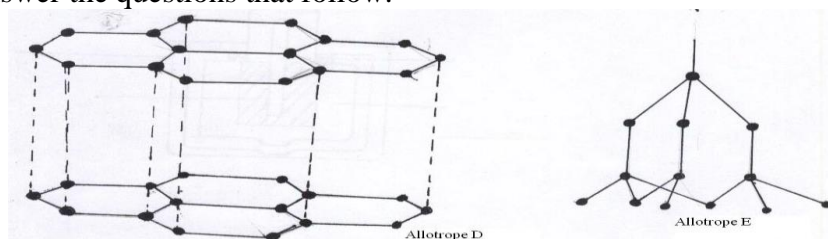


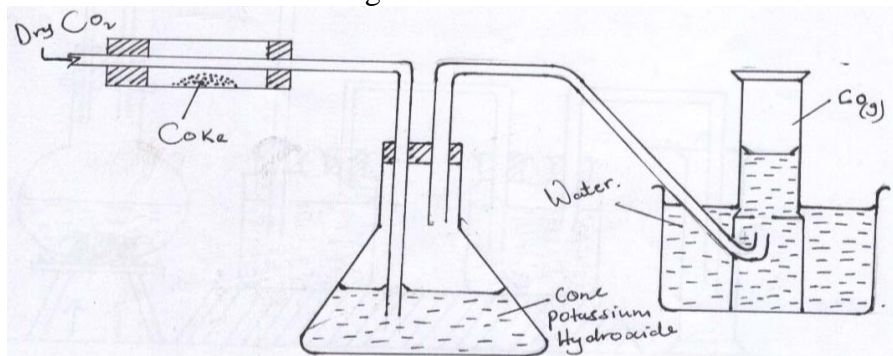
JOINT INTERSCHOOLS EVALUATION TESTS JISET 2009

This paper consists of 12 printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

1. (a) Carbon has two allotropes. **What** is meant by the term allotropy? (1mk)
 (b) The following diagrams show the structures of two allotropes of carbon. Study them and answer the questions that follow.

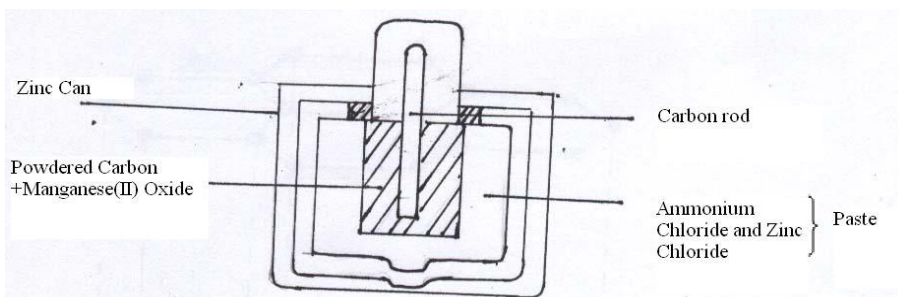


- (i) **Name** the allotrope (2mks)
 D
 E
 (ii) Give one use of D (1mk)
 (iii) Which allotrope does not conduct electricity. **Explain** (2mks)
 (c) **State two** properties of Carbon (IV) Oxide that make it suitable for use in fire extinguishers. (2mks)
 (d) In an experiment, Carbon (IV) Oxide gas was passed over heated coke and the gas produced collected as shown in the diagram below.

