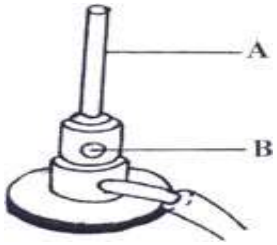
FORM FOUR CLUSTER KCSE MODEL11

CHEMISTRY PAPER 1 QUESTIONS

1. The diagram below shows a Bunsen burner.



Name the parts labeled A and B

A.....
.... B.....
.....

2.

Element	Atomic Number	Ratomic radius (nm)	Ionic radius(mn)
P	3	0.134	0.074
Q	5	0.090	0.012
R	13	0.143	0.050
T	17	0.099	0.181

a) In which period of the periodic table is element Q? Give a reason. .....
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b) Explain why the atomic radius of P is greater than that of Q.

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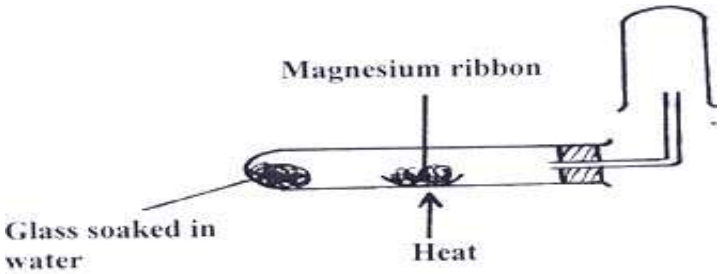
3. The set up below was used to prepare nitric acid.



a) Why is hydrogen collected as shown above?

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b) How would you show that the gas collected is hydrogen?

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.....

c) When copper turning were used instead of magnesium in above reaction, hydrogen gas was not produced. Explain.

4. Solutions can be classified as acid, base or neutral. The table below shows solution and their PH values

Solution	pH values
K	1.5
L	7.0
M	14.0

i) Select any four pair that would react to form a solution pH 7. .....
.....

ii) Identify two solutions that would react with Aluminium hydroxide. Explain. .....
....
.....

5. A certain carbonate, BCO_3 reacts with dilute hydrochloric acid according to the equation given below.

$$BCO_{3(s)} + 2HCl_{(aq)} \rightarrow BCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$$

If 1 g of the carbonate reacts completely with 200cm3 of 1 M hydrochloric acid, calculate the relative atomic mass of B (C = 12.0,O=16.0)

6. Name the process which takes place when: a) Gaseous Carbon (IV) Oxide changes directly into solid Carbon (IV) Oxide (dry ice). (1mark) .....
.....

b) Blue litmus paper turns white when dropped into chlorine water. (1 mark) .....
.....

c) Ethene gas molecules are converted into a giant molecule. (1 mark) .....
.....

7. Sulphuric acid is manufactured in large scale by the contact process. The basic reaction in the contact process is catalytic oxidation of sulphur (IV) Oxide.

a) Name the catalyst used.
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.....
b) State one large scale use of sulphuric (VI) acid.
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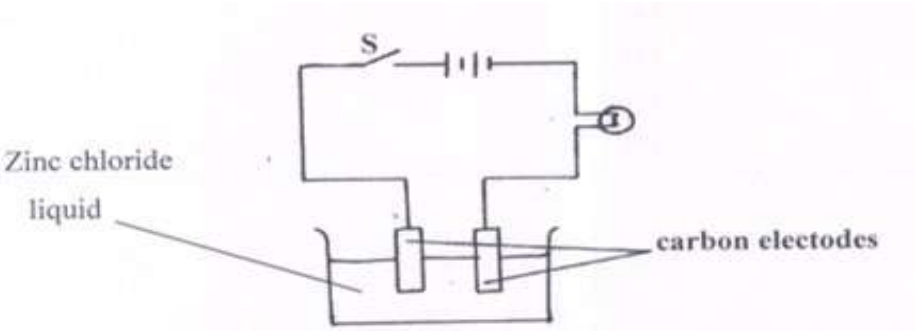
8. Study the diagram below and answer the questions that follow:



a) State one omission in the set up above.

