

# FOCUS A365

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## FORM 4 TERM I CHEMISTRY PPI EXAMINATIONS 2018

NAME: \_\_\_\_\_ ADM NO: \_\_\_\_\_ CLASS: \_\_\_\_\_

### Instructions to Candidates

- Write your name and admission number in the spaces provided.
- Answer ALL the questions in the spaces provided.
- Mathematical tables and silent electronic calculators may be used.
- All working MUST be clearly shown where necessary.
- All questions should be answered in English.

### For Examiner's Use only

Question	Maximum Score	Candidate's Score
1 – 28	80	

1. The table below gives some information about elements represented by the letters B,C,D& E. Study the information and answer the questions that follow.

Element	Atomic radius
B	0.152
C	0.186
D	0.231
E	0.244

- a) Would the elements form a part of group or period. Explain, (2mk)
2. A solution of hydrogen chloride gas in water liberates hydrogen when reacted with Zinc metal while a solution of the same gas in Methylbenzene does not. Explain this observation. (2 Mks)
3. Describe how you can prepare dry copper (II) nitrate crystals from copper (II) carbonate. (3 mks)
4. Below is a diagram of a Bunsen burner



- a) When is the above flame obtained (1 mk)
- b) Give one use of the flame (1 Mk)
- c) What is the name of the above flame (1Mk)
5. Calculate the maximum volume of oxygen measured as s.t.p evolved when 12.25g of potassium chlorate are heated (K=39 Cl=35.5 O=16)(3marks)

6. Some energy changes are shown below. Calculate the heat of formation of Hydrogen Chloride from Hydrogen and Chlorine molecules (2mks)

(b) Write down a thermochemical equation representing the heat of formation of hydrogen chloride

7. When excess chlorine gas is bubbled through dilute sodium hydroxide. The resulting solution acts as a bleaching agent.

(a) write an equation for the reaction between chlorine gas and sodium hydroxide solution (1mark)

(b) Explain how the resulting solution acts as a bleaching agent (2marks)

8. A student wanted to determine the solubility of potassium nitrate. He obtained the following results.

Mass of evaporating dish = 14.32g

Mass of evaporating dish + solution = 35.70g

Mass of evaporating dish + salt = 18.60g

Calculate the solubility of potassium nitrate from the above results. (3marks)

9. Draw a well labeled diagram of the complete set-up of apparatus you would use to produce and collect hydrogen gas (3marks)

10. Fill in the following table

Substance	Effect on exposure to air	Name the process
(i) calcium oxide		
(ii) Sodium carbonate crystals		
(iii) Sodium hydroxide pellets		

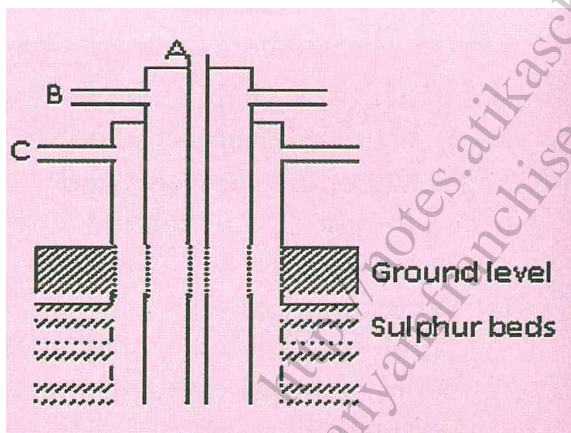
11. write down an equation for the reaction between

(i) Calcium carbonate and dilute hydrochloric acid (1mark)

- (ii) Why would the reaction above not proceed if sulphuric (VI) acid was used instead of the hydrochloric acid (2mark)

12. Metal A reduces an oxide of B to form metal B. A also reduces an oxide of C to form metal C. B on reacting with oxide of D forms D although it does not react with oxide of C. C reacts with oxide of D to form D. what is the order of reactivity of the four metals starting with the most reactive (2marks)

13.