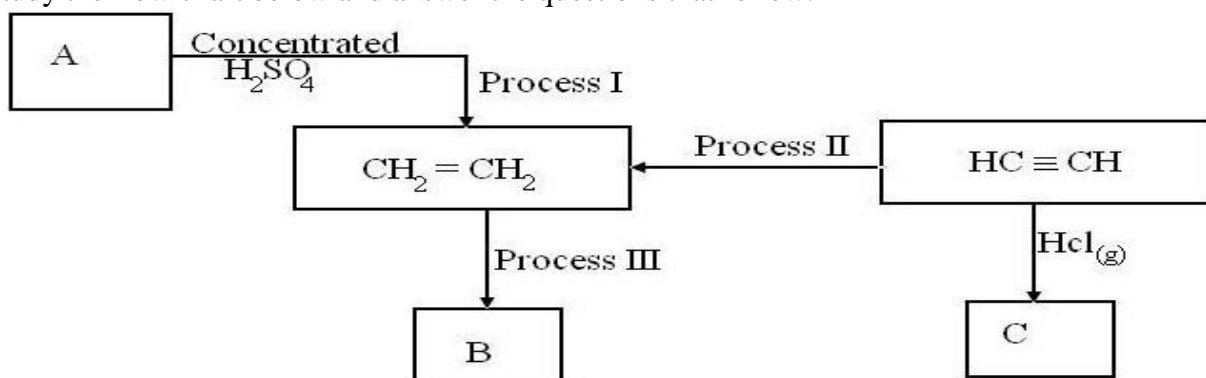


- (i) **Write** an equation for the reaction that took place in the combustion tube. (1mk)
 (ii) **Name** another substance that can be used instead of Potassium Hydroxide. (1mk)
 (iii) **Describe** a simple chemical test that can be used to distinguish Carbon (II) oxide. (2mks)
 (iv) **Give one** use of carbon(II) Oxide (1mk)
2. To prepare Zinc(II) Sulphate crystals ($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$) 0.2 M Sulphuric acid was placed in a beaker. Zinc(II) oxide solid was added and the solution was filtered. The filtrate was heated until it was ready to form crystals. It was left to cool, until crystals were formed. The filtrate was filtered again and crystals were washed and dried.
- (a) **How** was the end point of the reaction known? (1mk)
 (b) **What** was the purpose of the first filtration? (1mk)
 (c) **How** would you know when the hot solution is ready to form crystals? (1mk)

- (d) **What** precaution should be taken when evaporating the filtrate? (1mk)
- (e) The diagram below is a cross-section of a dry cell. Study it and answer the questions that follow.



- (i) On the diagram, show with a (+ve) sign the positive terminal. (1mk)
- (ii) **Write** the equation for the reaction in which electrons are produced. (1mk)
- (iii) The Zinc can is lined with Ammonium Chloride and Zinc Chloride paste. What would happen if the mixture was to become dry? Give a reason. (2mks)
- (iv) **Give one** advantage and one disadvantage of dry cell. (2mks)
3. Study the flow chart below and answer the questions that follow.



- (a) (i) **Name** processes 1 (1mk)
- (ii) **Give** the conditions necessary for process 1 to occur. (1mk)
- (iii) **Name** compound C. (1mk)
- (iv) **Name** the reagent A. (1mk)
- (b) **Give** the general formula of the homologous series to which A belongs. (1mk)
- (c) Molecules of $\text{CH}_2=\text{CH}_2$ polymerize to form a large molecule B called polymer.
- (i) **Draw** the structure of the polymer B. (1mk)
- (ii) **Give** the name of the molecule formed in C(i) above. (1mk)
- (d) An organic compound T contains 50% Oxygen, 12.5% Hydrogen and 37.5% Carbon. The compound has a relative molecular mass of 32.
- (i) **Determine** the molecular formula of the compound T. (3mks)
- (ii) **Draw** the structural formula of the compound T. (1mk)
4. 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	Atomic number	Melting point ($^{\circ}\text{C}$)	Ionization (KJmol^{-1})
P	11	97.8	496
Q	13	660	860
R	14	1410	914
S	17	-101	1258
T	19	63.7	419

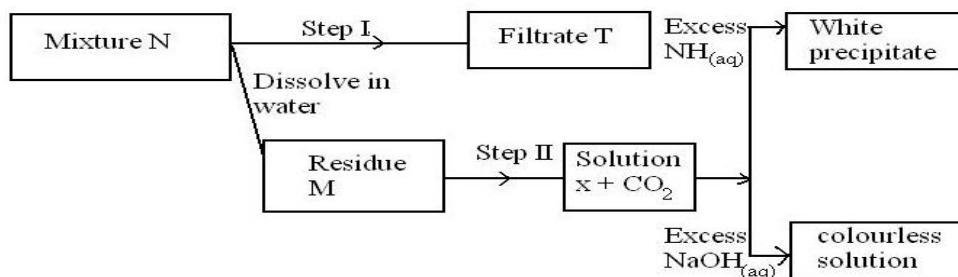
- (a) **Write** the electron arrangement for the ions formed by elements P and T. (2mks)

P
T

- (b) Select an element which is
- The most reactive metal. (1mk)
 - A good conductor of electricity and light. (1mk)
- (c) In which period of the periodic table does element T belong? (1mk)
- (d) Element P loses its outermost electron least readily than element T. **Explain.** (2mks)
- (e) **Describe** how a solid mixture of Lead Sulphate and Sulphate of element T can be separated into solid samples. (3mks)
- (f) **Determine** the relative atomic mass of the following elements whose isotope mixture occurs in the given proportion.