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……

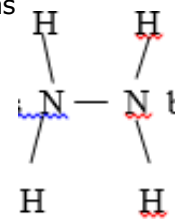
b) Write equations for the reactions that occur when the switch S is closed for 30 minutes at;

Anode……
……

Cathode……

9. Draw a dot and cross diagram to whose bonding in (atomic numbers) (Cl=17,O=8)

10. Hydrazine gas



burns in oxygen to form nitrogen gas and steam.

a) Write a chemical equation for the reaction that takes place.
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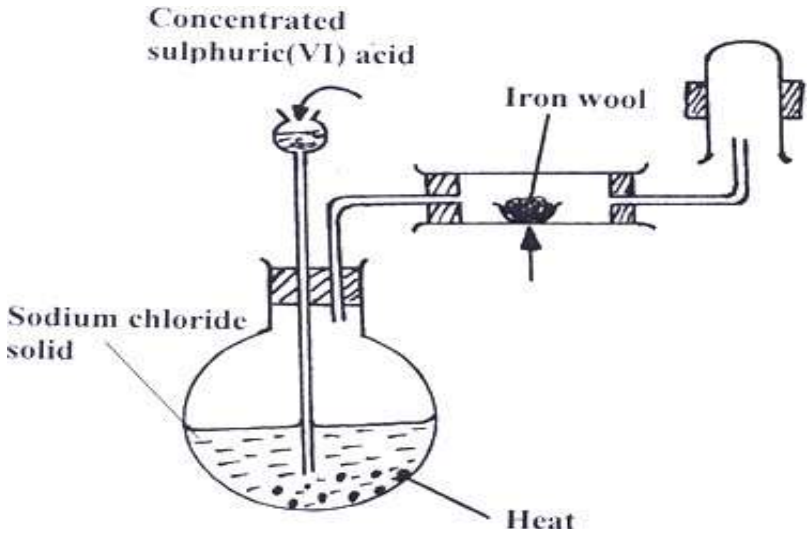
……

b) Using the bond energies given below, calculate the enthalpy change for the reaction in (a) above

Bond	Bond energy (kJ per mole
N≡N	944
N-N	163
N-H	388
0=O	496
H-O	463

11. The set up below was used to prepare a certain gas X.



a) Name the gas X. .....
.....

b) Name the product formed in the combustion tube and write an equation for its formation. .....
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..

12. a) State Graham's law of diffusion.

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....
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b) The molar masses of gas U and V are 16.0 and 44.0 respectively. If the rate of diffusion of U through the porous material is $12cm^3S^{-1}$.

Calculate the rate of diffusion of V through the same material.

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

a) Find the relative rate of diffusion for the gas Krypton and Bromine. (Br =79.9,Kr =83.8)(

b) If Bromine gas moves 10 cm in the dry tube what distance will Krypton move? .....
.....

