



Rewarding Learning

ADVANCED

General Certificate of Education

2019

Centre Number

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Candidate Number

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Environmental Technology

Unit A2 1

Building and Managing a Sustainable Future



AET11

[AET11]

FRIDAY 7 JUNE, MORNING

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Questions **6(a)** and **9**.

For Examiner's use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total Marks	
-------------	--

(b) There are restrictions on the location and development of landfill sites.

Explain **two** difficulties associated with the location and **two** difficulties associated with the development of landfill sites.

Location:

1. _____

_____ [2]

2. _____

_____ [2]

Development:

1. _____

_____ [2]

2. _____

_____ [2]

Examiner Only	
Marks	Remark

(c) Landfill Tax is a tax levied by central government through Her Majesty's Revenue and Customs (HMRC).

Discuss **one** way in which Landfill Tax supports the Northern Ireland Waste Management Strategy.

[2]

Examiner Only	
Marks	Remark

3 Biohydrometallurgy is a method used to extract metals. It is an alternative to modern smelting methods.

(a) Name **one** organism used in biohydrometallurgy.

_____ [1]

(b) Explain what makes a site suitable for biohydrometallurgy.

_____ [2]

(c) Explain how sites, once identified, are prepared for effective and efficient use of biohydrometallurgy.

_____ [2]

Examiner Only	
Marks	Remark

4 Hydrogen is being developed as a transport fuel of the future. Hydrogen fuel cells use hydrogen to produce energy.

(a) List **four** common forms of hydrogen fuel cell.

1. _____ [1]

2. _____ [1]

3. _____ [1]

4. _____ [1]

(b) Describe **one** application of hydrogen fuel cells, other than in transport.

_____ [2]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

- 5 (a) The 'U value' for a material is sometimes formally referred to as being the "overall heat transfer co-efficient of the material".

In a testing facility the U values of two different materials have been measured. Material **A** has a U value of $3.8 \text{ Wm}^{-2}\text{K}^{-1}$ and Material **B** has a U value of $2.4 \text{ Wm}^{-2}\text{K}^{-1}$. State which material is the better insulator.

_____ [1]

- (b) Outline **two** factors other than the U value which determine the rate of heat loss through a material.

1. _____

2. _____

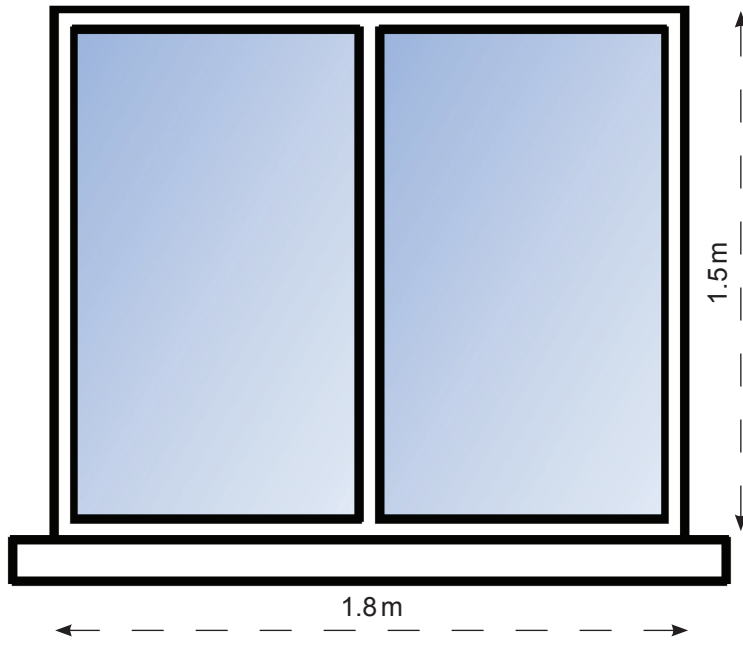
_____ [2]

Examiner Only

Marks

Remark

(c) Fig. 2 below shows a window in a typical house.



Source: © Principal Examiner

Fig. 2

In Fig. 2 the window (including glass and frame) has an overall heat loss of 64.8 W.

Assuming that the temperature inside is 19°C and that the temperature outside is -1°C, calculate the overall U value of the window.

Show your working out in the space below.

Overall U value of window = _____

[4]

Examiner Only	
Marks	Remark

BLANK PAGE

(Questions continue overleaf)

Access to communication technologies

[2]

Examiner Only	
Marks	Remark

(b) State **one** advantage and **two** risks associated with the use of geo-engineering.

Advantage _____

Risks

1. _____

2. _____

_____ [3]

(c) State the name given to the process of using algae to generate electricity in biological solar cells.

_____ [1]

Examiner Only

Marks

Remark

THIS IS THE END OF THE QUESTION PAPER

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