



Rewarding Learning

ADVANCED

General Certificate of Education

2017

Centre Number

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Candidate Number

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Environmental Technology

Unit A2 1

Building and Managing a Sustainable Future



A2EA1

[A2EA1]

THURSDAY 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.

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 **3(b)**, **7(a)** and **9**.

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

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| Total Marks | |
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1 (a) Describe the concept of embodied energy.

[2]

(b) In Fig. 1 below identify **A** and **B** in the stages associated with anaerobic digestion.

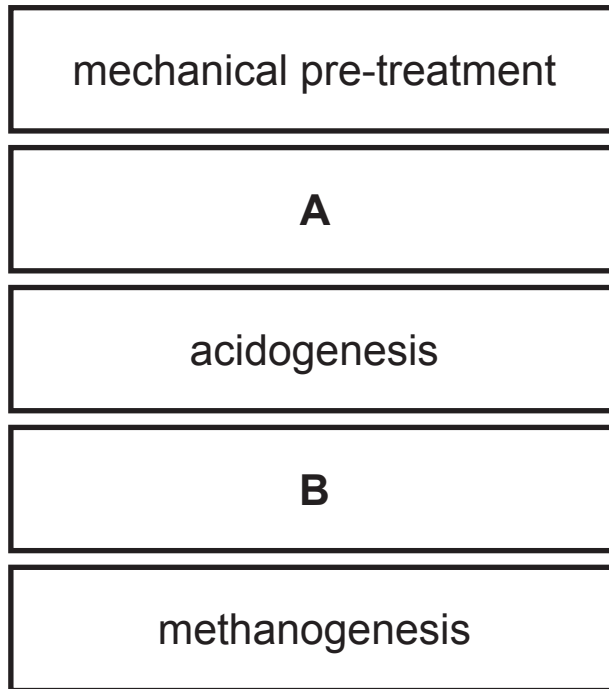


Fig. 1 © Principal Examiner

A: _____

B: _____

[2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

(c) Explain what happens during the acidogenesis and methanogenesis stages associated with anaerobic digestion.

Acidogenesis: _____

Methanogenesis: _____

_____ [4]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

If the owner of the house in **Fig. 2** replaces the existing windows with new triple glazed windows (which have a U value of $0.8 \text{ Wm}^{-2}\text{K}^{-1}$) of the same area, and if the internal and external temperatures remain at 19°C and -1°C respectively, calculate the reduction in the total rate of heat flow through the rear wall and windows. Show your working out in the space below.

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

[5]

(c) Fig. 3 below shows the Zero Carbon Homes hierarchy.

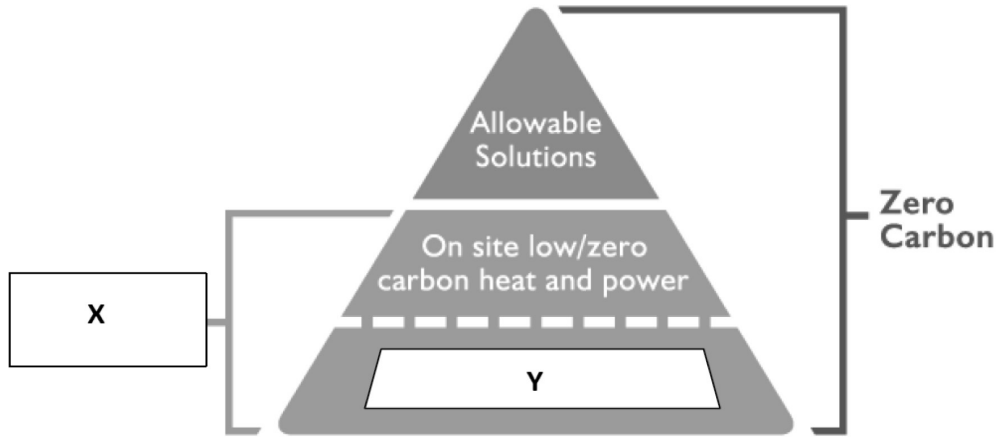


Fig. 3

© Zero carbon hub

Identify X and Y in Fig. 3.

X: _____

Y: _____
 _____ [2]

(d) Name **two** of the main environmental building performance measurement systems for buildings in the UK.

 _____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

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(Questions continue overleaf)

5 (a) You are employed as a sustainability advisor by an organisation and have been asked to provide advice on One Planet Living. Name and outline **three** of the principles of One Planet Living which your organisation could adopt.

1. _____

2. _____

3. _____

_____ [6]

(b) It is generally agreed that someone living in a developed country will have a larger ecological footprint than someone living in a developing country. Explain why this may be the case.

_____ [4]

Examiner Only

Marks

Remark

(c) Explain the linkage between a carbon footprint and an ecological footprint.

[2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
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(Questions continue overleaf)

8 Biodiesel is a renewable fuel that can be used instead of conventional diesel derived from fossil fuels. Biodiesel is manufactured from vegetable oil.

(a) Complete the diagram below by inserting the names of the relevant chemicals:



(b) Outline **three** advantages of using biodiesel instead of conventional diesel.

[3]

(c) Comment on the statement that the “production of biodiesel is contentious”. Refer to **three** aspects of biodiesel production in your answer.

[3]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

(d) Hydrogen is being developed as another alternative to fossil fuels for use in vehicles. Describe **two** challenges presented by using hydrogen as an energy source for use in vehicles.

1. _____

_____ [2]

2. _____

_____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

THIS IS THE END OF THE QUESTION PAPER

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