

FOCUS A365

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FORM 4 TERM 1 CHEMISTRY PP2 EXAMINATIONS 2018

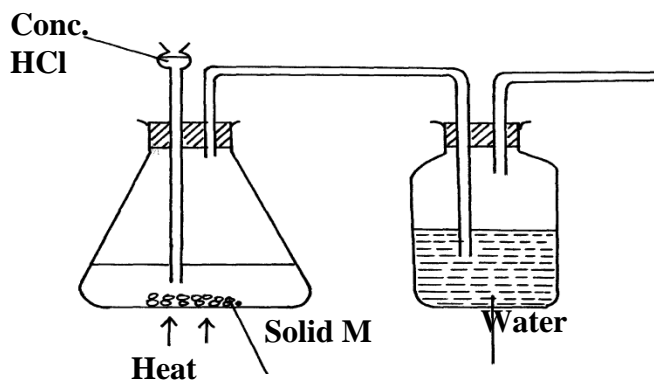
NAME: _____ ADM NO: _____ CLASS: _____

- Answer all questions
- This paper consists of 7 questions
- Electronic non-programmable calculators can be used
- Answer all the questions in the spaces provided
- All working must be clearly shown

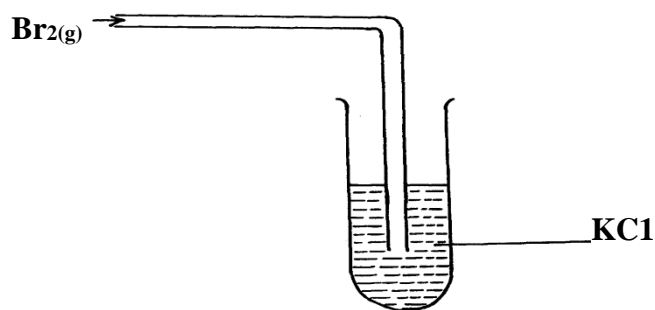
For examiners use only

Questions	Maximum score	Students score
1	11	
2	13	
3	10	
4	12	
5	11	
6	13	
7	10	
TOTAL SCORE	80	

1. The set up below was used to prepare chlorine gas.



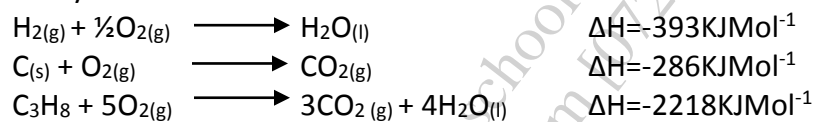
- (i) Identify solid **M** (1mk)
- (ii) What is the role of water in the experiment? (1mk)
- (iii) Complete the set up to show how dry chlorine gas can be collected (2mks)
- (iv) Write a chemical equation to show how chlorine gas is formed. (1mk)
- (v) Chlorine reacts with cold dilute sodium hydroxide to form a bleaching agent. Name the bleaching agent. (1mk)
- (vi) Give an equation to show how chlorine forms bleaching powder. (1mk)
- (vii) Other than bleaching, state two other uses of chlorine gas. (2mks)
- (viii) Study the diagram below.



State and explain the observation made after sometime. (2mks)

2. (a) Define standard heat of combustion of a substance. (1mk)

(b) Study the heats of combustion shown below.



- (i) Draw an energy cycle diagram linking heat of formation of propane with its heat of combustion and the heat of combustion of the constituent elements. (2mks)

- (ii) Use the information above to calculate the heat of formation of propane (2mks)

(c) A given amount of propane was used to heat one litre of water. The temperature of the water rose from 25°C to 50.5°C. (specific heat capacity of water = 4.2Jgk⁻¹)

- (i) Calculate the heat change for the reaction. (2mks)

(ii) Find the mass of propane burnt (C=12, H=1) (2mks)

(d) Calculate the caloric value of propane. (2mks)

(e) Apart from heating value, state two other factors to consider when choosing a fuel. (2mks)

3. Study the periodic grid below and answer the questions which follow. The letters do not represent actual symbols of the elements.

