



ALEXANDER ROAD HIGH SCHOOL

SEPTEMBER 2011

1 HOUR

PHYSICAL SCIENCE CONTROL TEST

IC, MA, CO

TOTAL = 60

GRADE 11

Instructions

- The question paper consists of 6 questions.
- Answer all the questions.
- Answer section A on the answer sheet provided AND section B on folio sheets.
- Rule off after each question in Section B.
- A non-programmable calculator may be used.
- Number the answers correctly according to the numbering system
- A data sheet is provided for your use.
- LO 1,2, 3 AS 1,2, 3

SECTION A

- Answer on the answer sheet -

QUESTION 1: One-word questions

- 1.1 The unstable intermediate compound formed during a chemical reaction. (1)
- 1.2 An acid that can provide two protons in an acid-base reaction. (1)
- 1.3 A solution with known amount of substance per volume of mixture. (1)

[3]

QUESTION 2: Multiple choice

- 2.1 Zinc metal reacts with bromine to form the compound zinc bromide. The balanced chemical equation is as follows...



In this reaction, the oxidation number of...

- A. Zinc increases and zinc is oxidized
- B. Br₂ increases and Br₂ is oxidized
- C. Zinc increases and zinc is reduced
- D. Zinc increases and zinc is the oxidizing agent

2.2 Consider the following acid-base reaction...



According to the Lowery-Bronsted theory, in this reaction the CO_3^{2-} ...

- A. Donates a proton and acts as an acid
- B. Accepts a proton and acts like a base
- C. Accepts a proton and acts like an acid
- D. Donates a proton and acts like a base

2.3 0,1 mol of sulphur dioxide is equivalent to grams of sulphur dioxide?

- A. 6,4
- B. 0,15625
- C. 0,0015625
- D. 4,8

2.4 The empirical formula of a hypothetical compound (P_xQ_y) is needed. It consists out of 43% of substance P. What is the empirical formula if $M(\text{P}) = 20 \text{ g.mol}^{-1}$ and $M(\text{Q}) = 40 \text{ g.mol}^{-1}$?

- A. P_2Q
- B. P_2Q_3
- C. PQ_2
- D. P_3Q_2

2.5 The molten iron from the bottom of the blast furnace can be used as

- A. Pig iron
- B. Slag
- C. Magnetite
- D. Cast iron

2.6 What is the function of carbon monoxide and limestone in a blast furnace in the process of extracting iron?

	Carbon monoxide	Limestone
A	Purification	Reducing agent
B	Purification	Oxidising agent
C	Reducing agent	Purification
D	Oxidising agent	Purification

[6 x 2 = 12]
SUB – TOTAL: 15

SECTION B

QUESTION 3

3. Sodium bromide forms when 10 g of sodium reacts with 10g bromine.

3.1 Determine the limiting reagent (2)

3.2 Calculate the amount (in grams) of sodium bromide that forms. (3)

3.3 Calculate the mass of carbon that is present in 400g of C₄H₈? (3)

3.4 The neutralisation reaction between potassium hydroxide and nitric acid is performed in a titration. The base is to be standardised. The incomplete (and obviously unbalanced) equation is given. The acid concentration is 0,1 mol.dm⁻³ and 5 ml of the base was titrated against 50 ml acid to complete the titration.

3.4.1 Complete and balance the equation



3.4.2 Determine the concentration of the base.

Formula: $\frac{n_a}{n_b} = \frac{c_a v_a}{c_b v_b}$ (4)

3.4.3 Name the apparatus in which the base is placed for the titration. (1)

[15]

QUESTION 4

A group of science learners at Alexander Road high school performed the following experiments to investigate the various types of chemical reactions. The experiment they performed, the observations they made and the type of reaction based on their conclusions are entered in the table on the next page...

	Experiment	Observations	Type of reaction
1	A piece of solid copper was dropped into an aqueous solution of sulfuric acid	Bubbles of hydrogen gas formed	Redox
2	Ammonia gas and hydrogen chloride gas are placed in a gas jar	A white solid forms	Acid - Base
3	A few drops of orange-brown Br ₂ is added to a solution containing an unsaturated hydrocarbon	The orange-brown colour disappeared	
4	A few drops of sulfuric acid is added to a warm alcohol solution	No observable change	

4.1 Write the balanced ionic equation for the reaction taking part in experiment 1. (3)

4.2 Identify the reducing agent in experiment 1. (1)

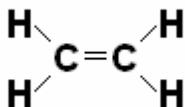
4.3 Give the formula of the spectator ion in experiment 1. (1)

4.4 Write a balanced equation for the reaction taking part in experiment 2. (2)

4.5 Give the formula of the ACID in experiment 2. (1)

4.6 Give the specific name of the reaction that occurred in experiment 3. (2)

4.7 Write a balanced equation for the reaction taking part in experiment 3, if the unsaturated hydrocarbon is: (3)

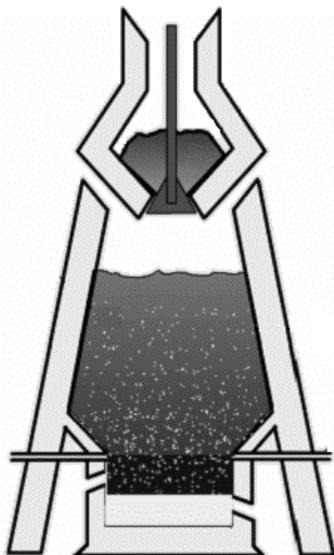


4.8 Give the specific name of the reaction that occurred in experiment 4. (2)

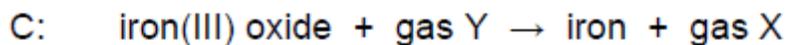
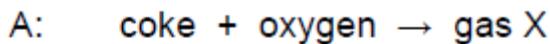
[15]

QUESTION 6

6. Iron is usually extracted from haematite (iron(III) oxide).
A substance mixed with limestone and coke is placed in a blast furnace to produce the metal..



The following incomplete word equations describe the extraction process.



- 6.1 Name the gas Y. (1)
- 6.2 Write a balanced chemical equation for reaction C. (2)
- 6.3 Other than coke and limestone, what else is placed in the top of the furnace. (1)
- 6.4 Briefly describe the impact that the mining of iron has on the economy and the environment in our country (2)

[6]

TOTAL 60 MARKS

- 1.1 A solution with known amount of substance per volume of mixture. (1)
- 1.2 The percentage of product that will form when the balanced equation and the given amount of pure reactant are given. (1)
- 1.3 The number on the periodic table that represents a multiple of the atomic mass unit (amu). (1)