



Rewarding Learning

ADVANCED

General Certificate of Education

2018

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 8 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.  
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(b)**, **7** and **9**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

4. \_\_\_\_\_ [1]

**(b)** Northern Ireland currently sends 40% of all municipal waste to landfill. The Northern Ireland Waste Management Strategy aims to reduce the quantity of waste going to landfill.

Explain **two** reasons why the Northern Ireland Waste Management Strategy seeks to end the over-reliance on landfill.

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[2]

2

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**(Questions continue overleaf)**

Material	Embodied energy (MJ/kg)
Copper obtained from ore	57.0
Copper obtained by recycling of scrap metal	16.5
Aluminium obtained from ore	218.0
Aluminium obtained by recycling of scrap metal	29.0

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- [2]

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- [2]

Examiner Only	
Marks	Remark



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[4]

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- [2]

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**Fig. 1**









1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [4]

Population:

1. \_\_\_\_\_
2. \_\_\_\_\_

1. \_\_\_\_\_
2. \_\_\_\_\_

1. \_\_\_\_\_
2. \_\_\_\_\_

[6]

Examiner Only	
Marks	Remark

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**(Questions continue overleaf)**

(b) **Fig. 2** below shows a type of wave energy convertor. With reference to **Fig. 2** name the type of wave energy convertor shown and describe the processes involved in its operation.







**Fig. 3**

14

With reference to **Fig. 3** describe the three phases of the carbon capture and storage process.

**7** In 1950 only 30% of the world's population lived in urban areas (according to the United Nations World Urbanisation Prospects 2014). This was projected to increase to 66% by 2050. With this trend in mind, discuss the main characteristics of a sustainable urban development. Your answer should include specific reference to the following issues:

- energy use for heating and cooling/the provision of versatile buildings;
- integrated and flexible transport facilities/micro-generation (including the use of smart grid technology);
- brownfield sites/waste management systems;
- sustainable urban drainage/dealing with water shortage;
- the environmental and other benefits of green spaces for people and wildlife.

**The quality of written communication will be assessed in your answer.**

[illegible]

Examiner Only	
Marks	Remark



Examiner Only	
Marks	Remark

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[1]

## 1. Pseudomonas aeruginosa

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 [1]

## 2. Dehalococcoides ethenogenes

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 [1]

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

Examiner Only	
Marks	Remark



**9** In May 2016 the UK Government's Office for Low Emissions Vehicles (OLEV) announced funding to encourage businesses to switch to hydrogen-fuelled vehicles. Hydrogen-fuelled vehicles use hydrogen fuel cells such as the PEM fuel cell.

Discuss the use of hydrogen as a transport fuel. Your discussion should focus on the following:

- Three methods used for the bulk production of hydrogen fuel.
- How a PEM fuel cell works, including relevant chemical equations.
- The challenges presented by using hydrogen as an energy source for transport.

**The quality of written communication will be assessed in this question.**

[illegible]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

[illegible]

**THIS IS THE END OF THE QUESTION PAPER**



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