

1. During the extraction of copper from copper pyrite(CuFeS_2), some of the processes include.

(i) Crushing the ore.

(ii) Mixing the crushed ore with water, oil and bubbling air through it.

(iii) Roasting the ore.

a) What name is given to process (ii) and give its use. (1 ½ mk)

Name.....

Use.....

b) Write equation for roasting of the copper pyrite. (1mk)

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c) Give one use of the copper metal. (1mk)

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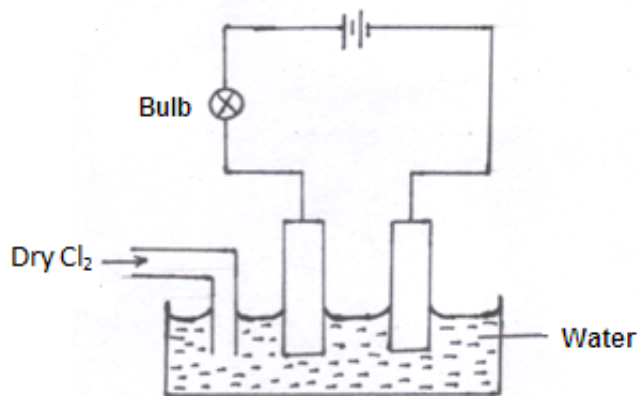
2. Aluminium chloride solution changes the blue litmus paper red. Explain this observation. (1½mks)

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3. The set up below was made by a form four student. At the start of the experiment, the bulb did not light.

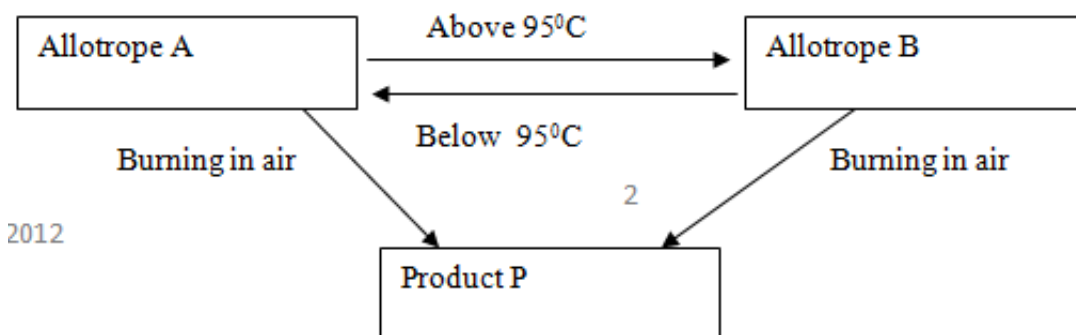


a) State and explain the observation made when $\text{Cl}_2(\text{g})$ was bubbled in the water for about 10 minutes.(2mks)

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b) Write the chemical equation for the reaction which took place at the cathode. (1mk)

4. The flow chart below shows some properties of two allotropes of element P.



i) Name the allotrope A. (1mk)

ii) Write an equation to show formation of product P. (1mk)

iii) What does 950C represent? (1mk)

5. a) 100g of a radio isotope was reduced to 12.5g after 81days. Calculate the half-life of the radio isotope. (2mks)

b) $^{212}_{80}\text{X}$ decays by beta emission. What is the mass number and the atomic number the element produced after the decay?(1mk)

6. Boilers used for boiling hard water are normally covered with boiler scale after sometime.

a) What is the chemical name for the boiler scale? (1mk)

b) How is the boiler scale removed? (1mk)

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c) State any one advantage of using hard water. (1mk)

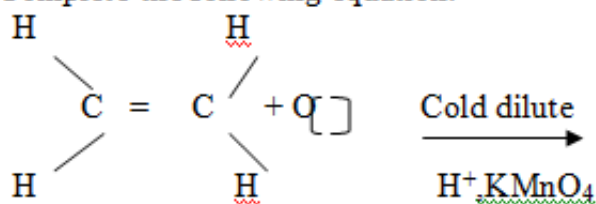
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7. a) Name the following compounds

i) $\text{CH}_3\text{CH}_2\text{CH}_2\overset{\text{O}}{\parallel}\text{C}\text{OH}$(1mk)

