K.C.S.E CHEMISTRY PAPER 233/1 2000

1. State and explain the change in mass that occurs when the following substances are separately h... in open crucibles (3 mar...

a) Copper metal

b) Copper (II) nitrate

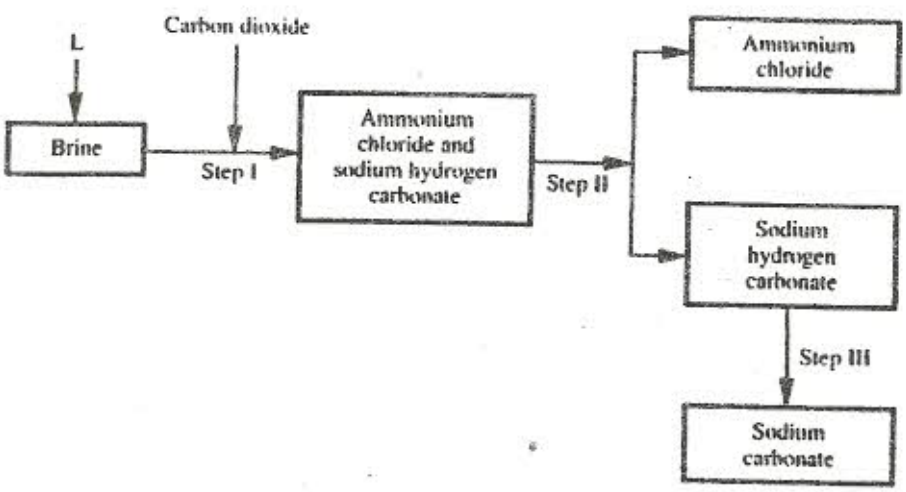
2. The equation given below represents a redox reaction

$Mg_{(s)} + 2HCL_{(aq)} \rightarrow MgCl_{2(aq)} + H_{2(g)}$

a) Write the equation for the reduction process (1 mark)

b) Which substance is oxidised? (1 mark)

3. The simplified flow chart shows some of the steps in the manufacture of sodium carbonate by the Solvay process



a) Identify substance L (1 mark)

b) Name the process taking place in Step II (1 mark)

c) Write an equation for the reaction which takes place in Step III (1 mark)

4. When a current of 1.5 amperes was passed through a cell containing M^{3+} ions on metal M for 15 minutes, the mass of the cathode increased by 0.26g. (1 Faraday = 95600 Coulombs).

a) Calculate the quantity of electricity used (1 mark)

b) Determine the relative atomic mass of metal M (2 marks)

5. The information below relates to elements S,T,U and X. (The letters do not represent the actual symbols of the elements).

i) T displaces X from an aqueous solution containing ions of X
ii) Hydrogen gas reduces heated oxide of S but does not reduce the heated oxide of X
iii) U liberates hydrogen gas from cold water but T does not

a) Write an equations for the reaction between T and the ions of X. But T and X are in group II of the periodic table (1 mark)

_____

b) Arrange the elements in order of their increasing reactivity (2 marks)

_____

6. Starting with copper metal, describe how a solid sample of Copper (II) carbonate can be prepared. (3 marks)

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7. Give two reasons why helium is used in weather balloons (2 marks)

