ALEXANDER ROAD HIGH SCHOOL

SEPTEMBER 2010 — 1 HOUR

PHYSICAL SCIENCE CONTROL TEST

KB, MA, CO — TOTAL = 66

GRADE 10

Instructions

- The question paper consists of 5 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 Periodic Table 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

Give one word/term for each of the following descriptions.

1.1 The formation of ions when molecules react with water during the dissolving process. (1)

1.2 The change that a water molecule undergoes during the water cycle. (1)

1.3 The new substance with new properties that forms when different metals are bonded. (1)

1.4 The strongest bond that keeps non-metal molecules together. (1)

[4]

QUESTION 2: Multiple choice

Four possible options are provided as answers to the following questions.
Each question has only 1 correct answer. Choose the correct answer and make a Cross (X) over the letter (A – D) next to the relevant question number (2.1 – 2.6)

2.1 Which of the following is an example of a weak electrolyte?

A. HCl B. HNO_3

C. CH_3COOH D H_2SO_4

2.2 The forces of attraction between molecules of different types of substance are forces of

A. fixation B. adhesion

C. cohesion D. capillarity

2.3 Ammonia is prepared industrially by the_____ process.

A. Haber

B. Contact

C. Ostwald

D. None of the above

2.4 Which of the following is insoluble in water?

A. Sodium Carbonate B. Potassium Sulphate

C. Silver Chloride D. Silver Nitrate

2.5 Metallic bonding and covalent bonding respectively involve the

A overlapping of loose electrons and transferring of electrons

B sharing of delocalised electrons between atoms and overlapping of half filled orbitals

C Overlapping of half filled orbitals and the sea of delocalised electrons

D Transferring of electrons and the overlapping of orbitals

2.6 The chemical formula for sodium carbonate is:

A $Na_2(CO_3)_2$

B Na_3CO_2

C $Na_3(CO_3)_2$

D Na_2CO_3

2.7 The general rule in chemistry is that energy will be given off and taken up respectively, when...

A bonds are formed and broken

B bonds are broken and formed

C bonds are broken and particles are moving closer

D nothing happens; energy does not play a role in bonding

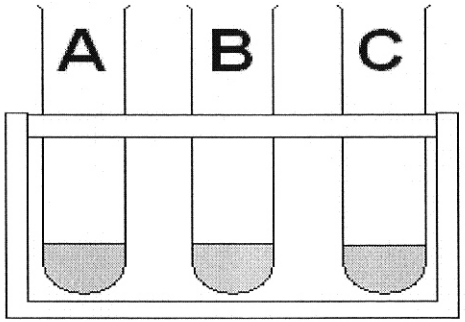
[7 x 2 = 14]
SUB – TOTAL: 18

SECTION B

QUESTION 3 (Hydrosphere and ions in solution)

3.1 In aqueous solutions, explain the difference between an electrolyte and a non–electrolyte. Give an example of each. (4)

3.2 The test tubes A, B and C contain solutions of unknown potassium salts. The following observations were made during the practical investigation to identify the solutions in the test tube.



a) A white precipitate formed when silver nitrate was added to test tube A.
b) A white precipitate formed in test tubes B and C when barium chloride was added.
c) The precipitate in test tube B dissolved in Nitric acid and a gas was released.
d) The precipitate in test tube C did not dissolved when nitric acid was added.

3.2.1 Determine the anions present in A,B and C. (3)

3.3 Ions are formed when the following are dissolved in water.

a) KCl
b) HCl

3.3.1 Write an equation to illustrate the process that is occurring in 3.3**a** and 3.3**b.** (4)

3.3.2 Give the name of the process occurring at 3.3**a** and 3.3**b.** (2)

3.4 Explain the difference between a dilute and a concentrated solution. (2)
[15]

QUESTION 4 (Global Cycles)

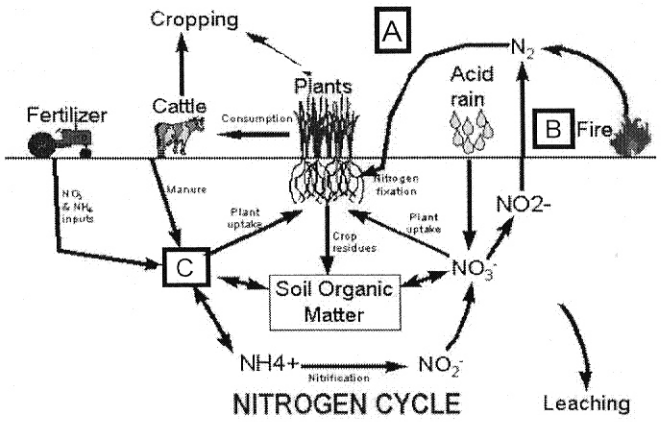
4.1 Draw a simple diagram of the water cycle and label it using the following terms. Transpiration, condensation, precipitation, collection. (4)

4.2 Heat energy has to be gained by ice to melt. It takes 334000 J of energy to melt 1 kg of ice at 0°C.

a) How much heat has to be gained to melt 200 g of ice at 0°C? (2)

4.3 What bonds are used to join water molecules? (2)

4.4 Study the following diagram.



(A diagram taken from http://www.soils.agri.umn.edu/academics/classes/soil2125/doc/s9chap2.htm)

4.4.1 Use all the chemical compounds below and write down the correct sequence of chemical equations for the process for **A** and balance the equations where necessary.

N_2 NO_2 H_2O $2NO_2$ NO LIGHTNING O_2

2NO O_2 NO HNO_3

(3)

4.4.2 One economic use of nitrates is for fertilizers. Name one other economic use. (1)

4.4.3 What happens at process **B**? (2)

4.4.4 Plants absorb two chemicals. Name the chemical absorbed by the plant at **C**. (1)

4.4.5 Why is important to educate farmers on the correct use of fertilizers?(your answer must be 4 lines or less) (2)

[17]

QUESTION 5

5.1 Differentiate between Covalent and ionic bonding by defining these two concepts. (2)

5.2 Show the ionic bonding of Aluminium and Oxygen by using Lewis structures. (4)

5.3 Rewrite and balance the following word equation into formulas.

Aluminium + hydrochloric acid ⟶ Hydrogen gas + aluminium chloride (3)

5.4 Calculate the amount of substance (in moles) that will form when 20g potassium burns in excess chlorine gas. (4)

5.5 Explain by using a labelled graph how an exothermic reaction will progress if you need to plot Energy changes versus time. (3)

[16]

TOTAL: 66 MARKS