

NAME:.....INDEX NO:.....

SCHOOL:.....CANDIDATE'S SIGNATURE:.....

DATE:.....

233/1
CHEMISTRY
PAPER 1
JUNE -2016
TIME: 2 HOURS

CENTRAL YEARLY MEETING OF FRIENDS (CYMF) -2016
Kenya certificate of Secondary Education

233/1
CHEMISTRY
PAPER 1

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. Answer all the questions in the spaces provided.
4. Mathematical tables and silent electronic calculators may be used.
5. All working must be clearly shown where necessary.
6. Candidates should check the question paper to ascertain that all the pages are printed as indicated and no question is missing.

FOR EXAMINER'S USE ONLY

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1-28	80	

This paper consists of 12 printed pages Check the Question paper to ensure that all pages are printed as indicated and no question are missing.

1. Explain the following

i) It is always advisable to scoop chemicals using a clean spatula. (1mk)

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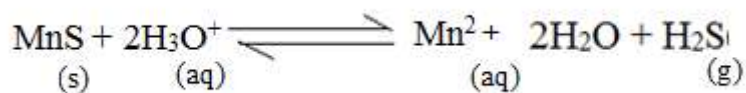
ii) Flammable substances should always be kept away from flames in the laboratory. (1mk)

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2. Name one reagent that can be used to distinguish between Al^{3+} and Zn^{2+} ions in solution and state what would be observed if each of the ions is treated with the reagent you have named. (3mks)

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3. Manganese sulphide reacts with acids according to the following equation.



State giving a reason what would happen to the equilibrium if;

i) Water is added to the equilibrium mixture. (2mks)

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ii) Hydrogen chloride is bubbled into the equilibrium mixture. (2mks)

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4. State the conditions under which copper reacts with sulphuric (vi) acid and give an equation for the reaction. (2mks)

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5. When 8.8g of hydrocarbon Z was burnt in excess air 14.4g of water and 11.95 dm³ of carbon (vi) oxide were obtained at s.t.p. Determine the empirical formula of Z. (3mks)

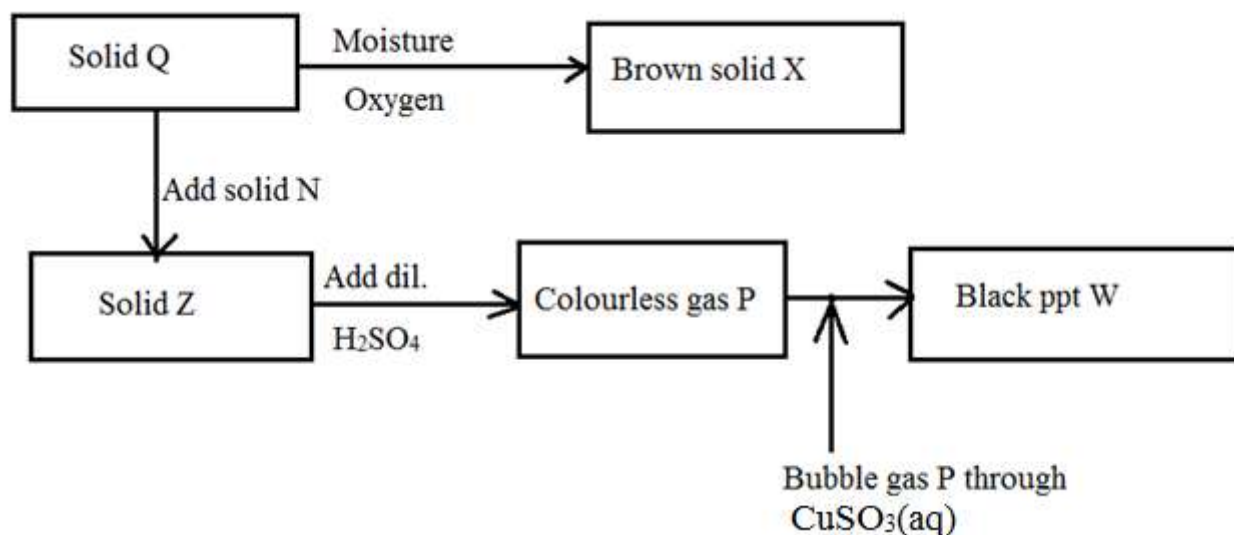
6. When zinc granules are dropped into two separate solutions of dilute sulphuric (vi) acid effervescence of a colourless gas occurs in each case. Give equations to represent the reactions that take place. (2mks)

