Name: ……Adm No. ……
Class: ……. Date: ….....

233/1
CHEMISTRY
PAPER 1
FORM III
END TERM 2 EXAMS
Time: 2 hours

233/1
CHEMISTRY
FORM III

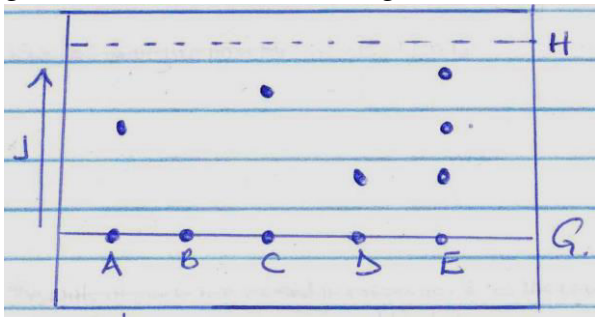
INSTRUCTIONS TO THE CANDIDATES:-

- Write your **name** and admission **number** on the spaces provided.
- Answer ***all*** the questions in the spaces provided.
- Mathematical tables and electronic calculators may be used
- All working **MUST** be clearly shown where necessary.

Question	Maximum score	Candidate's score
1-30	80	

This paper consists of 10 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing

1. The diagram below shows Chromatograms for five different dyes.



a) Name one condition required to separate the chromatograms present in a dye. (1 mk)

b) What is meant by the solvent front? . (1 mk)

c) Which chromatograms are present in dye E. (1 mk)

d) Name two industrial applications of chromatography. (2 mks)

2. An element Y has the electronic configuration 2.8.5

a) Identify its period _____ (1mk)

b) Write a formula of the most stable anion formed when U ionizes. (1mk)

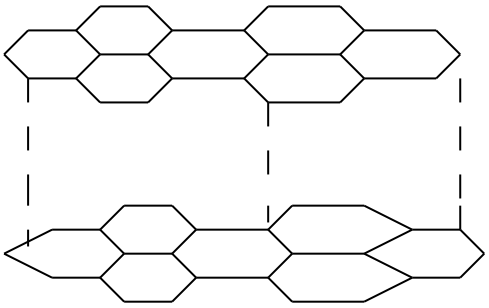
c) Explain the differences between the atomic radius of element Y and its ionic radius. (2mks)

3. a) What is meant by allotropy? (1 mark)

……

……

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



i) Identify the allotrope ($^1/_2$ mk)

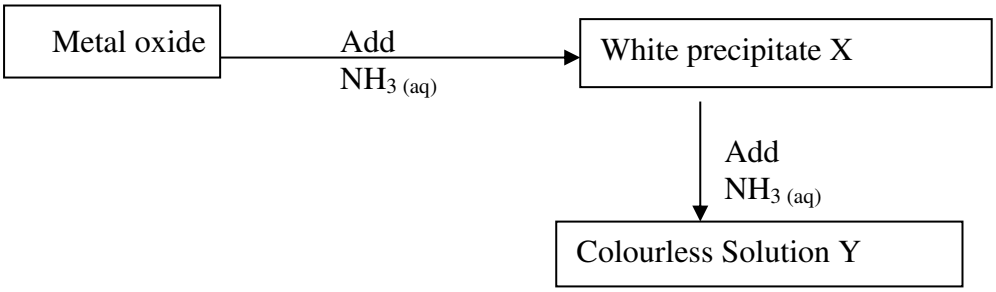
……

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

…….

…….

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



a) Identify the metal oxide. (1mk)

b) Write an ionic equation leading to the formation of the white precipitate X. (1mk)

c) Give the formula of the ions responsible for the colourless solution Y. (1mk)

5. a) Apart from their location, state any two differences between a proton and an electron.**(2 mks)**

(b) Protons and neutrons are found in the nucleus of an atom. State two important roles played by of neutrons in the nucleus of an atom. (2 mks)

6. Give equations to show the reactions that take place when;
(a) Iron reacts with steam. **(1 mark)**

(b) Name and give one industrial use of the gas produced in the reactions in (i) above. **(2mks)**
Name:
Use:

