

# FOCUS A365

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## FORM 3 TERM 1 chemistry pp2 EXAMINATIONS 2018

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

### INSTRUCTIONS TO STUDENTS

- i. Write your name and admission number in the spaces provided.
- ii. Sign and write the date of examination in the spaces provided above.
- iii. Answer all the questions in the spaces provide.
- iv. Mathematics tables and silent calculators may be used.
- v. All working must be clearly shown when necessary.
- vi. Candidates should check the question paper to ascertain that are pages are printed as indicated and that no questions are missing.
- vii. Students should answer all the questions in English.

### FOR EXAMINER'S USE ONLY

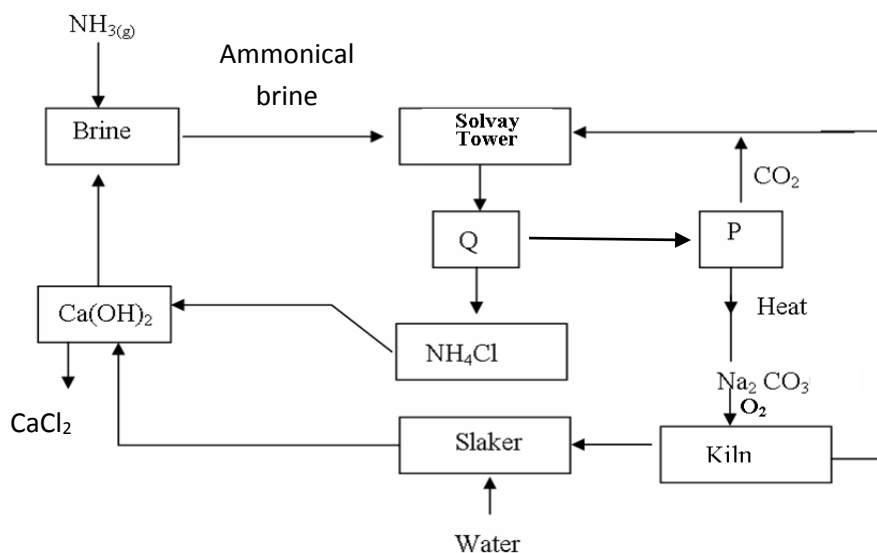
Question	Max Score	Candidate's Score
1	8	
2	10	
3	13	
4	13	
5	15	
6	8	
7	13	
<b>Total score</b>	<b>80</b>	

1. The following grid represents part of the Periodic Table. Elements are represented by letters which are not their actual symbols. Study the grid and answer the questions that follow.

							G
			H		I	J	
	K				M	N	
O	P						Q
	R						
			T				

- a) i) An element X has atomic number 1. Indicate its position on the grid. (1mk)
- ii) Where else can element X fit on the table. (1mk)
- b) name the family of elements to which the following elements belong.
- i) K and P. (1mk)
- ii) J and N. (1mk)
- c) Choose a letter from the grid which represents the lightest noble gas. (1mk)
- d) Write an equation for the reaction between element K and chlorine. (1mk)
- e) With a reason compare the reactivity of J and N. (1mk)
- f) Element F belongs to the same group as element O. write down the formula of the oxide of F. (1mk)

2. The flow chart below shows the manufacture of sodium carbonate. Study it carefully and answer the questions that follow.



a) i) What is ammonical brine? (1mk)

.....

ii) Ammonical brine reacts with carbon (IV) oxide to form a mixture of two salts which produce Q. Write an equation to show formation of Q (1mk)

.....  
 .....

iii) Name two processes that are used to separate Q into  $\text{NH}_4\text{Cl}$  and P (2mks)

.....  
 .....

b) Give two uses of sodium carbonate produced in the process (2mks)

.....  
 .....

c) i) Name the substance that reacts with water that comes into the slaker (1mk)

.....

ii) What happens at the kiln? (1mk)

.....  
 .....

d) Write an equation for the reaction that occurs when P is heated to form solid

$\text{Na}_2\text{CO}_3$  (1mk)

.....  
.....  
e) Name two substances that are recycled in the process. (1mk)

.....  
.....