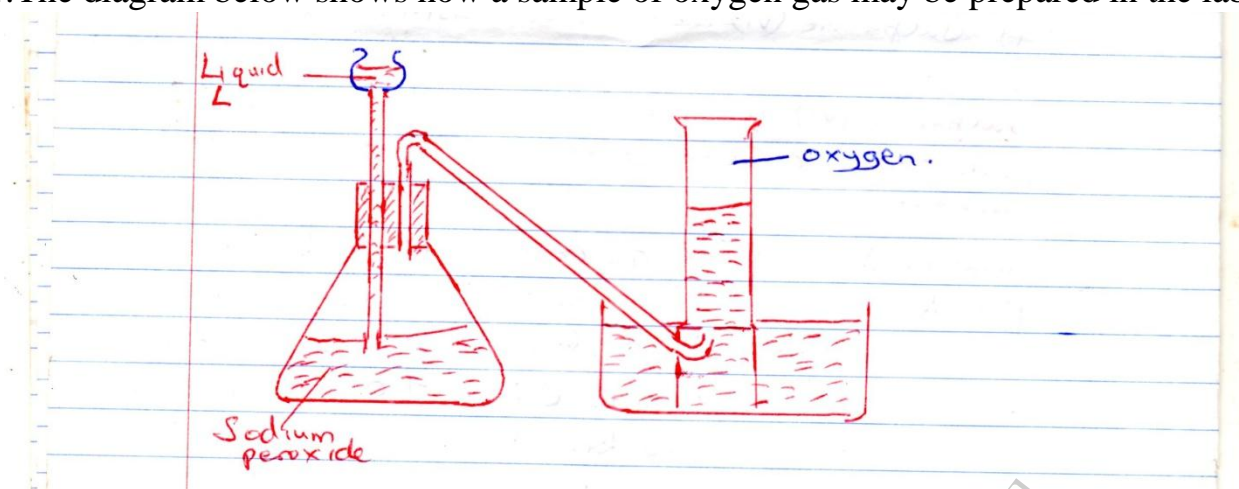


Sulphur is extracted from underground deposits by the Frasch process. Three concentric pipes A, B and C are sunk down to the deposits as shown above

(a) Name the substance that passed through pipe (2mark)

(b) What is the purpose of pipe B (1mark)

14. The diagram below shows how a sample of oxygen gas may be prepared in the laboratory



(a) Identify liquid L (1 mark)

(b) Write a balanced chemical equation between liquid L and sodium peroxide (1 mark)

15. Oxygen is used in steel making. Explain its role (1 mark) (a) During the manufacture of sulphuric (VI) acid sulphur (VI) oxide is dissolved in concentrated sulphuric (VI) acid instead of dissolving it in water. Explain. (2 marks)

(b) State one use of sulphuric (VI) (1 mark)

16. A sample of water is suspected to contain chloride ions. Describe an experiment that can be carried out to determine the presence of chloride ions (3 marks)

17. Fluorine, chlorine, bromine and iodine are in group VII of the periodic table

(a) What does this tell you about the electronic structure of atoms of bromine and iodine (1 mark)

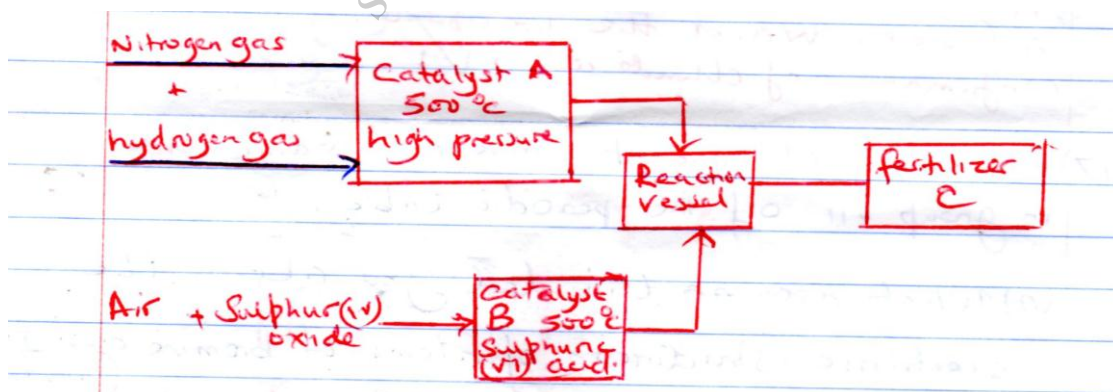
b) Write down the chemical formula of sodium bromide (1 mark)

c) Explain why fluoride ions are more readily formed than chloride ions (1 mark)