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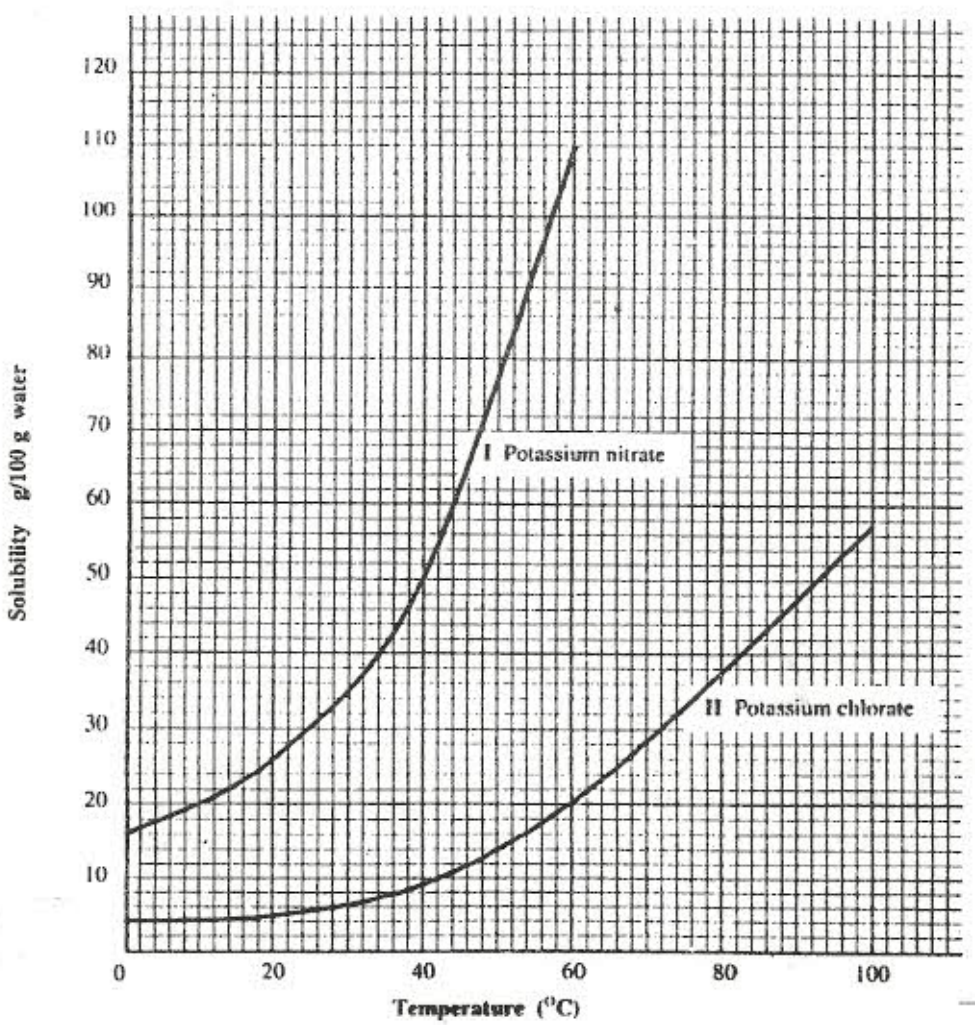
8. Study the solubility curves below and answer the question that follows.



What happens when a solution containing 40g of potassium chlorate and 40g of potassium nitrate in 100g of water at 90°C is cooled to 40°C? Explain (3 marks)

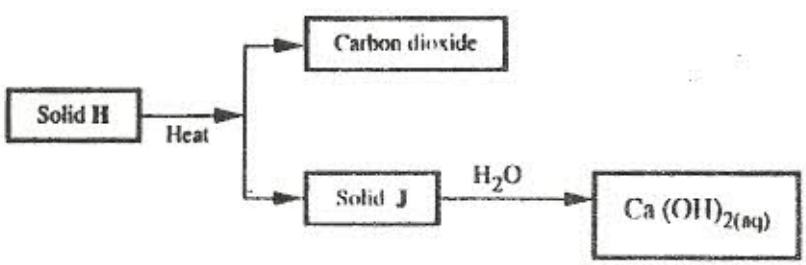
9. A hydrocarbon P was found to decolourise bromine water. On complete combustion of 2 moles of P, 6 moles of Carbon dioxide and 6 moles of water were formed.

a) Write the structural formula of P. (1 mark)

b) Give the name of P (1 mark)

c) Name **one** industrial source of P (1 mark)