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



a) Identify solid X. (1mk)

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b) Write the ionic equation for the reaction between P and copper (ii) sulphide solution. (1mk)

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c) State the observations made when gas P is bubbled through iron (iii) chloride solution. (1mk)

8. State and explain the observation made when a moist red litmus paper is put in a gas jar of dry chlorine gas. (2mks)

9. Use the information in the table below to answer the questions that follow.

Melting point	Element	Atomic number
97.8	R	11
660	S	13
1440	T	14
-40.1	U	17
63.1	V	19

a) Write the electron arrangement of

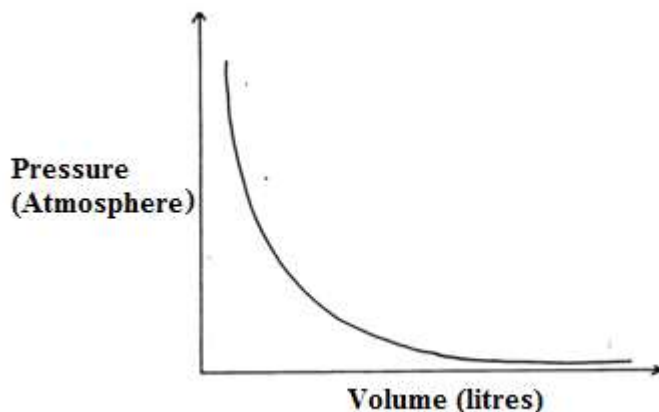
i) Ion of S

ii) atom of T

b) Explain why the melting point of T is higher than that of U. (2mks)

10. Calculate the volume of nitrogen (i) oxide produced when 38.2g of ammonium nitrate is completely decomposed by heating (at s.t.p). (N=14, H=1, O=16) (3mks)

11. The graph below shows the behavior of affixed mass of a gas at constant temperature.



a) What is the relationship between the volume and the pressure of the gas? (1mk)

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b) 60cm^3 of oxygen gas diffused through a porous partition in 50 seconds. How long would it take 60cm^3 of sulphur(iv) oxide gas to diffuse through the same partition under same conditions? (S = 32, O = 16.0) (3mks)

12. a) When extinguishing a fire caused by burning kerosene carbon(iv) oxide is preferred to water. Explain. (2mks)

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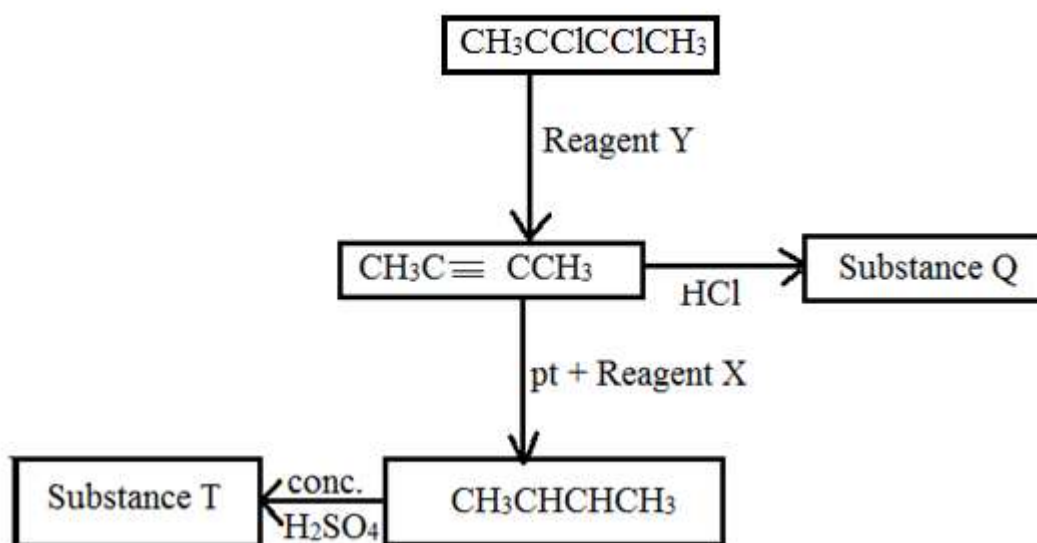
b) Write the formula of the oxide of carbon which is 'silent killer'. (1mk)

