TORORO GIRLS SCHOOL

SENIOR FOUR CHEMISTRY TEST 2020

1 Hour and 30 Minutes

Attempt all questions

1. (a) (i) Name two substances from which nitric acid can be prepared in the laboratory. (2 marks)

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(ii) Write equation for the reaction between the substances you have named in (a) (i) (1 ½ marks)

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(b) Write an equation for the reaction between fuming nitric acid and copper. (1 ½ marks)

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2. (a) dilute ammonia was added dropwise to a solution containing lead(II)

ions. Write equation for the reaction that took place. (1 ½ marks)

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(b) To the resultant solution in (a) was added sodium hydroxide solution dropwise until in excess.

(i) State what was observed (1 mark)

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(ii) Write equation for the reaction that took place in b(i)

(1 ½ marks)

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(c) Zinc powder was added to an aqueous solution of lead (II) nitrate solution and the mixture allowed to stand.

(i) write an ionic equation for the reaction that took place. (1 mark)

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(ii) state any conclusion that can be drawn from the equation you have written in (c)(i)

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3. (a) Briefly describe how a pure dry chlorine gas can be prepared in the laboratory. (6 marks)

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(b) state what would be observed if chlorine was bubbled through a; (3 marks)

(i) blue litmus solution

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(ii) Potassium bromide solution

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(iii) Solution of iron (III) ions

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(c) Write the equation(s) for the reaction in b(ii) and b(iii). (3 marks)

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(d) Write equation for the reaction between chlorine and

(i) heated iron (1 ½ marks)

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(ii) cold dilute sodium hydroxide solution. (1 ½ marks)

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4. (a) Nitrogen can react with hydrogen in the presence of a catalyst to form ammonia in the Haber process.

(i) State the source of nitrogen. (½ mark)

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(ii) Name the catalyst used in the process. (½ mark)

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(iii) Explain why the catalyst is finely divided. (1 ½ marks)

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(iv) Write the equation leading to formation of ammonia. (1 mark)

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(v) State two factors which can affect the yield of ammonia in the Haber process. (1 mark)

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(b) write equation to show that ammonia can;

((i) as a reducing agent. (1 ½ marks)

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(ii) burn in oxygen (1 ½ marks)

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(c) Ammonia obtained in the Haber process can be converted to nitrogen (II) oxide.

(i) Write equation for the reaction leading to conversion of ammonia to nitrogen (II) oxide. (1 ½ marks)

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

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(d) Write equations to show how nitrogen (II) can be converted to nitric acid. (3 marks)

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(e) when excess ammonia was added to copper (II) sulphate solution, a blue precipitate was formed, the precipitate dissolved to form a deep blue solution. (2 marks)

(i) identify the blue precipitate.

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(ii) Write the formula and name of the cation in the deep blue solution

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5. . (a) During the laboratory preparation of nitric acid, a mixture of concentrated sulphuric acid a white crystalline solid **R** was heated. Effervescence occurred giving out brown fumes which condense in the cooled flask and nitric acid collects as a yellow liquid.

(i) Identify **R** (1 mark)

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(ii) Name the piece of apparatus in which the preparation of nitric acid was carried out and give a reason for the suitability of the apparatus. (2 marks)

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(iii) Briefly explain why the nitric acid collects as a yellow liquid. (3 marks)

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(iv) State how the yellow colour in the acid can be removed. (1 mark)

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(v) Write equation for the reaction that led to the formation of nitric acid from the reaction mixture. (1 ½ marks)

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(vi) State one large scale use of nitric acid. (½ mark)

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(b) Concentrated nitric acid was added to iron (II) sulphate solution that contained dilute sulphuric acid.

(i) State what was observed. (1 ½ marks)

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(ii) Explain briefly your observation in (b) (i) (2 ½ marks)

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6. (a) Draw a labelled diagram of the setup of apparatus that can be used to prepare a dry sample of ammonia in the laboratory. (3½ marks)

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(ii) Write equation for the formation of ammonia (1½ marks)

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(b) Write equation for the reaction between ammonia and

i) hydrogen chloride (1½ marks)

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ii) lead (II) oxide (1½ marks)

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iii) aqueous solution of lead (II) nitrate (1½ marks)

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(c) State what would be observed if ammonia solution was added to a solution of copper(II)sulphate drop wise until in excess. (1½ marks)

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(d) On heating a mixture of ammonium chloride and aqueous potassium hydroxide ammonia gas was produced according to the equation.

$NH_4Cl(s) + KOH(aq) \rightarrow KCl(aq) + H_2O(l) + NH_3(g)$

When Xg of ammonium chloride was heated with excess potassium hydroxide until there was no further change, 424.5cm^3 of ammonia gas was evolved at s.t.p. Calculate the value of X.

(H = 1, N = 14, Cl = 35.5 I mole of a gas occupies 22.4dm3 at s.t.p)

(4 marks)

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7. (a) Write equation for the reaction that takes place when chlorine is bubbled into water. (1mark)

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(b) A glass tube filled with aqueous solution chlorine was inverted in a beaker of water and left to stand for some time in bright sunlight.

(i). State what was observed. (1½ mark)

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(ii) Explain your observation in (b) (i). (3½ mark)

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(c) Dry chlorine was passed over strong heated iron wire. State what was observed and the equation for the reaction that took place. (3½ mark)

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(d) State the conditions in each case and write equation for the reaction of chlorine with

(i). sulphur (2 marks)

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(ii) turpentine. (2 marks)

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(e) Write an ionic equation for a reaction which can show that chlorine is more reactive than bromine. (1½ mark)

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END