

FOCUS A365

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FORM 3 TERM 1 chemistry pp3 EXAMINATIONS 2018

NAME: _____ ADM NO: _____ CLASS: _____

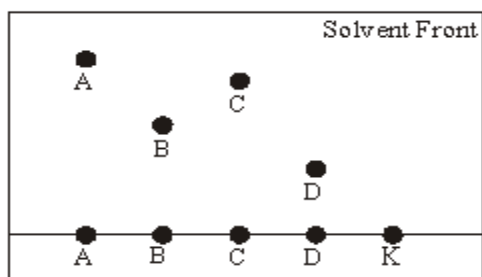
Instructions to Candidates

- 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 – 27	80	

1. The diagram below represents a paper chromatogram of pure A, B, C and D. K is a mixture that contains A and D only.



- (i) Indicate on the diagram the chromatogram of K. (1 mark)
- (ii) Give a reason why A moves faster to the solvent front than B (1mark)

(iii) Indicate on the diagram the base line (1 mark)

2. Element W has atomic number 14 and consists of three isotopes as shown below:

isotope	X	Y	Z
Isotopic mass	28	29	30
% abundance	92.2	4.7	3.1

- (a) What are Isotopes? (1 mark)
- (b) Determine the relative atomic mass of W (2 marks)

3. When a hydrocarbon was completely burnt in oxygen, 4.2g of carbon (IV) oxide and 1.71g of water were formed. Determine the empirical formula of the hydrocarbon (H=1.0, C = 12.0, O = 16.0) (3 marks)

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

Element	Electron arrangement	Ionization Energy	
		1 st I.E.	2 nd I.E
P	2.2	900	1800
Q	2.8.2	736	1450
R	2.8.8.2	590	1150

- (i) What chemical family does elements P, Q and R belong? (1 mark)

(ii) What is meant by the term 1st ionization energy?

(1 mark)

(iii) The 2nd ionization energy is higher than the first ionization energy of each. Explain. (2mark)

(iv) When a piece of element R is placed in cold water, it sinks to the bottom and an effervescence of a colourless gas is observed. State one commercial use of the gas. (1 mark)

5. When hydrated copper (II) sulphate is subjected to a source of heat gently, it forms a white anhydrous copper (II) sulphate. On adding water to the white powder, blue copper (II) sulphate crystals are reformed.

(a) Write the equation for the above case

(1 mark)

(b) Name the type of change that occurs in the above case and give a reason for your answer.

(2 marks)

6. (a) Explain why the metals Magnesium and Aluminium are good conductors of electricity.

(1mark)

(b) Other than cost, give two other reasons why aluminium is used for making electric cables while magnesium is not.

(2 mark)

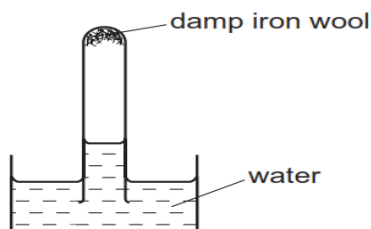
7. A certain mass of gas occupies 146dm³ at 291K and 98.31kPa. What will be its temperature if its volume is reduced to 133dm³ at 101.325 kPa?

(3 marks)

8. A mixture contains ammonium chloride, copper (II) oxide and sodium chloride. Describe how each of the substances can be obtained from the mixture.

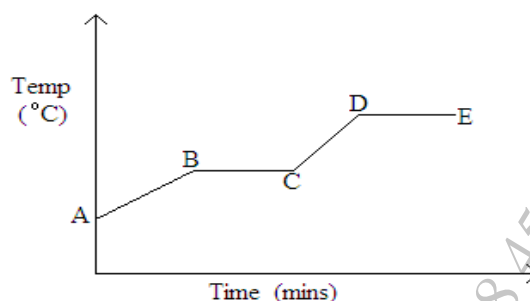
(3 marks)

9. A test-tube containing damp iron wool is inverted in water.



State and explain what is observed after three days. (2 marks)

10. The curve shown below was obtained when solid naphthalene was heated to boiling.



Explain in molecular terms the changes occurring in portions.

(i) AB

(1 mark)

(ii) DE

(1 mark)

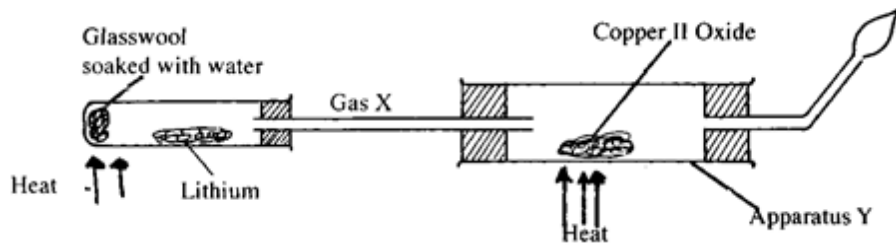
(iii) What is the significance of portion BC?

(1 mark)

11. Describe how solid sample of lead II chloride can be prepared using the following reagents. dilute Nitric Acid, Dilute Hydrochloric Acid, and lead Carbonate (3 marks)

12. 120cm^3 of nitrogen gas diffuses through a membrane in 40 seconds. How long will it take 240cm^3 of carbon (IV) oxide to diffuse through the same membrane? (3 marks)

13. The diagram below represents a set up that can be used to react Lithium with water to produce gas X which is then reacted with copper (II) oxide.