13. What is an Amphoteric oxide? Give two examples. (2mks)

14. A certain fertilizer is suspected to be containing nitrate ions. Describe how the presence of nitrate ions can be determined in such fertilizer. (3mks)

15. Starting with zinc carbonate solid, describe how zinc hydroxide can be prepared in the laboratory. (3mks)

16. Below is a scheme of some reactions starting with but-2-ene. Study it and answer the questions that follow.



a) Name Y, X and T.

(1 ½ mks)

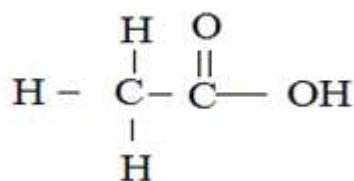
Y.....

X.....

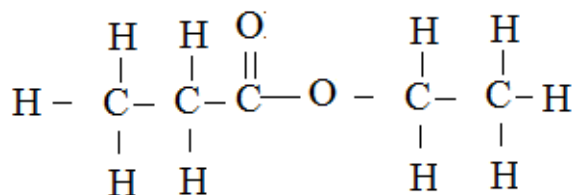
T.....

b)i) Give the name of the following organic compounds.

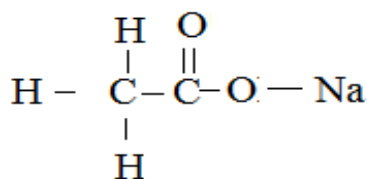
(½ mk)



ii)



iii)



17. The following results were obtained during an experiment to determine the solubility of potassium nitrate in water at 30⁰C.

Mass of dish = 15.86g

Mass of dish + saturated solution at 30⁰C = 26.86g

Mass of dish + solid KNO₃ after evaporation to dryness = 16.7g

Calculate the mass of saturated solution containing 60.0g of water at 30⁰C. (3mks)

18. Apart from their location, state any two differences between a proton and an electron. (1mk)

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19. Explain why chlorine is a gas while iodine is a solid at room temperature. (2mks)

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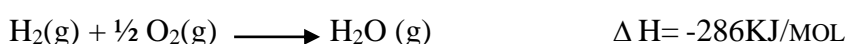
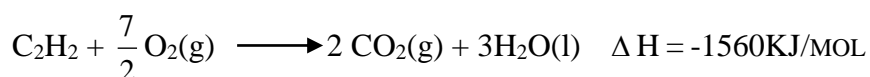
20. a) When magnesium metal is burnt in air, it reacts with both oxygen and nitrogen gases giving white ash. Write two equations for the reactions that take place. (2mks)

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b) Give the total number of atoms present in the gas produced when water is added to magnesium nitrate. (1mk)

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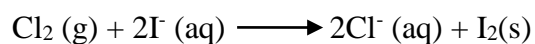
21. Use the thermo chemical equations below to answer the questions that follow.