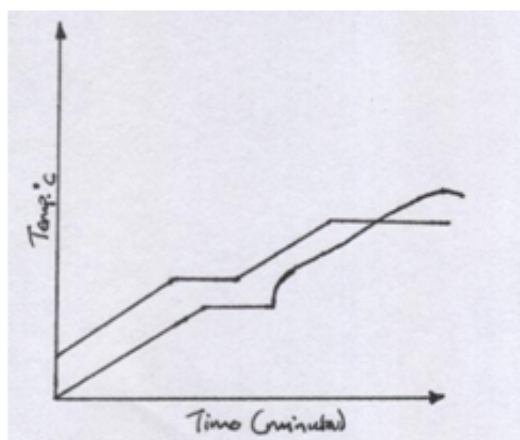
ii) $\text{CH}_3\text{COOCH}_2\text{CH}_2\text{CH}_3$(1mk)

b) Complete the following equation.



8. Two samples of a similar substance from different containers were investigated.

The graph below represents the variation of temperature with time when heated.



a) Explain the variation in the curves of:

Sample I.....(1mk)

Sample II..... (1mk)

b) Common salt is sprinkled on roads during winter in temperate countries. Explain. (1mk)

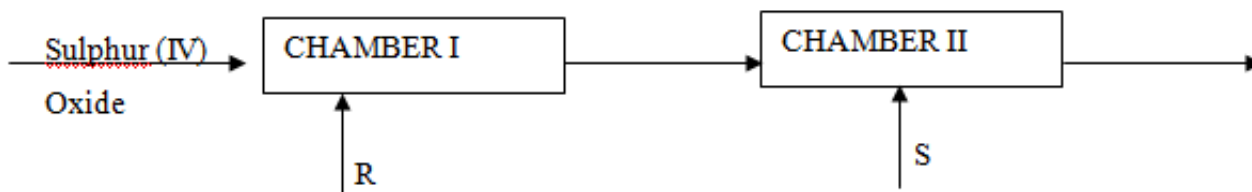
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9. a) Write an ionic equation for the reaction between copper II ions in solution and excess ammonia solution. (1mk)

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b) Name the complex ion formed in the reaction in (a) above.(1mk)

10. The chart below shows the last stages in the manufacture of sulphuric acid using the contact process.



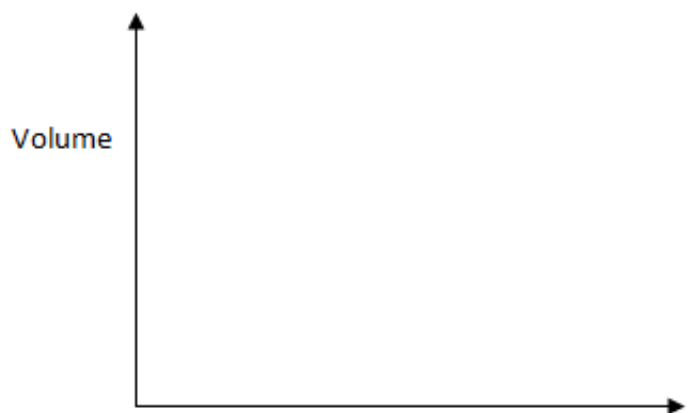
- a) Identify substances R and S

.....(2mks)

- b) Write an equation for the reaction taking place in chamber II. (1mk)

11. a) State Boyle's Law. (1mk)

- b) On the axes below sketch a graph of pressure against volume. (1mk)



- c) Explain the shape of the graph terms of kinetic theory. (1mk)

12. a) Aluminium is a reactive metal yet most household utensils are made up using it. Explain. (1mk)

- b) It is not advisable to use wood ash to wash aluminium utensils. Explain (1mk)

- c) i) Define the term alloy (1mk)

ii) Duralumin is an alloy used for making aircraft components. What is its constituent? (1mk)

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13. The following information is for two chlorides of element A and B.