(i) Write an equation for the reaction between gas X and CuO

(1 mark)

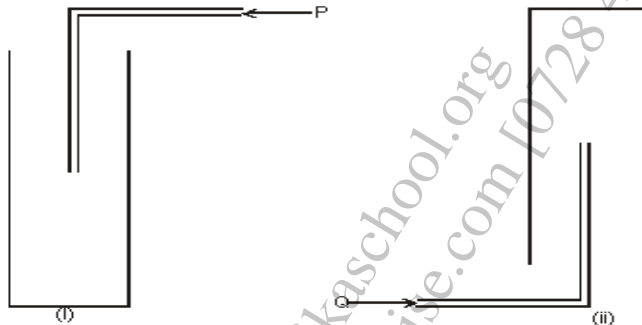
(ii) Give the observation made in the apparatus

(1 mark)

(iii) Why is it necessary to burn excess gas at the end of the jet

(1 mark)

14. The diagram below shows how two gases, P and Q were collected.



(a) Name the two methods used.

(1 mark)

(c) State properties of P and Q that enable them to be collected through the methods shown.

(2 marks)

15. Solution R, S and T have P^H values shown in the table below:

Solution	pH value
R	1.0
S	6.5
T	8.0

a) What do you deduce about the nature of solution R?

(1 mark)

b) Which solution would react most vigorously with sodium hydrogen carbonate.

(1 mark)

c) Which solution is likely to be ammonia solution?

(1 mark)

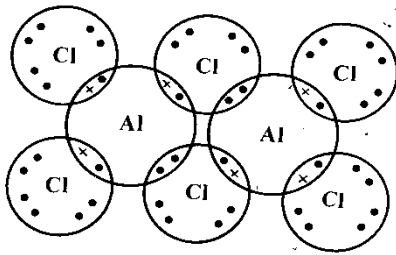
16. When magnesium ribbon is burnt in air and the product dissolved in water, a colourless solution is formed and a colourless gas is evolved.

(i) What effect does the solution formed have on litmus paper? (1 mark)

(ii) Name the compound responsible for the production of the colourless gas. (1 mark)

(iii) Write down a balanced chemical equation for the reaction producing the colourless gas (1 mark)

17. The diagram below shows an arrangement of electrons in Aluminium chloride dimer



(i) Write down the molecular formula of the above molecule (1 mark)

(ii) On the diagram indicate using an arrow the dative bond (1 mark)

18. In the last stage of the solvay process, a mixture of sodium hydrogen carbonate and ammonium chloride is formed.

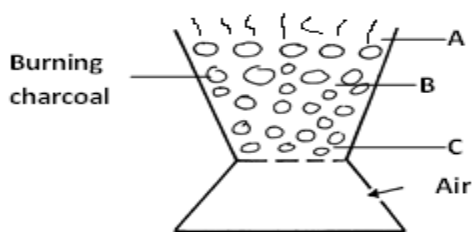
(i) State the method of separation used. (1 mark)

(ii) Write an equation showing how lime is slaked (1 mks)

(iii) Name the by-products recycled in the above process (1 mark)

19. 62g of hydrated sodium carbonate $\text{Na}_2\text{CO}_3 \cdot n\text{H}_2\text{O}$, were dissolved in distilled water and made up to one litre of solution. 20cm^3 of 1.5 M hydrochloric acid completely reacted with 30.0cm^3 sample of the sodium carbonate solution. Determine the value of n. (Na = 23.0, C = 12.0, O = 16.0). (3 marks)

20. The diagram below represents a charcoal burner. Study it and answer the questions that follow



(i) Write equations for the reactions occurring at

Zone A..... (1mark)

Zone B..... (1mark)

Zone C..... (1mark)

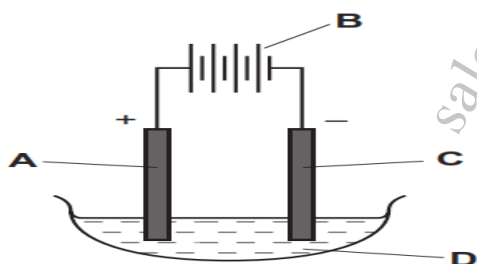
(ii) What is the colour of the flame (1 mark)

21. The table below shows information about three solid substances A, B and C. Study it and answer the question that follow.

Solid	Cold water	Hot water
A	Soluble	Soluble
B	Insoluble	Insoluble
C	Insoluble	Soluble

Describe how you will separate the three solids from a mixture of the three. (3 marks)

22. The figure below can be used to investigate effect of an electric current on molten lead(II)iodide



(i) Identify the electrodes labelled A and C (1mark)

(ii) Which particles are responsible for conduction in molten lead(II)iodide (1 mark)

23. 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	Electrical conductivity	Ductility	Action of water.
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A	Good	Good	No reaction
B	Good	Poor	No reaction
C	Good	Good	Reacts

Select an element which:-

a) Is likely to be in group (II) of the periodic table **(1mark)**

b) Could be used to make electric cable **(1mark)**

c) Is likely to be graphite. **(1mark)**

24. 30cm^3 of 0.5M hydrochloric acid was used to neutralize 25cm^3 of sodium hydroxide solution. Determine the concentration of sodium hydroxide in grams per litre.

(H=1, O = 16, Na = 23)

(2marks)

25. Calculate the volume of 2.2M hydrochloric acid which is required to neutralize completely 9.4g of potassium oxide. (K = 39.0 , O = 16.0)

(3 marks)

26.a) What role do the following parts play during fractional distillation of water and ethanol?

i) The fractionating column. **(1mark)**

ii) The glass beads **(1mark)**

(b) State one application of fractional distillation.

(1mark)

27. Metal R does not react with an oxide of metal S. metal T reacts with an oxide of metal S. metal Q reacts with an oxide of T. Arrange the metals in increasing order of reactivity.

(2marks)