk)

ii) What property of the white precipitate is illustrated by steps I and II? (1 mk)

iii) Write an ionic equation for the reaction taking place in step 1. (1 mk)

28. a) The set up below was used to obtain dry nitrogen gas from air. Study it and answer the questions that follow.

   i) Name the method used above. (1 mk)

   ii) Identify solution Q. (1 mk)

   iii) State the observation made in the combustion tube. (1 mk)

29. Explain why bodies of motor vehicles wear out more in Mombasa than Nairobi.

   (1 mk)

30. In the last state of the solvay process a mixture of sodium hydrogen carbonate and ammonium chloride is formed.
   a) State the method of separation used. (1 mk)
   b) Write an equation showing how lime is slaked. (1 mk)

   c) Name the by product in the above process. (1 mk)