14. Given below are molar enthalpies of combustion of propane, hydrogen and carbon.

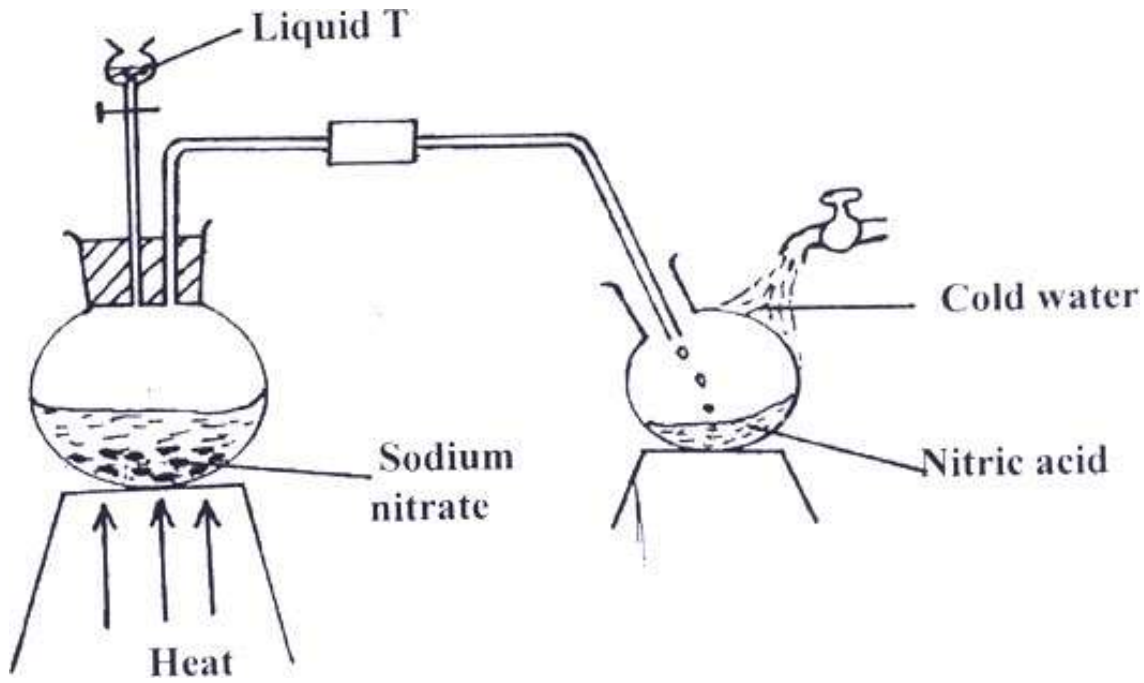
$$C_3H_{8(g)} + 5O_{2(g)} \rightarrow 3CO_{2(g)} + 4H_2O_{(l)}; \quad \Delta H = -2220.6kJ$$

$$H_{2(g)} + \frac{1}{2}O_{2(g)} \rightarrow H_2O_{(g)} \quad \Delta H = -285.9kJ$$

$$C_{(s)} - O_{2(g)} \rightarrow CO_{2(g)} \quad \Delta H = -393.5kJ$$

Use the above information to calculate the molar enthalpy of formation of propane.

15. The set up below was used to prepare nitric acid.



a) Give the name of liquid T.

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b) Write the equation for the reaction which took place in the reaction flask. ……
……

c) Explain why nitric acid is stored in dark bottles.

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……

16. In Kakamega County magazine journalist wrote " on a busy road the proportion of carbon (II) oxide has varied from 6 parts million to 180 parts per million" a) Explain why the proportion of carbon (II) oxide varies as above. ……
……

b) Explain why carbon (II) oxide considered to be a silent killer.

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…… ……
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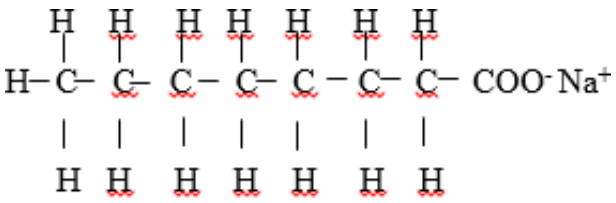
17. The structure of a detergent is:



a) Write the molecular formula of the detergent.

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b) What type of detergent is represented by the formula?

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……

c) Give one disadvantage of using the detergent.

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18. Starting with aluminium sulphate describe how a solid of aluminium hydroxide could be prepared. .
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…… ……
…… ……
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19. The table below shows the results obtained when soap solution was added to different samples of equal volumes of calcium hydroxide solution treated with different amounts of Carbon (IV) Oxide.