10. Use the scheme below to answer the questions that follow



a) Identify the solids

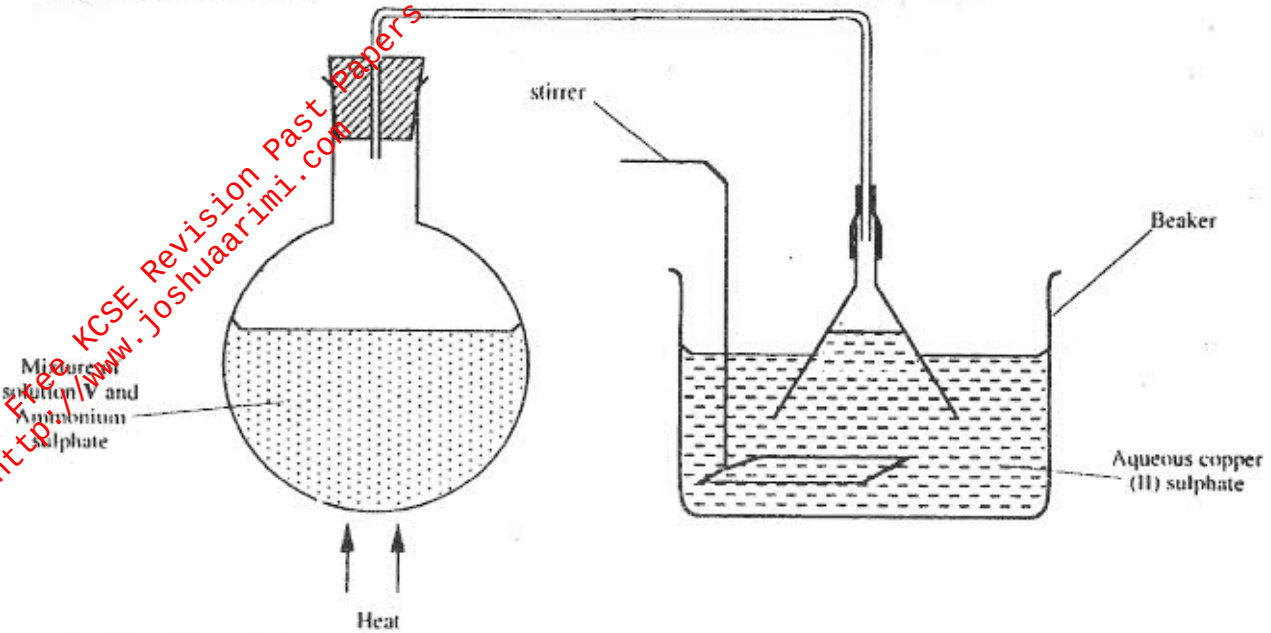
H (1 mark)

J (1 mark)

b) State one commercial use of solid J (1 mark)

11. 20.0cm³ of a solution containing 4g per litre of sodium hydroxide was neutralised by 8.0cm3 of dilute sulphuric acid. Calculate the concentration of sulphuric acid in moles per litres (Na=23.0, O=16.0, H = 1.0) (3 marks)

12. A student set up the apparatus shown below to prepare ammonia gas and react it with copper (II) sulphate solution.



a) Identify solution V (1 mark)

_____

b) State the observations which were made in the beaker (2 marks)

_____

13. A radioactive isotope X_2 decays by emitting two alpha (α) particles and one beta (β) particles to form $^{214}_{83}Bi$

a) What is the atomic number of X_2? (1 mark)

_____

b) After 112, $\frac{1}{16}$ of the mass of X_2 remained. Determine the half-life of X_2 (2 marks)

_____

14. The table below shows the tests carried out on separate samples of water drawn from a well and the results obtained.

Tests		Results
i)	Addition of excess aqueous ammonia	White precipitate
ii)	Addition of a few drops of dilute sulphuric acid	No observable change
iii)	Addition of dilute hydrochloric acid followed by a few drops of barium chloride	White precipitate

a) Identify the cation and the anion present in the water

Cation (1 mark)

_____

Anion (1 mark)

_____

b) Write an ionic equation for the reaction which takes place in test (iii) (1 mark)

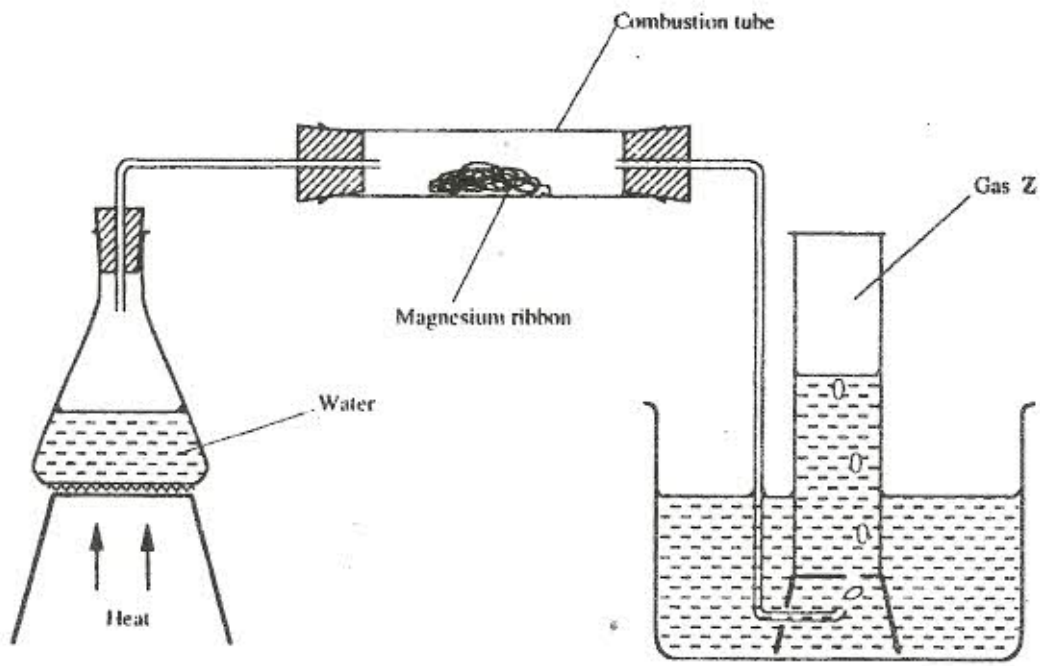
15. State any two differences between luminous and non-luminous flames (2 marks)