7. $20cm^3$ of an unknown gas Q takes 12.6 seconds to pass through small orifice.$10cm^3$ of oxygen gas takes 11.2 seconds to diffuse through the same orifice under the same conditions of temperature and pressure. Calculate the molecular mass of unknown gas Q (O=16). (3mks)

8. A compound of carbon, hydrogen and oxygen contains 71.12g by mass of oxygen, 2.2g hydrogen and the rest is carbon. It has relative molecular mass of 90.
   a) Determine the empirical formula of the compound. (3mks)

   b) Determine the molecular formula of the compound. (2mks)

9. Study the information in the table and answer questions that follow:

Isotope	Relative abundance %
$^{69}_{31}R_1$	61.3
$^{71}_{31}R_2$	38.7

   (a) Determine the number of neutrons of R_1 (1mk)

(b) Calculate the relative atomic mass of element **R**. (2mks)

10. (a) Identify the type of bond formed in (i) and (ii). (1mks)

(I) (II)

(I)……..

(II)……..

(b) Use dot (.) and cross (x) diagram to draw the structure of Sulphur (IV) oxide. **(2marks)**

11. Complete the table below. (3 mks)

Element	Latin Name	Symbol
_____	Plumbum	_____
Copper	_____	Cu
Potassium	_____	K
Tin		Sn

12. (a) State Gay Lussac's law. (1mk)

b) What volume of oxygen will be required for complete combustion of $100cm^3$ of carbon (II) oxide. What is the volume of the product formed (All volumes at same temperature and pressure). (2mks)

13. If $25.0cm^3$ of 0.1 M H_2SO_4 solution neutralized a solution containing 1.06g of sodium carbonate in $250cm^3$ of solution, calculate the molarity and volume of the sodium carbonate solution used. (3mks)

14. (i) State Charles' law. (1mk)

(ii) The capacity of a balloon to hold a gas at 5^oC is $1dm^3$ before it bursts due to expansions show whether it will burst or not at 35^oC at constant pressure. (2mks)

15. What is the colour of the following?

Metal oxide	Colour when hot	Colour when cold
Zinc oxide	(i)	(ii)
Lead (II) oxide	(iii)	(iv)

(4mks)

16. Form two students from Anestar Premier High School reacted three elements as shown in the table below

Element	Reaction with Oxygen	Reaction with water
X	Formed acidic oxide	No reaction
Y	Formed basic oxide	Formed soluble hydroxide gave off hydrogen gas
Z	Formed acidic oxide	Dissolved to form an acidic solution

Which element (s) is likely to be: (3mks)

i) Non-metal (s)

ii) Metal (s)

iii) Insoluble in water

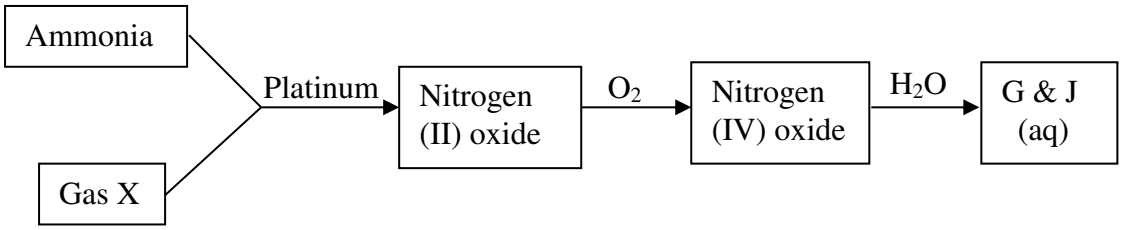
17. State the function of the following parts of a Bunsen burner (3mks)

a) Air hole

b) Collar

c) Base

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

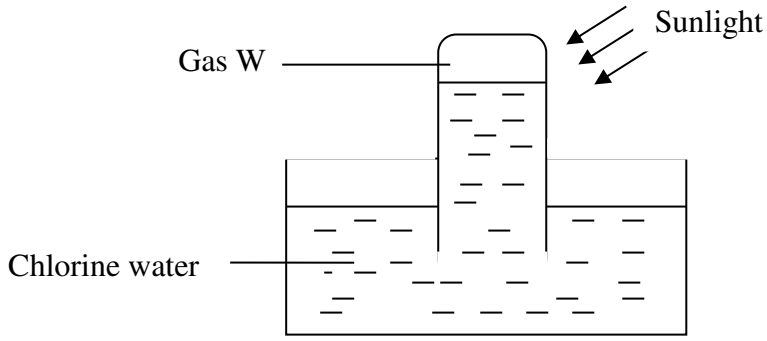


a) Identify gas X (1mk)

b) Write an equation for the reaction between ammonia and gas X (1mk)

c) Write an equation to show the formation of G and J (1mk)