Sample	Solution	Volume of soap added to sample to lather
C	$50cm^3$ of calcium hydroxide +excess x carbon (IV) oxide)	$10cm^3$
D	$50cm^3$ of calcium hydroxide +little carbon (IV) oxide	$2cm^3$

Explain the difference in the volumes of soap required to form lather in different samples of calcium hydroxide C and D. ……
…… ……
……

20. Element A has atomic mass 23 and element B atomic mass 27 and also have 12 neutrons and 14 neutrons respectively.

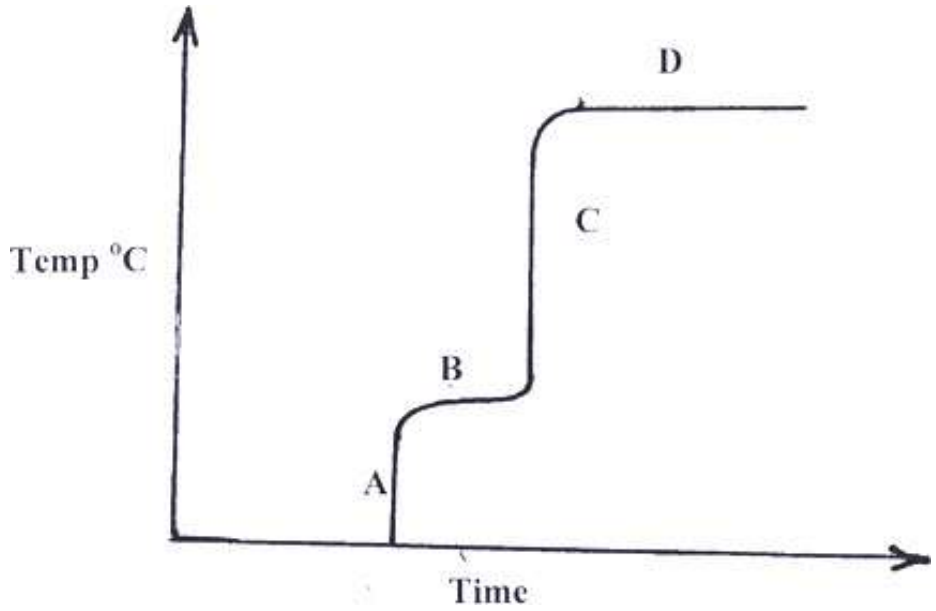
a) Write the electronic arrangement of A and B.

A……
B……

b) Which element has higher ionization energy? Explain.
……
…… ……
……

21. A mixture of heptanes, boiling 980C and 2,2-dimethy pentane of boiling point 800C was separated by fractional distillation.

The graph below shows the temperature of vapour intensity entering the condenser over a period of time.



At what region of the graph does 2, 2-dimethyl pentane start to distil over. Explain. .....
.....
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22. Iron reacts with steam according to the equation given below;

$$3Fe_{(s)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{4(s)} + 4H_2O_{(g)}$$

i) Explain the effect of decreasing pressure on the position of equilibrium. .....
.....
.....

ii) What is the effect of adding more hydrogen gas to the equilibrium mixture? .....
.....
.....

23. . a) Define the term electrolyte.

.....
....

b) Mercury is a good conductor but it is not an electrolyte. Explain. .....
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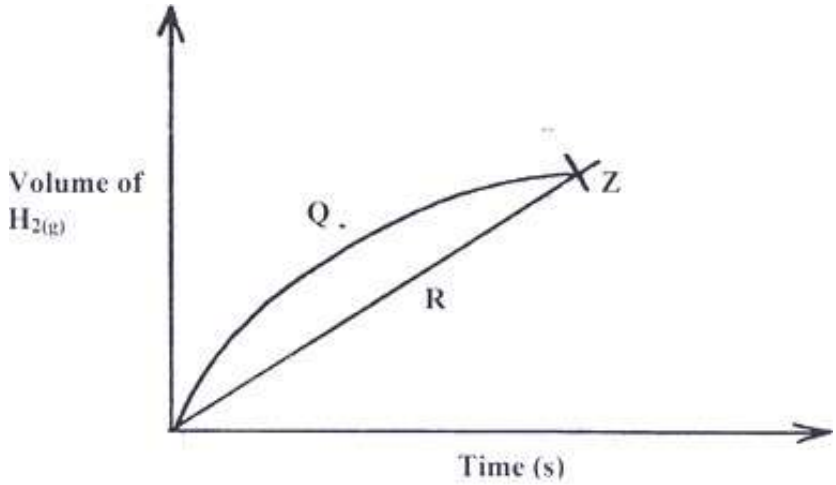
24. 24. Curves R and Q shown below were obtained when equal masses of magnesium metal were reacted separately with two different aqueous acids of the same concentration.



a) Explain which curve corresponds to; i. 1.0 M Propanoic acid.....

ii. 1.0 M Hydrochloric acid.....

b) What is the significance of point Z?