P				F					
S	T			C	E		U	X	Z
			N					Y	

(i) To which category of elements does element **N** belong? (1mk)

(ii) Compare the atomic radius of element **U** and **X**. Explain. (2mks)

(iii) An ion A^{3-} has a configuration of 2.8. Place element A on the grid above. (1mk)

(iv) Which of the group 1 elements will require the greatest amount of energy to remove the outermost electron. Explain. (2mks)

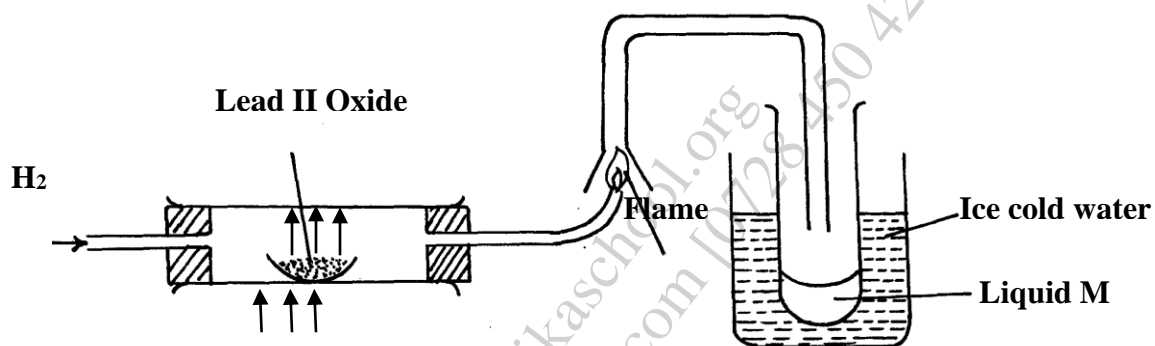
(v) Why is element **Z** used in light bulbs? (1mk)

(vi) Write the formula of the phosphate of element T. (1mk)

(vii) State the type of structure found in the oxide of element F. (1mk)

(ix) What is atomicity? (1mk)

4. Study the diagram below and answer the questions which follow.



(i) State **two** observations made when hydrogen gas pass over hot lead (II) oxide. (2mks)

(ii) Write the equation for the reaction which occurs in the combustion tube. (1mk)

(iii) What property of hydrogen is shown in the experiment above (1mk)

(iv) Identify liquid **M**. (1mk)

v) What type of reaction occurs when hydrogen gas reacts with butene? (1mk)

(vi) State the condition required for the reaction (v) above (1mk)

(vii) Apart from hydrogen peroxide, state **two** other reagents that can be used to prepare oxygen gas. (1mk)

(viii) Write an equation to show how oxygen gas is formed from the reagents chosen in (vii) above. (1mk)

(ix) In an experiment, 1g of calcium carbonate was completely dissolved in 100cm³ of 0.25M excess hydrochloric acid. Calculate the molar concentration of the acidic solution formed. (Ca = 40; C = 12; O = 16) (3mks)

5. The table below gives the solubilities of potassium chloride and potassium nitrate at various temperatures.

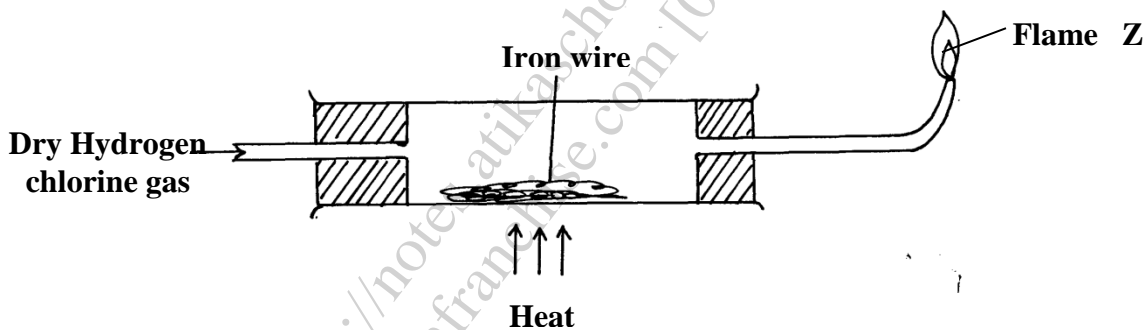
Temp. (°C)		0	10	20	30	40	50	60	70	80
Solubility g/100g of water	KCl	27.6	31.0	34.0	37.0	40.0	42.6	45.5	48.5	51.0
	KNO ₃	13.3	21.0	31.5	46.0	64.0	83.5	110.0	138.0	169.0

a) On the same pair of axes plot the solubility curves for potassium chloride and potassium nitrate on the graph paper provide. (4mks)

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- b) At what temperatures are the solubilities of the salt each 36.0g/100g of water
- (i) Potassium chloride (1mk)
- (ii) Potassium nitrate (1mk)
- c) A boiling tube contains 4.0g of potassium Chloride and 4.0g of potassium nitrate in 10cm³ of distilled water at 80°C. If the content of the boiling tube is placed into a freezing mixture, determine the:
- (i) Temperature at which crystals will first appear. (2mks)
- (ii) Composition of the crystal deposited by mass at 10°C (3mks)