3. 8.4g of sodium hydrogen carbonate are completely decomposed by heating. calculate the mass of the resulting solid and the volume in litres of the gas produced at s.t.p. (molar gas volume 22.4litres)

a) (i) write a balanced chemical equation (1mks)

ii) calculate the mass of solid formed (2mks)

iii) Calculate the volume of the gas produced in litres at s.t.p (3mks)

b) During an experiment on the reduction of an oxide of copper the following data was obtained.

Mass of empty boat.....25.0g

Mass of empty boat + oxide of copper.....29.0g

Mass of boat+copper(after reaction).....28.2g

(Cu=64.0 O=16)

Find the empirical formula of copper oxide.(4mks)

(c) A volume of  $375\text{cm}^3$  of a gas has a pressure of 20 atmospheres. what will be its volume if pressure is reduced to 15 atmospheres?(3mks)

4 Study the following information in the table below and answer the questions that follow. The letters are not actual symbols of the elements.

Element	Atomic number	Melting Point ( $^{\circ}\text{C}$ )	Boiling point ( $^{\circ}\text{C}$ )	Atomic radii (nm)	Ionic radii (nm)
L	11	98	890	0.135	0.132
M	12	650	1110	0.126	0.124
N	13	660	2470	0.125	0.120
P	14	1410	3275	0.118	
Q	15	442/590	280	0.111	0.119
R	16	113/119	445	0.103	0.109
S	17	-101	-35	0.109	0.120

a) Write the electronic configuration of an ion of element M and R. (2 mks)

M ..... R .....

b) Why do the elements represented by Q and R have two melting points? (1 mk)

.....  
 .....

c) Explain the following observations in terms of structure and bonding. (2 mks)

i) There is an increase in melting and boiling points from L to N.

.....  
 .....

ii) There is increase in electrical conductivity as you move from L to N. (2 mks)

.....  
 .....

d) Select an element (1 mk)

i) that has giant atomic structure.

.....  
 .....

ii) that is a gas at room temperature. (1 mk)

.....  
 .....

e) Explain why (2 mks)

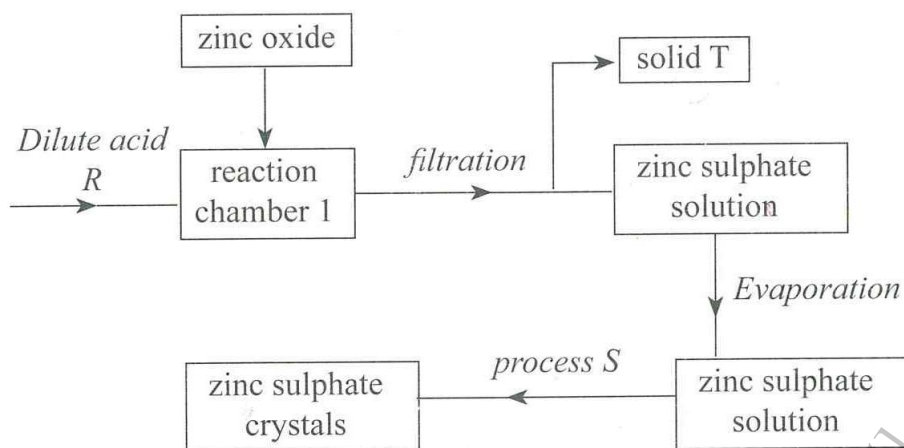
i) Ionic radius of Q, R and S is bigger than atomic radius.

.....  
 .....

ii) atomic radius of L, M and N is bigger than ionic radius. (2 mks)

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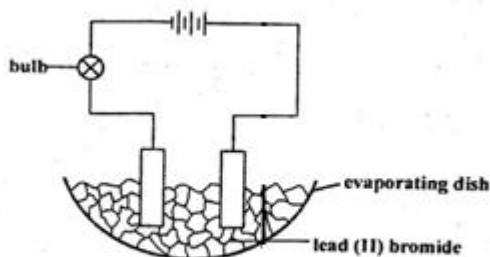
5 a) The flowchart below summarises the stages in the preparation of Zinc Sulphate salt.