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25. In an experiment it was found that 40.0cm3 of 0.2M sodium hydroxide solution just neutralized 2 g of a dibasic acid Q. Calculate the relative molecular mass of acid.

26. a) State Le Chatelier's principle.

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b) According to the Le Chatelier's Principle stated in (a) above, what two conditions should be adopted in the Haber process in order to obtain the maximum yield of ammonia

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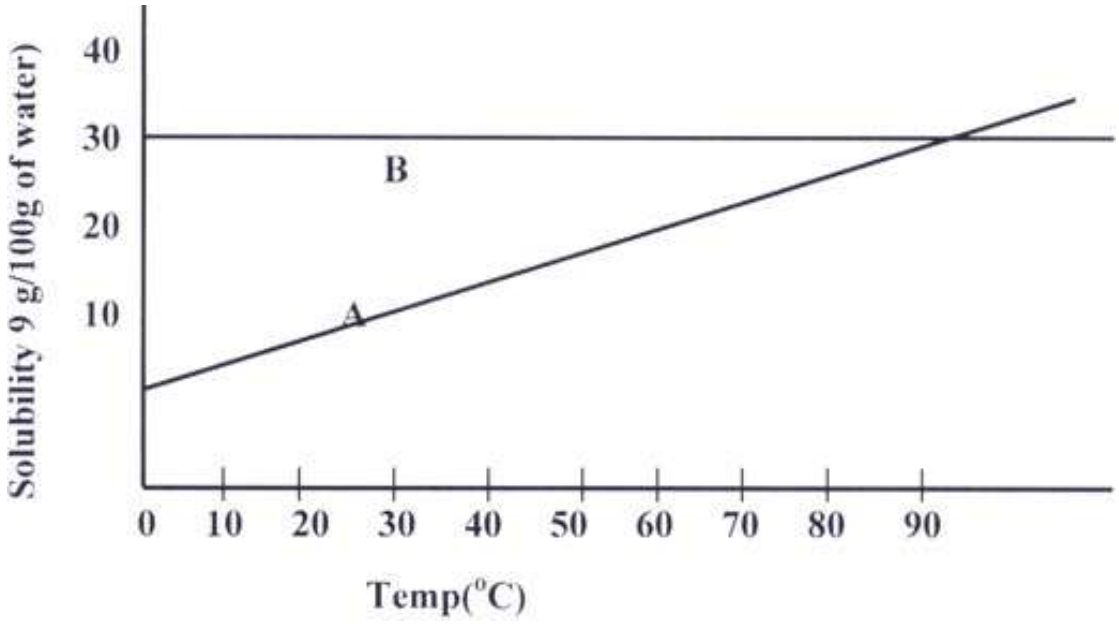
27. Study the curves below and answer the questions that follow.



a) Which of the salts is more soluble in water at below 900C? Explain. .....
.....

b) State and explain what happens when 100 g of solution containing 20 g of salt A and 20 g of salt B is cooled from 900C to 200C. .....
....
.....

28. The following tests were carried out on three separate portions of a colourless solution. S.

Tests	Observations
i) Addition of dilute hydrochloric acid on the first portion of solution **S.**	No observation change.
ii) Addition of aqueous sodium carbonate to the second portion of solution **S.**	A white precipitate was formed.
iii) Addition of aqueous ammonia to the third portion of solution **S.**	A white precipitate was formed which dissolved on addition of excess aqueous ammonia.

a) From the information in test (i), name a cation which is not present in solution S. .....
.....

b) Write a cation, which is likely to be present in solution S.

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.....

c) Write an ionic equation for the reaction, which takes place in tests (iii). .....
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