



AUGUST 2013
PE, CO, KB, IC

ALEXANDER ROAD HIGH SCHOOL
PHYSICAL SCIENCE CONTROL TEST
GRADE 10

1 HOUR
TOTAL = 60

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 list of relevant formulas appears at the end of the question paper.
- Round off to two (2) decimal places where necessary.
- A periodic table has been included at the back of the question paper.

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 energy that an object has due to its position above a reference point.
- 1.2 Velocity changes with the same amount every second
- 1.3 The apparatus used to deliver exactly 25,0 ml of a solution in the titration practical
- 1.4 SI unit for the amount or quantity of a substance which contains $6,02 \times 10^{23}$ particles

[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 – 2.4)

- 2.1 An object of mass, m , moves at a speed v . If the mass of the object is DOUBLED and its speed is HALVED, then its kinetic energy will...
- A. remain the same B. double
C. halve D. quadruple
- 2.2 Which one of the following quantities is not a vector?
- A velocity
B force
C acceleration
D mass
- 2.3 Given the following two reagents: $\text{H}_2\text{SO}_{4(\text{aq})}$ and $\text{CaS}_{(\text{s})}$. What type of reaction (if any) will occur?
- A precipitation reaction
B gas forming reaction
C Acid base neutralization reaction
D No reaction
- 2.4 1,125mol of NaOH is dissolved in water and made up to a volume of 250cm^3 . Calculate the concentration of the solution.
- A. 281,25 $\text{mol}\cdot\text{dm}^{-3}$
B. 0,281 $\text{mol}\cdot\text{dm}^{-3}$
C. $4,5 \times 10^{-3}$ $\text{mol}\cdot\text{dm}^{-3}$
D. 4,5 $\text{mol}\cdot\text{dm}^{-3}$

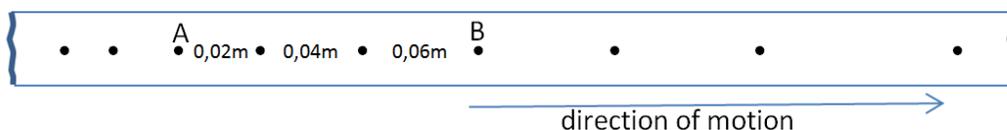
[4x2 =8]

SUB – TOTAL: 12

SECTION B

QUESTION 3: Vectors and motion

- 3.1 A car's velocity changes from $30\text{m}\cdot\text{s}^{-1}$ to $10\text{m}\cdot\text{s}^{-1}$ in 4 seconds. Calculate the acceleration of the car. (3)
- 3.2 A ticker timer that is attached to a laboratory trolley produces 13 dots in 0,24 seconds. A small portion of the ticker tape is shown below. Measured distances between some dots are also given.



- 3.2.1 Calculate the average velocity of the trolley during interval AB. (3)
- 3.2.2 Did the trolley accelerate (Yes or No)? Give a reason for your answer. (2)
- 3.3 Study the following path description and draw a scale vector diagram in order to find the resultant displacement (use the scale $1\text{ cm} = 20\text{ m}$).

“A man walks from his house to the shop. He walks 200 meters north, then turns and walks 80 meters easterly. The next turn takes him 80 meters south east. He then reaches his destination”.

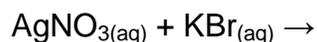
(4)

[12]

QUESTION 4: Reactions in aqueous solutions

- 4.1 In a titration 25,0 ml of a standard solution of sodium hydroxide ($0,14\text{ mol}\cdot\text{dm}^{-3}$) is titrated against a hydrochloric acid solution of unknown concentration. It takes 18,3 ml of acid to neutralize the base.
- 4.1.1 What indicator must be used and what colour changes will be observed in this titration? (3)
- 4.1.2 Write a balance equation for the reaction (2)
- 4.1.3 Calculate the concentration of the unknown hydrochloric acid solution. (3)