- i) Identify acid R and Solid T. (2mks)
  - ii) Write an equation for the reaction that produces zinc sulphate salt. (1mk)
  - iii) Why is filtration necessary in this experiment? (1mk)
  - iv) Why is the zinc sulphate solution subjected to evaporation? (1mk)
  - v) Name process S. (1mk)
  - vi) Name two other salts that can be prepared using this method. (2mks)
- a) Starting with lead (II) oxide, sodium sulphate crystals, distilled water and nitric acid, explain how lead (II) sulphate salt may be prepared. (4mks)
- b) Give the names of the processes that take place when
    - i) Zinc Chloride crystals form a solution when left exposed for two days. (1mk)
    - ii) Sodium carbonate decahydrate turn to white powder when left exposes to air. (1mk)
  - c) Name the salt used to relief excess acidity in human stomach. (1mk)

6. a) Define an electrolyte (1mk)

b) The diagram below shows an experiment for investigating electrical conduction in lead (II) bromide. Study it and answer the questions that follow.



i) Label anode and cathode. (2mks)

ii) Show the direction of movement of electrons. (1mk)

iii) State the condition that is missing for electrical conduction to take place. (1mk)

(c) Write equations for the reactions that take place at the electrodes.

Anode (1mk)

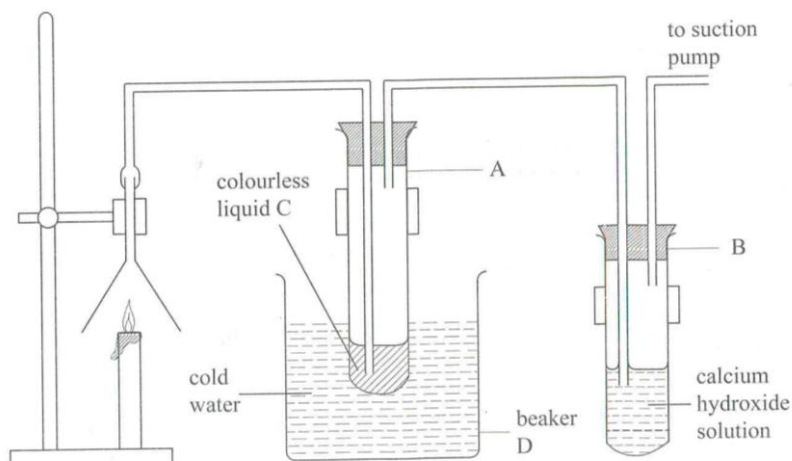
Cathode (1mk)

d) Why should this experiment be carried in a fume chamber? (1mk)

7. a) Give two natural sources of water. (1mk)

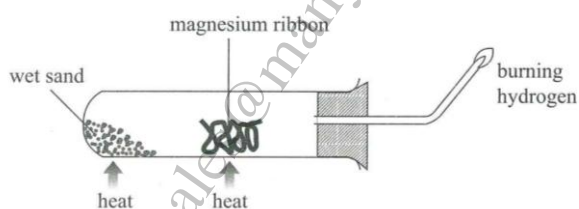
b) Water is said to be universal solvent. Explain what this statement means. (1mk)

c) The following set-up was used to investigate the products of burning a candle.



- i) Give two tests that can be used to identify the colourless liquid C. (1mk)
- ii) State and explain the observations made in tube B. (2mks)
- iii) What is the purpose of the cold water in beaker D? (1mk)
- iv) How would you prove that the colourless liquid collected in tube A is pure? (1mk)
- v) From the results of this experiment, state the two elements that make up the candle wax. (1mk)

(d) The following set-up was used to burn magnesium in steam.



- i) State the observation made in the boiling tube at the end of the experiment. (1mk)
- ii) What is the purpose of the wet sand? (1mk)
- iii) Compare with reasons the mass of magnesium at the start and end of the experiment? (1mk)
- iv) Write a chemical equation for the reaction that takes place in the boiling tube. (1mk)

(e) What is water pollution? (1mk)