



ALEXANDER ROAD HIGH SCHOOL

SEPTEMBER 2018

1 HOUR

PHYSICAL SCIENCE GRADE 10

CO

CONTROL TEST

TOTAL = 60

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.
- Round off to two (2) decimal places where necessary.
- Formulas and a periodic table have been included at the end of the question paper

SECTION A

- Answer on the answer sheet -

QUESTION 1: 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 write the letter (A – D) next to the relevant question number (1.1 – 1.6) on the answer sheet.

1.1 Which ONE of the following balanced equations represents a dissociation process?

- A $K^+(aq) + Cl^-(aq) \rightarrow KCl(s)$
- B $NaCl(s) \rightarrow Na^+(aq) + Cl^-(aq)$
- C $Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$
- D $NaCl(aq) + AgNO_3(aq) \rightarrow NaNO_3(aq) + AgCl(s)$

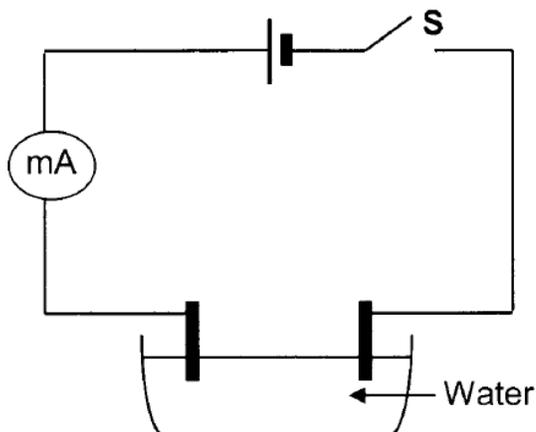
1.2 Which ONE of the following represents 1 mole of a substance?

- A 16 g oxygen gas
- B 2g hydrogen gas
- C 22,4 dm³ copper
- D 22,4 cm³ nitrogen gas

- 1.3 One vector that represents other vectors acting together...
- A positive vector
 - B negative vector
 - C resultant vector
 - D combination vector
- 1.4 An object moves with constant acceleration. This means that ...
- A its change in velocity per unit time remains constant.
 - B its displacement per unit time is constant.
 - C the accelerating force is continuously changing.
 - D its velocity remains constant during this time.
- 1.5 Which ONE of the following pairs of quantities are both vector quantities?
- A force and speed
 - B displacement and weight
 - C velocity and mass
 - D distance and acceleration
- 1.6 A car sets out from town X and travels 40km along a straight road to town Y. The driver turns around and immediately drives back to town X. The whole trip takes 2 hours.
- The magnitude of the average velocity for the whole journey, in kilometres per hour, will be ...
- A 0
 - B 20
 - C 40
 - D 80

QUESTION 2

The experimental setup below is used to compare the **electrical conductivity** of a calcium chloride solution $\text{CaCl}_2(\text{aq})$, and a sodium chloride solution, $\text{NaCl}(\text{aq})$. The concentration of each solution is $0,5 \text{ mol}\cdot\text{dm}^{-3}$.



NUMBER OF DROPS OF SOLUTION	AMMETER READING (mA)	
	$\text{CaCl}_2(\text{aq})$	$\text{NaCl}(\text{aq})$
0	0,18	0,18
1	0,55	0,34
2	0,92	0,55
3	1,29	0,74
4	1,47	0,92
5	1,84	1,1
6	2,21	1,29
7	2,39	1,47

The $\text{CaCl}_2(\text{aq})$ is added drop by drop to water and the ammeter reading is recorded after the addition of each drop. The procedure is then repeated with the $\text{NaCl}(\text{aq})$. The results are shown in the table above.

2.1 Identify the:

2.1.1 Dependent variable (1)

2.1.2 Independent variable (1)

2.2 From the results, deduce the relationship between the ion concentration in a solution and its conductivity. (1)

2.3 Use **balanced** chemical equations to explain why $\text{CaCl}_2(\text{aq})$ is a stronger electrolyte than $\text{NaCl}(\text{aq})$. (3)

2.4 What is the solubility rule for the Chlorides? (1)

2.5 NAME the solution to be added to test for the presence of chlorides. (1)

[8]

QUESTION 3

3.1 Identify the type of reaction in each of the following:

3.1.1 $\text{Al} + \text{Cu}(\text{NO}_3)_2 \rightarrow \text{Cu} + \text{Al}(\text{NO}_3)_3$ (1)

3.1.2 $\text{HNO}_3(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow \text{NaNO}_3(\text{aq}) + \text{H}_2\text{O}(\ell)$ (1)

3.2 Define what a redox reaction is. (2)

3.3 What is the colour change in the solution in 3.1.1? Give a reason. (2)

[6]

QUESTION 4

4.1 A 60 g sample of hydrous copper sulphate is heated in order to remove the water of crystallisation. The removal of the water can be observed, because as the hydrous copper sulphate is heated, the colour changes from blue to white. Once all the water of crystallisation has been removed, the mass of the compound is 38,64g. Determine x if the compound's formula is given as $\text{CuSO}_4 \cdot x\text{H}_2\text{O}$. (4)

4.2 Calculate the % Oxygen present in the *anhydrous* copper sulphate. (3)

4.3 Ethyne (C_2H_2) burns in oxygen (at STP) and forms carbon dioxide and water, according to the following equation:



4.3.1 Show, by calculation, that the amount of moles of carbon dioxide that forms from 100 g of ethyne, is 7,69mol. (4)

4.3.2 Calculate the volume of carbon dioxide formed. (2)

4.3.3 Calculate the amount of moles of oxygen gas that reacts with the ethyne. (2)

4.4 Define what a **mole** is. (2)

[17]

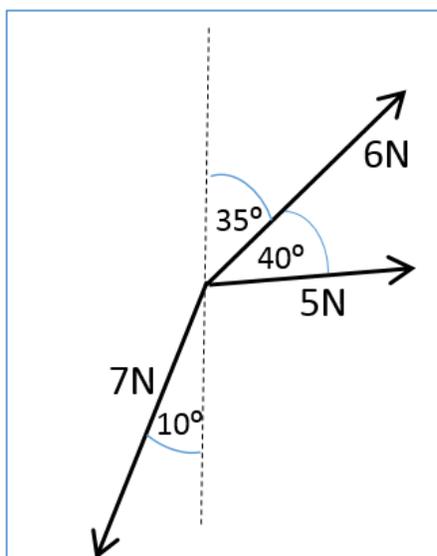
QUESTION 5

5. Define:

5.1 Vector (2)

5.2 Resultant (2)

5.3 The 3 vectors below (not drawn to scale) act on a point. Draw a scale drawing to find the resultant vector of these vectors. (Use a scale of 1cm:1N)



(5)

5.4 The ticker tape below was produced by a motion trolley that moved UP an inclined plane. The ticker timer worked with a frequency of **40 Hz**. The indicated dots were made after every **4 time intervals** (i.e. there are 4 spaces between every 2 dots indicated below). The trolley's direction of motion is indicated by the arrow. Only some distances between dots are indicated.



5.4.1 Calculate the average velocity for the 0,1 m interval. (3)

5.4.2 Calculate the acceleration of the trolley if it is given that the average velocity for the 0,04 m interval is $0,4 \text{ m}\cdot\text{s}^{-1}$. (5)

[17]

[TOTAL = 60]