



ALEXANDER ROAD HIGH SCHOOL

MARCH 2012

1 HOUR

PHYSICAL SCIENCE CONTROL TEST

IC, MA, CO

TOTAL = 60

GRADE 11

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 data sheet is provided for your use.
- Round off to two (2) decimal places where necessary.
- LO 2,3 AS 1,2, 3

SECTION A

- Answer on the answer sheet -

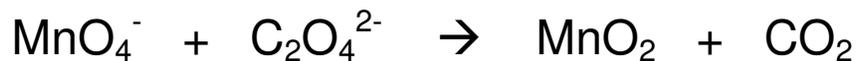
QUESTION 1: One-word questions

- 1.1 The ability of an object to resist its state of rest. (1)
- 1.2 The type of electric field that exists between two charged parallel plates. (1)
- 1.3 Substances that can act as proton donors and proton acceptors. (1)
- [3]**

QUESTION 2: Multiple choice

- 2.1 A boy applies a force of 500N when pushing a car as shown in the diagram. The frictional force acting on the car is 450N. The magnitude of the force exerted by the car on the boy is . . .

2.5 In the reaction below...



- A. $\text{C}_2\text{O}_4^{2-}$ is reduced. B. MnO_4^- is oxidized.
C. $\text{C}_2\text{O}_4^{2-}$ is the oxidizing agent. D. MnO_4^- is the oxidizing agent.

2.6 In the reaction below...



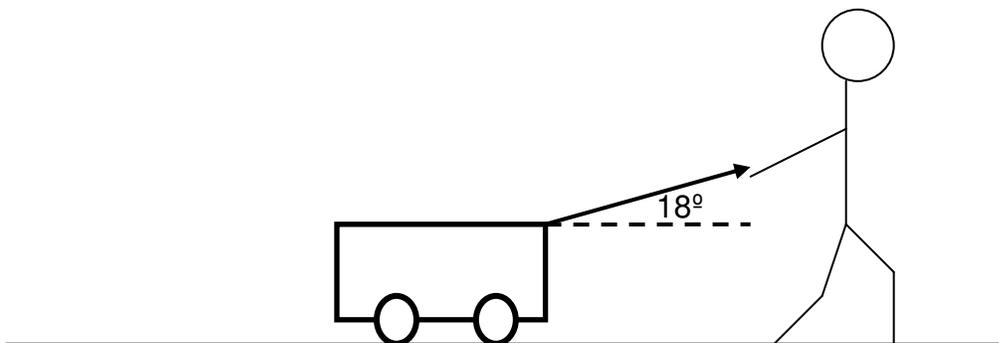
- A. H_2O is the acid and HCO_3^{2-} is its conjugate base.
B. H_2O is the acid and OH^- is its conjugate base.
C. H_2O is the base and HCO_3^{2-} is its conjugate acid.
D. H_2O is the base and OH^- is its conjugate acid.

[6 x 2 = 12]
SUB – TOTAL: 15

SECTION B

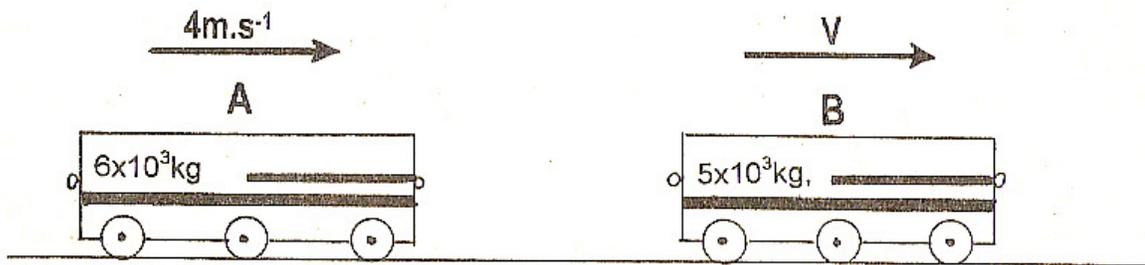
QUESTION 3

- 3.1 Anna is pulling a rope attached to a trolley along the ground at an angle of 18° to the horizontal. The trolley has a mass of 900g and the toys in the trolley a mass of 650 g. She pulls with a force of 12N.



The trolley moves over the grass with a frictional force of 6N acting between the grass and the wheels.

- 3.1.1 Draw a free body diagram of all the forces acting parallel to the ground. (2)
- 3.1.2 Calculate the magnitude of the acceleration of the trolley. (5)
- 3.1.3 Using one of Newton's Laws of motion briefly explain what will happen to the trolley if Anna suddenly stops pulling the trolley. (2)
- 3.2 In the shunting yard two railway trucks A, of mass $6 \times 10^3 \text{ kg}$, and B, of mass $5 \times 10^3 \text{ kg}$, are moving, on a horizontal surface, in the same direction at different speeds, as shown in the sketch. The two trucks collide, link together and move at 3 m.s^{-1} in the original direction.



- 3.2.1 State in words the principle of the Conservation of Momentum. (2)
- 3.2.2 Calculate the speed of B before the collision. (4)

[15]

QUESTION 4

- 4.1 A negatively charged graphite coated polystyrene ball A with unknown charge is kept at rest above another ball B with a charge of -2 nC . The mass of the balls is $0,15 \text{ g}$ each. Calculate the charge on Ball A. (5)
- 4.2 If a force between two charged polystyrene spheres is $6,5 \times 10^{-4} \text{ N}$. Calculate the new force between these spheres if the distance between them is doubled and the charge on one sphere is made $\frac{3}{4}$ of the original. (3)
- 4.3 Draw an E-field pattern between two negative charges where the one charge is slightly bigger than the other one. (3)
- 4.4.1 Define Electric field strength. (2)
- 4.4.2 Draw a sketch graph that shows the relationship between electric field strength and distance (r) from the charge. (2)

[15]

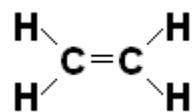
QUESTION 5

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 below.

	Experiment	Observations	Type of reaction
1	A piece of solid zinc was dropped into an aqueous solution of nitric acid	Bubbles of hydrogen gas formed and no precipitate was found	
2	A sodium hydroxide solution and hydrochloric acid were poured into the same beaker	Upon evaporation of the solvent, a white solid forms in the beaker	Acid - Base
3	Some colourless gaseous HBr was bubbled through a solution containing an unsaturated hydrocarbon	No observable change	
4	A few drops of sulfuric acid was added to a warm alcohol solution	No observable change	
5	Methane and chlorine gas were pumped into the same reaction vessel	No observable change	Substitution

- 5.1 Write the balanced ionic equation for the reaction taking part in experiment 1. (3)
- 5.2 Give the name for the type of reaction that occurred in experiment 1. (1)
- 5.3 Give the formula of the spectator ion in experiment 1. (1)
- 5.4 Write a balanced molecular equation for the reaction taking part in experiment 2. (2)
- 5.5 Give the specific name of the reaction that occurred in experiment 3. (2)

- 5.6 Write a balanced equation, using structural formulae for the reaction taking part in experiment 3, if the unsaturated hydrocarbon is: (3)



- 5.7 Give the general name of the reaction that occurred in experiment 4. (2)
- 5.8 Give the reaction conditions required for the reaction in experiment 5 to occur. (1)

[15]

TOTAL 60 MARKS