

Please write clearly in block capitals.

Centre number

Candidate number

Surname _____

Forename(s) _____

Candidate signature _____

Level 3 Certificate and Extended Certificate in Applied Science

KEY CONCEPTS IN SCIENCE

Unit Number: ASC1

Section B – ASC1/C (Chemistry)

Thursday 22 June 2017 Morning

Time allowed: 1 hour 30 minutes. You are advised to spend approximately 30 minutes on this section

Materials

For this paper you must have:

- a calculator
- Periodic table
- Formula sheet

Instructions

- Use black ink or black ball-point pen.
- Answer **all** questions in each section.
- You must answer the questions in the spaces provided.
- Do not write outside the box around each page or on blank pages.
- Do all rough work in this book.
- Cross through any work you do not want to be marked.
- The total time for all three sections of this paper is one-and-a-half hours.

Information

- You will be provided with a copy of the Periodic Table and formula sheet.
- There are three sections in this paper:
Section A – Biology Section B – Chemistry Section C – Physics.
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60 and the maximum mark for this section is 20.

Advice

Read each question carefully.

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
TOTAL	

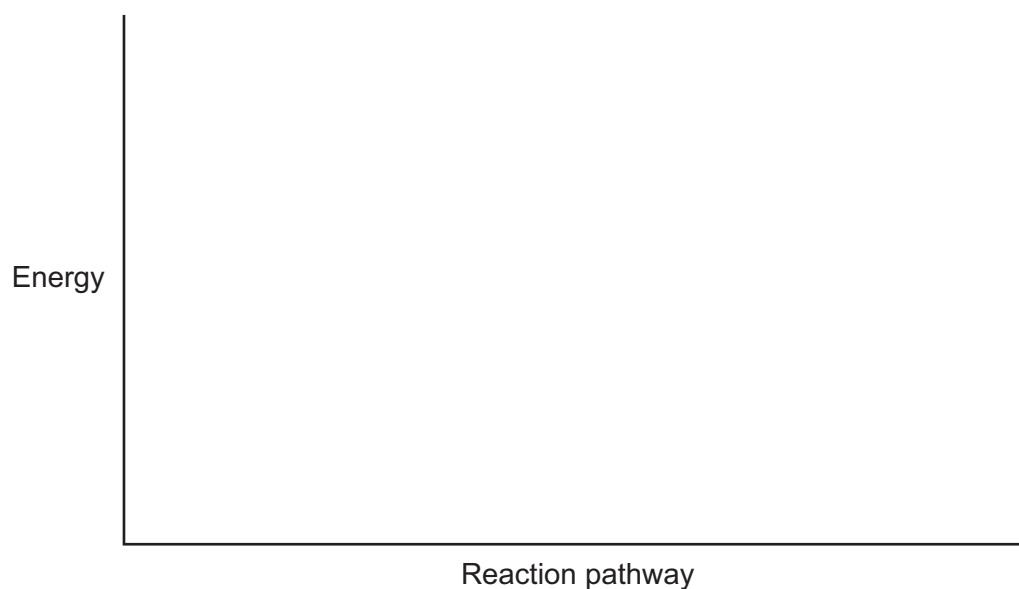


Section B – ChemistryAnswer **all** questions in this section.**0 1**

Chemical engineers should always consider the enthalpy changes involved in chemical processes. Neutralisation reactions are exothermic and so temperatures within reaction vessels must be monitored.

0 1 . 1

On **Figure 1** draw the reaction profile you would expect for an exothermic reaction.

[3 marks]**Figure 1****0 1 . 2**

Draw a line on **Figure 1** to show the activation energy.

[1 mark]**0 1 . 3**

All acids contain hydrogen ions, H^+ and an anion. Sulfuric acid contains the anion SO_4^{2-}

State the formula for sulfuric acid.

[1 mark]



0 2

Material scientists need a thorough understanding of the bonding and structure of compounds to predict the properties of materials. Different formulas give different information about compounds. An empirical formula is appropriate for an ionic compound and a molecular formula for a covalent compound.

0 2 . 1

State what is meant by an ionic bond.

[2 marks]

0 2 . 2

State what is meant by a covalent bond.

[2 marks]

0 2 . 3

State what is meant by an empirical formula.

[2 marks]



0 2 . 4

Compound X contains the elements carbon, hydrogen and chlorine. Analysis of a sample of X shows that it contains 24.35% of carbon and 4.05% of hydrogen by mass.

Calculate the empirical formula of compound X.

[3 marks]

Empirical formula of X is _____

0 2 . 5

Another **compound, Y**, has an empirical formula of CNO_2H_4 .

The relative molecular mass, M_r , of Y is 124.

Calculate the molecular formula of compound Y.

[1 mark]

Molecular formula of Y is _____

10

END OF QUESTIONS



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