6. Dry hydrogen chloride gas was passed through heated iron wire as shown in the diagram below



- a) (i) How can the identity of the substance burning with flame Z be confirmed. (1mk)
- (ii) What is observed in combustion tube during the experiment? (1mk)
- (iv) Write the equation for the reaction taking place in the combustion tube. (1mk)
- (iv) Chlorine gas was passed over the product obtained in the combustion tube to give another product Q
- a) State **one** precaution that should be taken. Explain (2mks)
- b) Identify product Q (1mk)

- c) The total mass of product Q formed was found to be 5.3g. Calculate the volume of chlorine gas used at room temperature.
(Cl = 35.5, Fe = 56, Molar gas volume at room temperature = 2400cm^3) (3mks)

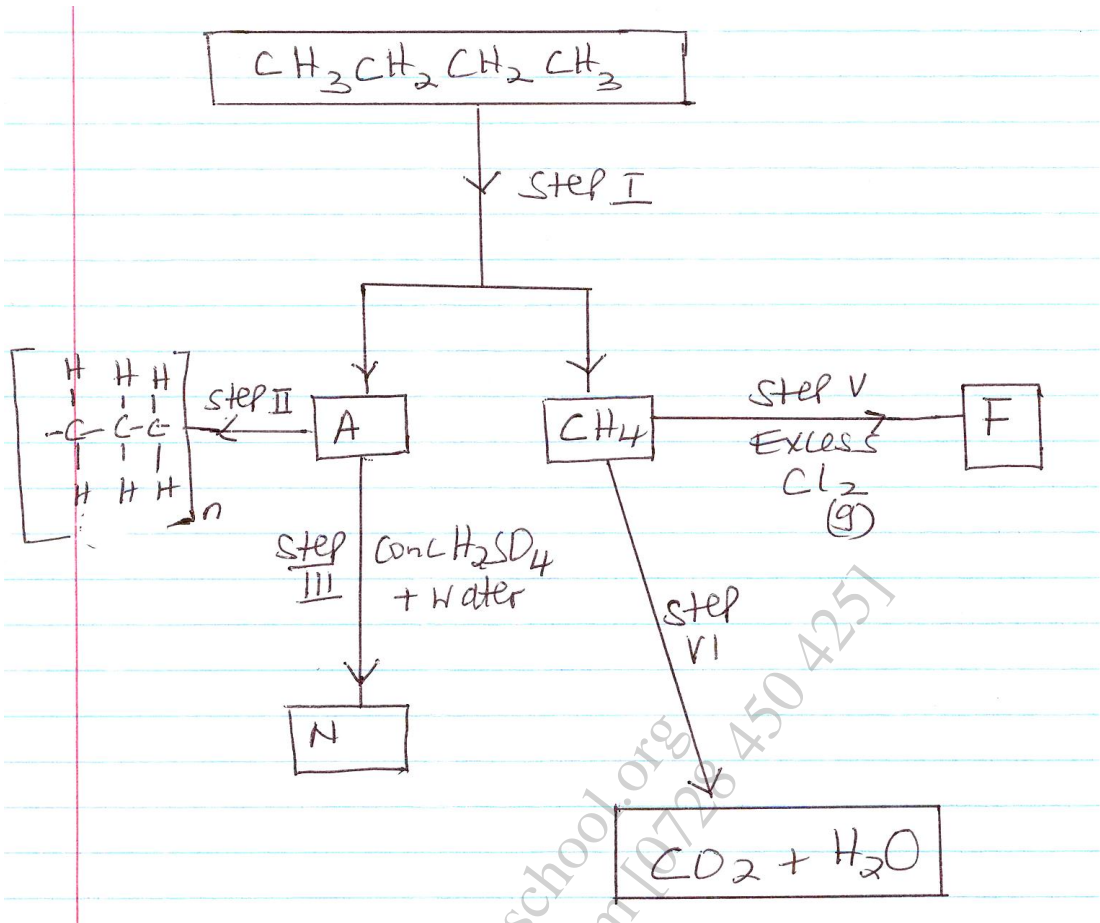
d) (i) Name two uses of hydrogen Chloride gas. (2mks)

(ii) On heating Ammonium Chloride two gases G and J were evolved G turned moist litmus paper red and J turned Moist litmus paper blue. On cooling, the two gases recombined to form a white solid.

a) Identify gases G and J. (1mk)

b) What property of Ammonium Chloride is shown in this experiment? (1mk)

7. The following is a reaction scheme starting with butane. Study it and answer the questions that follow.



a) Write down the name and formula of compounds. (2mks)

i) A

ii) F

b) State the types of reactions represented by the following steps. (3mks)

i) Step I

ii) Step II

iii) Step V

c) To what class of compounds does A belong? (1mk)

A

d) Using a chemical test state how you would distinguish between (2mks)

$\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{CH}_3$ and

$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$

e) Name the compound formed in step II. (1mk)

f) State ONE use of methane. (1mk)