



Rewarding Learning

ADVANCED

General Certificate of Education

2022

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 10 JUNE, AFTERNOON

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 **5(a)**, **7** and **9**.

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

Total Marks	
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(Questions continue overleaf)

- 2 A homeowner has inherited a house in the countryside, similar to that shown in **Fig. 1**. Before moving in, several upgrades to the building are necessary to make it more energy efficient and comfortable to live in.



© Getty Images

Fig. 1

- (a) Identify **one** economic and **one** environmental benefit of upgrading the glazing from single glazed windows to double glazed windows.

Economic: _____
_____ [1]

Environmental: _____
_____ [1]

Examiner Only	
Marks	Remark

- (b) The homeowner wants to add insulation to the walls of the house. Three different types of insulation A, B and C have been considered.

Table 1 shows the U values of walls installed with each of the three different types of insulation.

Table 1

Insulation	U Value (W/m ² K)
Wall with insulation A	1.3
Wall with insulation B	1.1
Wall with insulation C	0.95

- (i) State which insulation the homeowner should use to achieve maximum energy efficiency.

_____ [1]

- (ii) Because of cost considerations it has been decided to use insulation **B**.

Calculate the rate of heat flow through a wall, measuring 4.0 m by 2.4 m, if the temperature inside is 19 °C and the temperature outside is 8 °C.

Show all working out in the space below.

Answer _____ [4]

Examiner Only

Marks Remark

(c) The Zero Carbon Homes Hierarchy aims to help reduce levels of carbon dioxide emitted during the construction of new buildings. A new building has passed the first two requirements on the Zero Carbon Homes Hierarchy:

Requirement 1: Fabric energy efficiency

Requirement 2: Onsite low / zero carbon heat and power

The building is now deemed as being Carbon Compliant, but the builder would like to achieve a Zero Carbon status. This means he must meet the third requirement on the Zero Carbon Homes Hierarchy.

(i) Identify the third requirement on the Zero Carbon Homes Hierarchy.

_____ [1]

(ii) Describe **two** methods which would meet the third requirement on the Zero Carbon Homes Hierarchy.

1. _____

_____ [2]

2. _____

_____ [2]

Examiner Only	
Marks	Remark

(b) Carbon capture and storage (CCS) is proposed as a method that will be useful for developing the use of 'clean coal' technologies.

Explain any **two** phases involved in CCS.

1. _____

_____ [2]

2. _____

_____ [2]

Examiner Only	
Marks	Remark

Rural Developments

Water: _____

_____ [2]

Energy provision: _____

_____ [2]

Transportation and travel: _____

_____ [2]

Examiner Only

Marks

Remark

- 7 Leading up to the 2012 Olympic Games in London, a 350 hectare brownfield site in East London was transformed into a successful venue for the Olympic and Paralympic Games as shown in **Fig. 2** below. Originally, much of the land being used was contaminated and required treatment to make it usable.



© Getty Images

Fig. 2

Discuss and evaluate phytoremediation as a possible method which could have been used to decontaminate the land.

Your answer should focus on the following areas:

- The process of phytoremediation.
- The advantages of phytoremediation compared to traditional treatment methods.
- The limitations of phytoremediation compared to traditional treatment methods.

Examiner Only

Marks Remark

THIS IS THE END OF THE QUESTION PAPER

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