Chloride Mpt ($^{\circ}\text{C}$)	Bpt ($^{\circ}\text{C}$)	Solubility in 100g of water	Solubility in 100g of benzene
800	1140	38	0.07
23	77	0.08	Very soluble

a) Which chloride has a molecular structure? Explain. (1mk)

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b) Which of the elements A and B could be a metal? Explain. (1mk)

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c) Explain the differences in solubility of the chloride in water. (1mk)

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14. The table below shows the PH values of solutions J to N

Solution	J	K	L	M	N
pH	5	13	2	10	7

b) Which solution.

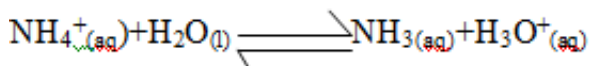
i) Contains the largest concentration of hydroxide ions? (1mk)

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ii) Is likely to be a solution of acetic acid? (1mk)

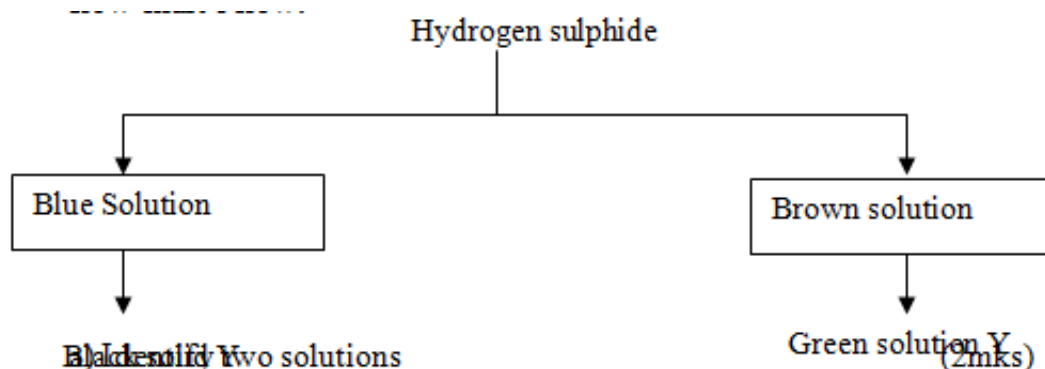
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b) In the equation below, identify the reagent that acts as an acid in the forward reaction. Give a reason (2mks)



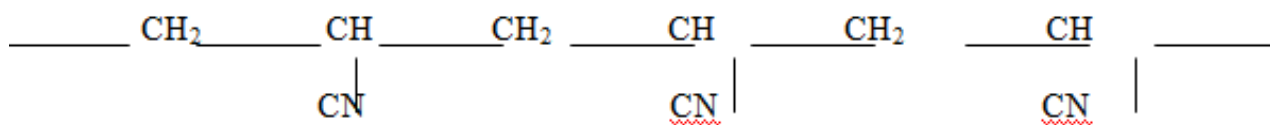
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15. Hydrogen sulphide was bubbled into solutions of metallic nitrates as represented in the flow chart below.



- Identify two solutions
- I. Blue solution.....
- II. Green solution.....

16. A polymer has the following structure.

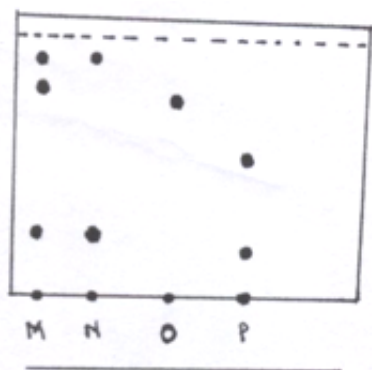


A sample of this polymer is found to have a molecular mass of 5194.

Determine the number of monomers in the polymer (H=1.0, C=12.0, N=14.0) (2mks)

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17. Study the diagram below and answer the questions.