i) Draw an energy cycle diagram to the enthalpy of formation of ethyne. (1 ½ mks)

ii) Calculate the enthalpy of formation of ethyne. (1 ½ mks)

22. For the reaction



Use oxidation numbers determine the reducing agent. (3mks)

23. When aqueous sodium hydroxide solution was added to freshly prepared acidified iron (ii) sulphate solution a green precipitate was formed. When hydrogen peroxide was first added to iron (ii) sulphate solution followed by sodium hydroxide solution, a brown precipitate was formed. Explain the observations. (3mks)

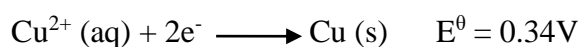
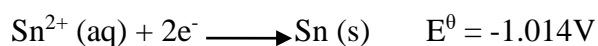
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24. Use the following information to answer the questions that follow.



a) Write the cell representation for the cell made up of two half cells. (1mk)

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b) Write an equation for the cell reaction. (1mk)

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c) Calculate the E^{θ} value for the cell. (1mk)

25. i) Define the term electrolysis. (1mk)

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ii) Hydrogen and oxygen can be obtained by electrolysis of acidified water. Using equation for the reaction at the electrode, explain why the volume of hydrogen obtained is twice that of oxygen.

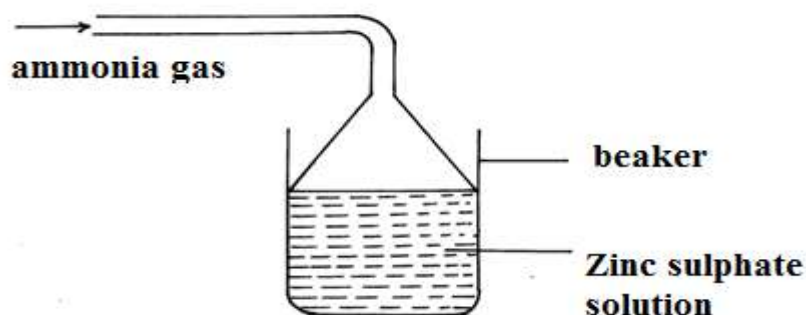
(2mks)

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26. A student prepared ammonia gas and let it into a solution of zinc sulphate using the arrangement shown below.



a) State and explain the observations that were made in a beaker. (2mks)

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b) Write the ionic equation involving zinc ions. (1mk)

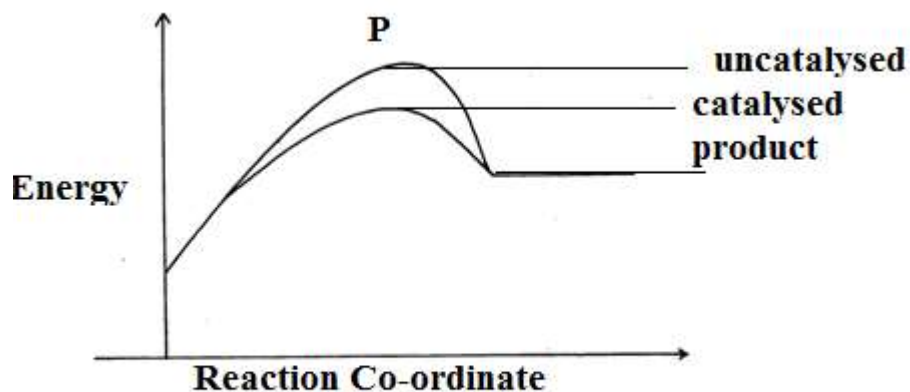
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27. Use dots (•) and cross (x) to show the bonding in:

a) The compound formed between phosphorous and hydrogen. (P = 15, H = 1) (2mks)

c) Carbon (ii) oxide. (C = 6, O = 8) (1mk)

28. The energy level diagram below shows the effect of catalyst on the reaction path.



a) What does point P represent? (1mk)

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b) With reference to energy level diagram, explain how a catalyst increases the rate of reaction. (2mks)

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