18. A balloon has a capacity of  $1000\text{cm}^3$ . The balloon contains  $975\text{cm}^3$  of air at  $5^\circ\text{C}$ . By calculation show what would happen to the balloon if it is taken to a room temperature at  $25^\circ\text{C}$  and constant pressure (3 marks)

19. When magnesium metal is heated with copper (II) oxide state and explain the observations made (3 marks)

20. The following is a flow chart representing the manufacture of a fertilizer



(a) Identify catalyst A (1mark)

(b) Identify catalyst B (1mark)

(c) Write down the formula of fertilizer C(1mark)

21. Name and write the formula of the complex ion formed when;

(i) Lead (II) hydroxide dissolves in excess sodium hydroxide (1mark)

(ii) Copper (II) hydroxide dissolves in excess ammonia solution

22. The concentration of  $\text{Ca}^{2+}$  in water from a well was found to be 0.001M. Calculate the mass of sodium carbonate needed to soften 200 litres of water from the well (Na =23 C =12 O=16)

23.(a) Alkanes, Alkenes and Alkynes can be obtained from crude oil. Draw the structure of the second member of the alkyne homologous series (1mark)

(b) State how burning can be used to distinguish between propane and the compound you have drawn in (a) above (2marks)

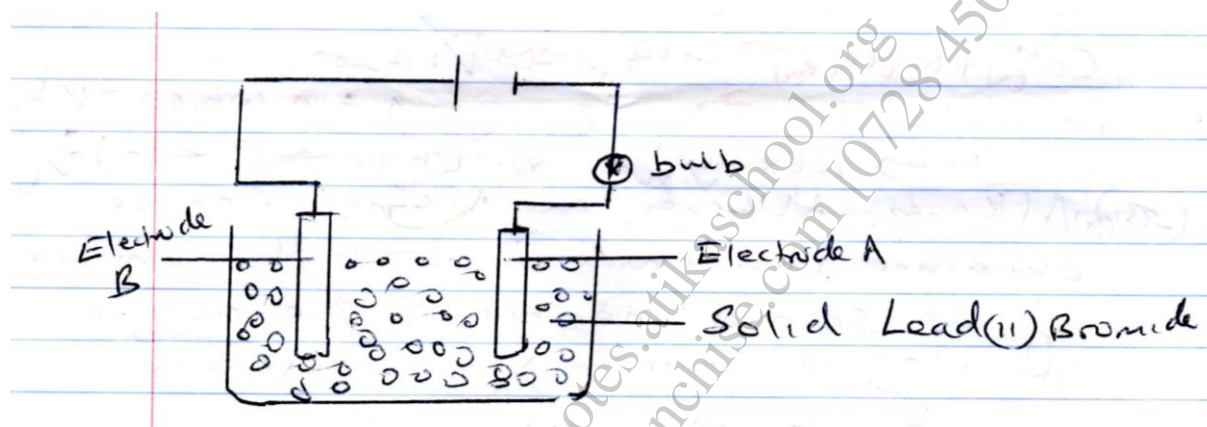
24. An organic compound has the following composition by mass Hydrogen 13.5%, Oxygen 21.6%. Carbon 64.9%

(a) Determine the empirical formula of the compound (C=12.0 H=1.0 O=16.0) (2marks)



(b) If the molecular formula mass of the compound is 74. Determine the molecular formula (1 mark)

25. The following diagram shows the effect of current on lead (II) bromide.



(a) Identify the cathode (1 mark)

(b) When circuit was completed no current flowed explain why (1 mark)

(c) When lead (II) bromine was heated to  $500^{\circ}\text{C}$  it melted and the bulb lit. State observations made at the cathode (1 mark)

26. From the list

A- Ammonia

B- Chlorine

C- Hydrogen

D- Nitrogen

E- Sulphur (IV) oxide

Choose the gas which is (3 marks)

- (i) Prepared by fractional distillation of air
- (ii) Soluble in water to give an alkaline solution
- (iii) Obtained as a by product when fossils fuel are burnt

27.(a) State Grahams law of diffusion (1 mark)

(b) A volume of hydrogen diffuses through a porous plug in 82 seconds. The same volume of air diffuses through the plug in 310 seconds. Calculate the density of air if the density of hydrogen is  $1\text{g/cm}^3$  (2 mark)

28. a) Describe an experiment that can be used to distinguish between carbon (II) oxide and carbon (IV) oxide (2 marks)

b) Apart from being used as a fire extinguisher state one other commercial use of carbon (IV) oxide (1 mark)