- a) On the diagram mark the base line. (1mk)

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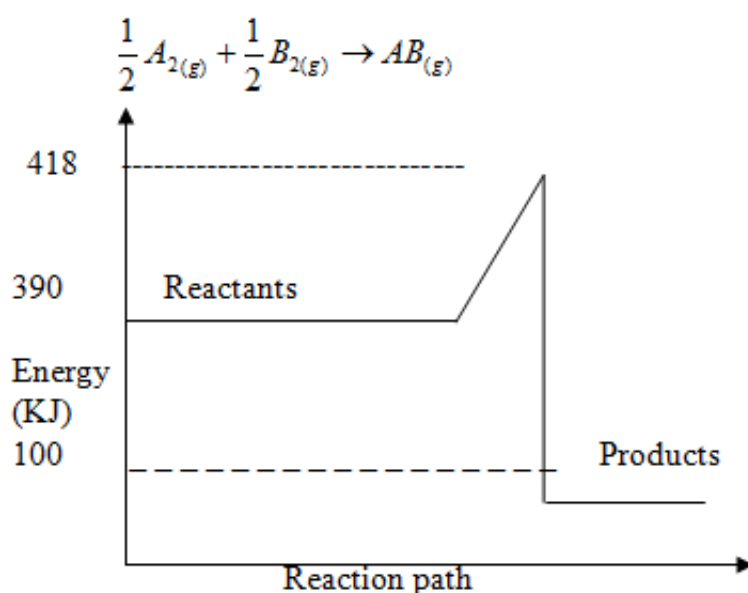
- b) Name the dyes which are in M. (1mk)

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- c) Which mixture of dyes has the dye with lowest solubility? Explain. (1mk)

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18. The following is energy level diagram for the reaction.



a) Calculate the activation energy for this reaction. (1mk)

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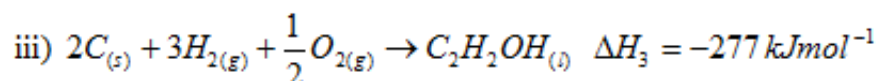
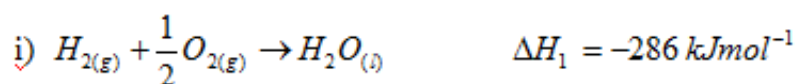
b) Calculate the enthalpy change) (ΔH for the reaction. (1mk)

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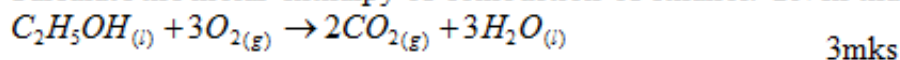
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19. Use the information below to answer the questions that follow:

Equation: Enthalpy of formation



Calculate the molar enthalpy of combustion of ethanol. Given that:



20. A given element Q has atomic number of 14 and consists of isotopes as shown below.

Isotope	X	Y	Z
Isotopic mass	28	29	30
Percentage abundance	92.2	4.7	3.1

a) Determine the relative atomic mass of Q. (2mks)

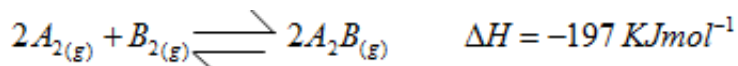
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b) State the group and period to which Q belongs.

Group.....(½ mk)

Period..... (½ mk)

21. Study the following equilibrium equation.

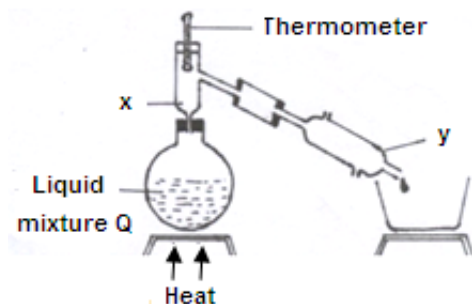


a) Suggest two ways of increasing the yield of A₂B. (2mks)

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b) Draw the energy level diagram for the forward reaction. (1mk)

22. Study the diagram below and answer the questions that follow. The diagram shows the method used to separate components of mixture Q. (1mk)



a) Name X and Y. (1mk) X.....
Y.....

b) What is the purpose of apparatus X? (1mk)

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c) Show the direction of flow of cold water used for cooling the vapour formed.(½ mk)

d) What name is given to the above method of separating mixtures? (1mk)

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23.