19. The diagram below shows the effect of sunlight on chlorine water



a) Identify gas W (1mk)

b) Write an equation to show the formation of gas W (1mk)

c) What compounds are present in chlorine water? (1mk)

d) Which compound is left in the beaker after complete formation of gas W? (1mk)

20. Study the table below and answer the questions that follow

Element	Atomic number	Atomic radius	Ionization energy
K	3	0.089	1800
V	11	0.136	1450
T	19	0.174	1150

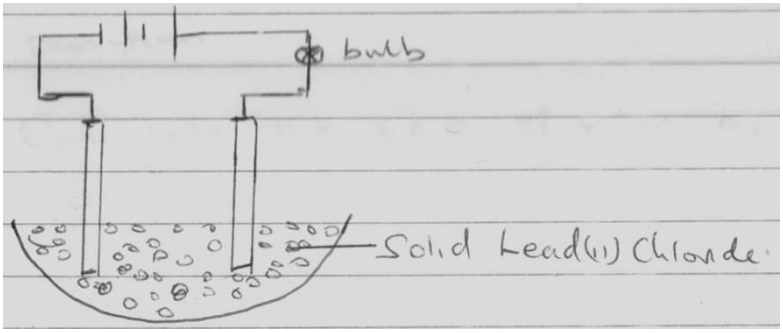
a) Define the term '**ionization energy**' (1mk)

b) Explain the trend in the ionization energy from element K to T (2mks)

c) Compare the trend in the melting and boiling points of elements K and T. (2mks)

21. Explain using chemical means how you would differentiate between carbon (II) oxide and carbon (IV) oxide. (2mks)

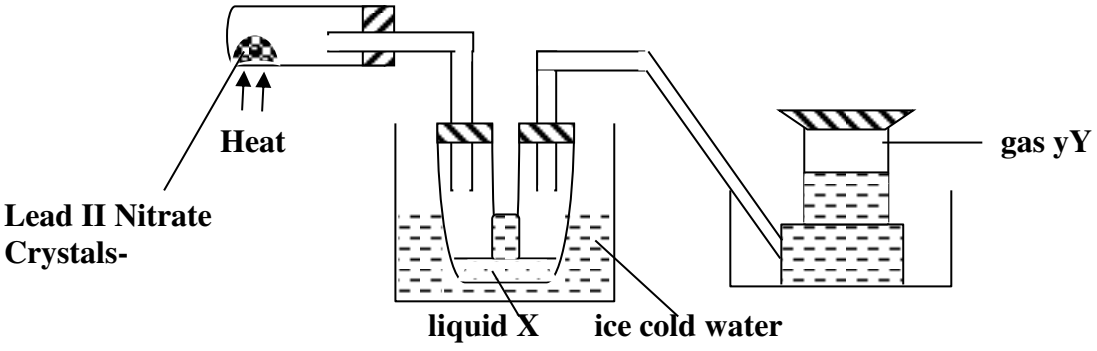
22. The following diagram shows the effect of electric current on lead (II) Chloride.



a) When the circuit was completed no current flowed. Explain why. (1mk)

b) When lead (II) Chloride was heated to about 300^0C, it melted and there was light on the bulb. State and explain the observation made at the anode. (2mks)

23. The set-up below shows the products formed when solid lead (ii) nitrate is heated.



a) Identify:

(i) Liquid **X** …… (1 mark)

(ii) Gas Y…… (1 mark)

b) When lead (ii) Nitrate crystals are heated, they decrepitate and decompose, what is meant by the term decrepitating? (1 mark)

……
……

24. Calculate the number of Al^{3+} ions released when $30cm^3$ of 0.1M of Aluminium Sulphate is dissolved in water. (L = 6.024×10^{23}). (3mks)