$\begin{matrix} 36 \\ 18 \end{matrix} Q(0.37\%)$	$\begin{matrix} 38 \\ 18 \end{matrix} Q(0.06\%)$	$\begin{matrix} 40 \\ 18 \end{matrix} Q(99.6\%)$
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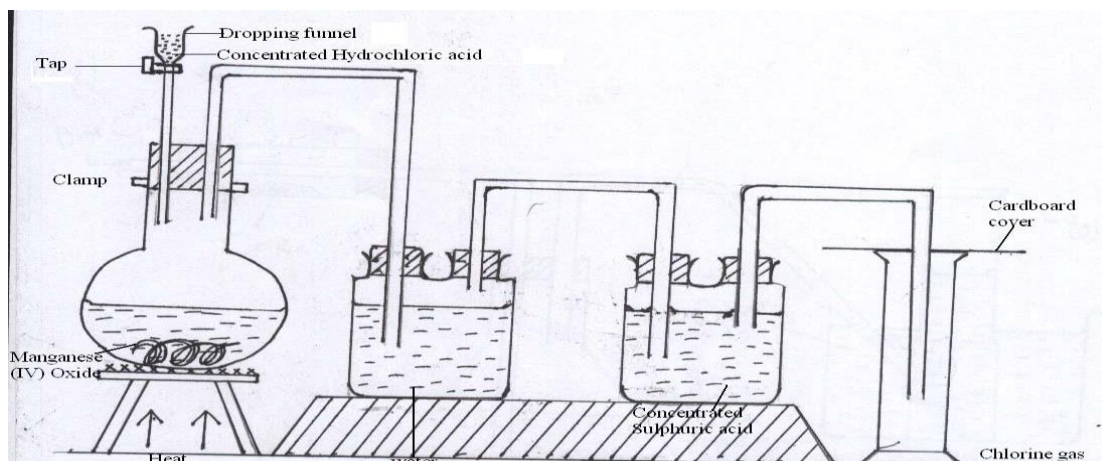
5. (a) The flow chart below shows analysis of mixture N that contains two salts. Study it and answer the questions that



- From step I alone, what conclusion can be drawn? **Explain.** (2mks)
 - Write** the formula of an anion present in residue M. Explain your answer. (2mks)
 - Suggest** the identity of the cations present in solution X. (1mk)
 - Name** the salts in mixture N. (1mk)
- (b) The empirical formula of Hydrocarbon is C_2H_3 . The Hydrocarbon has a relative molecular mass of 54 (H=1, C=2)
- Determine** the molecular formula of the hydrocarbon. (1mk)
 - Draw** the structural formula of hydrocarbon (1mk)
- (c) 70cm^3 of 0.01M Calcium hydroxide was added to a sample of water containing 0.001 moles of calcium hydrogen carbonate.
- Write** an equation for the reaction which took place. (1mk)
 - Calculate** the number of moles of calcium ions in 70cm^3 of 0.01M calcium Hydroxide.
- (d) **What** could be observed if soap solution was added dropwise to a sample of the water after the addition of Calcium Hydroxide? Give a reason. (1mk)
6. Chlorine, bromine and Iodine are members of group VII elements.
- What name** is given to the chemical family to which they belong? (1mk)
 - Study** the table below and complete it by giving the missing information in (i),(ii) (iii) (3mks)

Element	Formula	Colour state at 25°C	Solubility
Iodine	I_2	Black grey shiny solid	(ii)
Chlorine	Cl_2	Greenish yellow gas	(iii)
Bromine	Br_2	(i)	Soluble

- (c) The setup of apparatus below was used to prepare and collect Chlorine gas.



- (i) Chlorine can also be prepared by reacting concentrated Hydrochloric acid with Potassium Manganate(VII). In this case no heating is required. **Explain.** (1mk)
- (ii) **Why** is Chlorine collected as shown in the set up? (1mk)
- (iii) **Write** the equation for the reaction between concentrated Hydrochloric acid and manganese(IV) Oxide (1mk)
- (d) What is the role of Manganese(IV)Oxide in this reaction. (1mk)
- (e) Iron(II) Chloride reacts with Chlorine gas to form Iron(III) Chloride. During this reaction, 7.10g of Iron(II) Chloride were converted to 9.08g of Iron(III) Chloride. **Calculate** the volume of Chlorine used.
 $Cl = 35.5$, molar gas volume at room temperature = 24000cm^3 $Fe = 56$ (3mks)
- (f) When excess Chlorine is reacted with substance N it forms dichloroethene.
 (i) **Name** the substance N. (1mk)
Draw the structure of compound formed. (1mk)
7. (a) If Chromium spoon was to be replated you advise it to be made the anode or the cathode? Explain your answer giving half reaction. (2mks)
- (b) A current of 2Amps was passed through 300cm^3 of an aqueous Silver Nitrate solution of concentration 0.5M for 1 hour and 10 minutes. The anode was platinum and cathode was silver.
 (i) Which species carry the current through the solution and to which electrode? (2mks)
- (ii) **Write** ionic equations of what takes place at the anode and cathode, (2mks)
 At cathode
 At anode
- (ii) **What** is the concentration in Moles per litre of the solution left with respect to both Silver and Nitric acid? (3mks)
- (c) **What** changes would occur if the platinum anode was replaced with a Silver anode? (1mk)
- (d) It was found in another experiment that 0.1270g of Copper and Ng of Silver were deposited at respective electrode in two cells connected in series. **Determine** the value of N. (2mks)
 (CU=63.5, Ag = 108)