Luminous	Non-luminous
_____	_____
_____	_____

16. Compound Q is a solid with a giant ionic structure, in what forms would the compound conduct an electric current? (2 marks)

_____

17. Study the set-up below and answer the questions that follow.



a) Write an equation for the reaction which takes place in the combustion tube (1 mark)

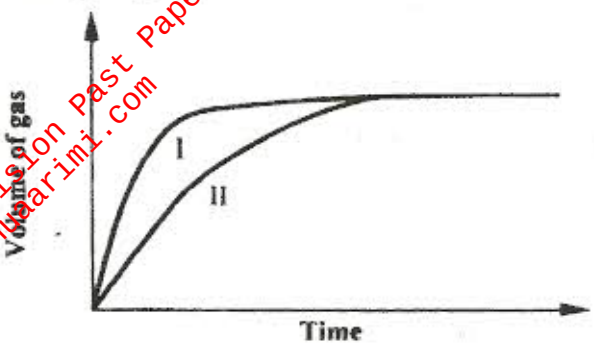
_____

b) What property of gas Z allows it to be collected as shown in the diagram? (1 mark)

_____

18. A given volume of ozone, (O_3), diffused from a certain apparatus in 96 seconds. Calculate the time taken by an equal volume of carbon dioxide (CO_2) to diffuse under the same conditions (O=16.0, C = 12.0) (3 marks)

19. The curves shown below were obtained when two equal volumes of hydrogen peroxide of the same concentration were allowed to decompose separately. In one case, manganese (IV) oxide, was added to the hydrogen peroxide.



Which curve represents the decomposition of hydrogen peroxide with manganese (IV) oxide? Explain (3 marks)

_____

_____

20. Pentane and ethanol are miscible. Describe how water could be used to separate a mixture of pentane and ethanol. (2 marks)

_____

21. Name another gas which is used together with oxygen in welding. (1 mark)

_____

22. Study the information in the table below and answer the questions that follow. (The letters do not represent the actual symbols of the elements)

Element	Electrical Conductivity	Ductility	Action of Water
A	Good	Good	No reaction
B	Good	Poor	No reaction
C	Good	Good	Reacts

Select an element which:

a) is likely to be in group II of the periodic table (1 mark)

_____

b) could be used to make electric cables (1 mark)

_____

c) is likely to be graphite (1 mark)

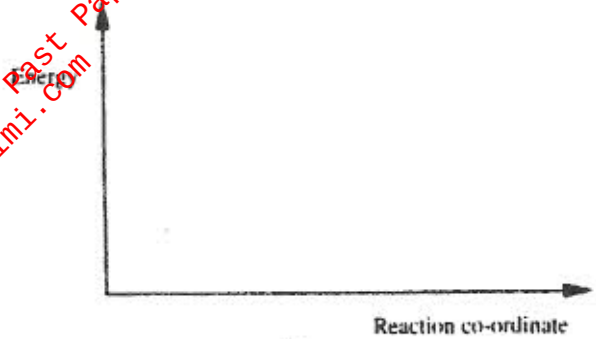
_____

23. When a solid sample of sulphur is heated in a test-tube, it changes into a liquid which flows easily. On further heating, the liquid darkens and does not flow easily. Explain these observations. (3 marks)

24. Hydrogen and Fluorine react according to the equation below:

$H_{2(g)} + F_{2(g)} \rightarrow 2HF_{(g)}$; $\Delta H = -538kJ$

a) On the grid provided below, sketch the energy level diagram for the forward reaction. (1 mark)



b) Calculate the molar enthalpy of formation of HF (1 mark)

_____

25. Explain why it is not advisable to leave a *jiko* with burning charcoal in a closed room where one is sleeping. (2 marks)

_____

_____

26. In an experiment, ammonium chloride was heated in a test-tube. A moist red litmus paper placed at the mouth of the test tube first changed blue then red. Explain these observations (3 marks)

_____

_____

27. State and explain the function of tartaric acid in baking powder. (2 marks)

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