

Namecentre/index No.....

Signature

RESOURCEFUL MOCK EXAMINATIONS 2016
S4 CHEMISTRY P545/2
TIME: 2 HOURS

SECTION A (50 MARKS)
Attempt all questions

1a) Write ionic equations to show how dilute hydrochloric acid reacts with
i) Sodium hydrogen sulphite (1½ marks)

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ii) sodium carbonate (1½ marks)

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b) i) Name two other substances that react with dilute hydrochloric acid the
same way as in a(i) and (1 mark)
ii) above

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iii) The product in a(i) turns acidified potassium dichromate solution from orange
to green . State the property shown by the products in a(i) (1 mark)

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2. a) Ethanol reacts with sulphuric acid to form a gas that turns reddish brown
bromine liquid colourless
i) Identify the gas (1 mark)

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ii) State the conditions for the reaction (1 mark)

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iii) Write equation for the reaction leading to the formation of the gas
(1 mark)

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b) Write equation to show how the gas in (a) can be converted into a polymer.
(1 mark)

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3. a) Differentiate between the terms allotropes and isotopes (2 marks)

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b) Name one element that is both allotropic and isotopic (1 mark)

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c) Name two allotropes and two isotopes of the element you have named in (b)
i) Allotropes (1 mark)

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ii) Isotopes (1 mark)

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d) State one use of one of the allotropes you have named in (c) in (ii) (1 mark)

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4. a) State what is meant by the term electrolyte. (1 mark)

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b) Electrolysis of aqueous copper (II) chloride solution was carried out using copper electrodes. Write equations for the reaction that took place at the;
i) Anode (1½ marks)

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ii) Cathode (1½ marks)

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c) Electrolysis of copper (II) chloride solution was repeated using a platinum anode

i) Identify the product formed at the anode (½ mark)

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ii) Write an equation of reaction leading to the formation of the product identified in c(i) (1½ marks)

5. a) Carbon was heated in a limited supply of oxygen gas and gas X was formed

i) Identify x (½ mark)

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ii) Write an equation for the reaction leading to the formation of x. (1½marks)

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b) Dry gas x was passed over heated copper (II) oxide.

i) State what was observed (1½ marks)

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ii) Write an equation for the reaction that took place (1½ marks)

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6. 15.7g of a mixture of copper and copper (II) oxide required 150cm³ of 2M hydrochloric acid for a complete reaction. Calculate the percentage of copper (II) oxide in the mixture. (5marks)

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7. Solid Q was strongly heated until there was no further change. A black residue , reddish brown fumes of gas Y and a colourless gas T were produced. The black residue dissolved in dilute nitric acid to form a blue solution which on addition of excess ammonia solution a deep blue solution was formed.

a) Identify; (½ mark each)

i) Q.....

ii) Y.....

iii) T.....

b) Write equation for the reaction leading to the formation of a blue solution (1 ½ marks)

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c) i) Write an ionic equation for the formation of a deep blue solution (1½ marks)

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ii) Write the name of the deep blue compound formed in c(i) above. (½ mark)

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8. a) Chlorine can be produced in the laboratory by the reaction between concentrated hydrochloric acid and substance Y.

i) Identify compound Y (1 mark)

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ii) Write an equation for the reaction leading to the formation of chlorine from substance Y and hydrochloric acid. (1½ marks)

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b) Dry hydrogen chloride gas was passed over heated iron wire in a tube.

i) State what was observed (1 mark)

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ii) Write equation for the reaction that took place. (1½ marks)

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9. Atom X belongs to group III and period 2 of the periodic table

a) i) Write the electronic configuration of X. (½ mark)

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ii) Write the formula of the ion formed by X. (½ mark)

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b) i) Write an equation for the reaction between X and chlorine (1½ mark)

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ii) Use diagrams to show how the product in b(i) is formed. (Atomic number of chlorine is 17) (2½ marks)

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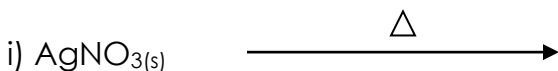
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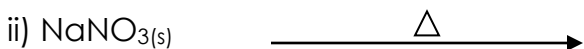
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10. Write equations to show the effect of heat on each of the following salts.
(1½ marks each)



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SECTION B: (30MARKS)

Attempt any **two** questions

11. a) (i) Describe how a dry sample of hydrogen chloride gas can be prepared in the laboratory. (6½ marks)

b) A solution of hydrogen chloride in water conducts electricity while a solution of hydrogen chloride in methyl benzene does not. Explain. (3marks)

c) Hydrogen chloride gas was bubbled through a silver nitrate solution.

i) State what was observed. (1 mark)

ii) Write an ionic equation for the reaction that took place. (1½ marks)

d) An aqueous solution of hydrogen chloride gas was electrolysed using platinum electrodes. Write equation for the reaction that took place at the

i) anode (1½ marks)

ii) cathode (1½ marks)

12. a) Ammonia gas can be prepared in the laboratory under suitable conditions by reacting calcium hydroxide and ammonium chloride.

i) State the condition for the reaction. (½ mark)

- ii) Write equation for the reaction that leads to the formation of ammonia gas (1½ marks)
- iii) Name one substance used to dry ammonia. (½ mark)
- iv) Briefly describe why ammonia is NOT dried using concentrated sulphuric acid. (2½ marks)
- b) Excess ammonia reacts with chlorine according to the following equation.
- $$8\text{NH}_3(\text{g}) + 3\text{Cl}_2(\text{g}) \longrightarrow 6\text{NH}_4\text{Cl}(\text{s}) + \text{N}_2(\text{g})$$
- If 1.92dm³ of ammonia was reacted with chlorine.
- i) Determine the mass of ammonium chloride formed. (2½ marks)
- ii) Calculate the volume of chlorine that reacted. (1½ marks)
- (N = 14, H = 1, Cl = 35.5, 1 mole of a gas occupies 24dm³ at r.t.p)
- c) Using equations only, show how ammonia can be used to manufacture nitric acid. (4 ½ marks)
- d) State one use of ammonia apart from the manufacture of nitric acid. (½ mark)
13. a) Distinguish between a conductor and an electrolyte. (3marks)
- b) Giving an example in each case, explain how each of the following factors affect the discharge of ions during electrolysis. (Your answer should include an example, observations and reactions at each electrode, diagrams are not necessary).
- i) concentration of electrolyte (3½ marks)
- ii) position of ion in the electrochemical series. (4½ marks)
- iii) nature of electrodes (4marks)
14. Explain each of the following observations.
- i) Ethanol reacts with concentrated sulphuric acid to form a gas which turns reddish brown bromine liquid colourless. (4½ marks)
- ii) Solid copper(II) bromide does not conduct electricity but conducts in its molten form. (3marks)

iii) When excess carbon dioxide gas was bubbled through a solution of calcium hydroxide a white precipitate was formed which dissolved to form a colourless solution. (4½ marks)

iv) When chlorine gas is bubbled through sodium bromide solution, a reddish brown solution is formed. (3marks)

*****END *****