4.2 The following two solutions are added together.



4.2.1 Write a balanced equation for the reaction (show the phases i.e. aq / s / g / l) (2)

4.2.2 Describe what you observe. (1)

4.3 Which one of the following salts is insoluble:

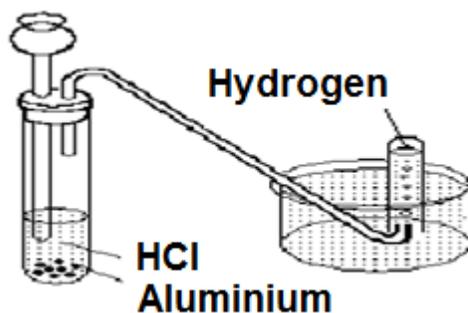
potassium oxide, lead nitrate, barium sulphate, ammonium hydroxide ? (1)

[12]

QUESTION 5: The mole

5.1 Calculate the percentage composition of C_2H_6 (3)

5.2 When Aluminium is placed in HCl a reaction occurs which forms aluminium chloride and hydrogen gas (as shown in the diagram below)



The balanced equation for this reaction is as follows:



Calculate:

5.2.1 How many mol of hydrogen is formed when 6mol of aluminium reacts with HCl. (3)

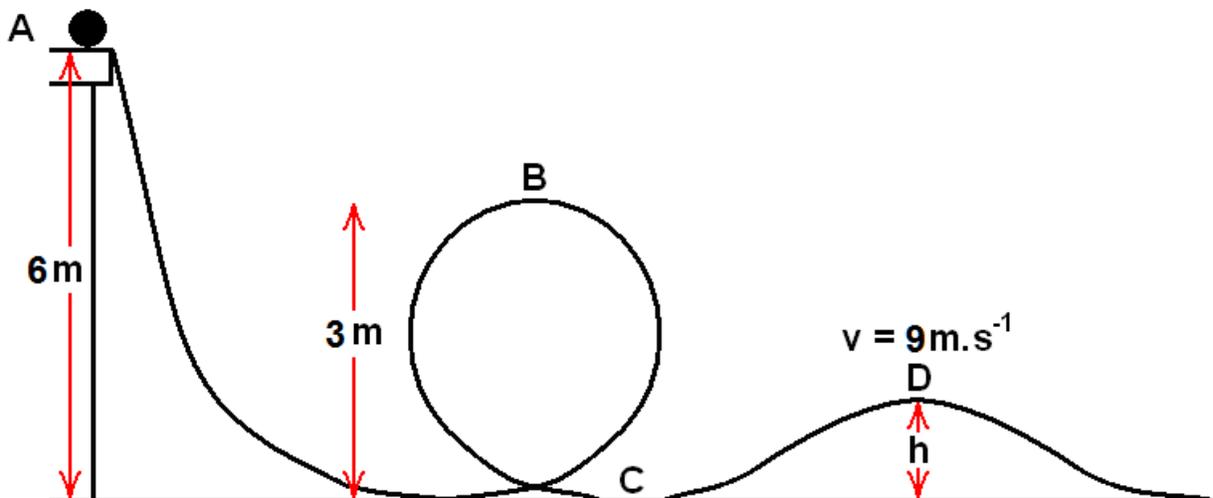
5.2.2 What mass of hydrogen will therefore be formed? (3)

5.2.3 What mass was originally used to form 6 mol of aluminium? (3)

[12]

QUESTION 6: Energy

Consider the diagram below showing a ball, of mass 10kg, about to roll down a track (that has no friction) from rest.



- 6.1 State the law of conservation of mechanical energy. (2)
- 6.2 Calculate the mechanical energy of the ball at "A". (3)
- 6.3 Calculate the kinetic energy of the ball at "B". (3)
- 6.4 Calculate the height "h" of the track at D. (4)

[12]

TOTAL 60 MARKS

Relevant formulas

Energy: $E_p = mgh$ ($g = 9.8 \text{ m.s}^{-2}$) $E_k = \frac{1}{2}mv^2$ $E_m = E_p + E_k$

Reactions in solution: $C = \frac{n}{v}$

Motion: $v = \frac{\Delta x}{\Delta t}$ $a = \frac{\Delta v}{\Delta t}$ $f = \frac{1}{T}$

Mole equations: $n = \frac{m}{M}$ $n = \frac{V}{V_0}$

