

Write your name here

Surname

Other names

Centre Number

Learner Registration Number

**Pearson BTEC  
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First Certificate**

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# Construction and the Built Environment

## Unit 11: Sustainability in Construction

Monday 2 June 2014 – Morning

**Time: 1 hour 15 min**

Paper Reference

**21635E**

**You do not need any other materials.**

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*

### Information

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Section A

1 Timber-based products are sustainable.

Identify **two** timber-based products.

Put a cross ☒ in **two** boxes to indicate your answers.

- A Recycled glass mineral wool
- B Structural insulated panels
- C Thatch used in roofing
- D Recycled particleboard sheets
- E Re-constituted roofing slates

(Total for Question 1 = 2 marks)

2 Give **one** way of reducing noise pollution from construction operations.

.....

.....

(Total for Question 2 = 1 mark)



3 Identify **two** alternative energy sources.

Put a cross ☒ in **two** boxes to indicate your answers.

- A** Green roof technology
- B** Photovoltaic roof tiles
- C** Solar hot water panels
- D** Rainwater harvesting
- E** Hemp for insulation

(Total for Question 3 = 2 marks)

4 Identify **two** low embodied energy materials.

1 .....

2 .....

(Total for Question 4 = 2 marks)

5 Explain **one** way bund walls are used to reduce land contamination.

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(Total for Question 5 = 2 marks)



6 Identify **two** ways to reduce pollutants at power stations.

Put a cross ☒ in **two** boxes to indicate your answers.

- A** Use of filters
- B** Use of scrapers
- C** Use of scrubbers
- D** Use of ventilation
- E** Use of incineration

**(Total for Question 6 = 2 marks)**

7 A sustainable building technique is the use of green roof technology.

(a) Identify **two** features of a green roof.

**(2)**

1 .....

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2 .....

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(b) Explain **two** advantages of using green roof technology.

**(4)**

1 .....

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2 .....

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**(Total for Question 7 = 6 marks)**



8 One disadvantage of small-scale wind turbines is that they can be noisy.

Explain **two** other disadvantages of small-scale wind turbines.

1 .....

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2 .....

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**(Total for Question 8 = 4 marks)**

9 Sustainable technologies can be best used to meet building requirements.

Identify the **two** water saving solutions.

Put a cross ☒ in **two** boxes to indicate your answers.

- A** Low volume flush toilets
- B** Structural wall insulation panels
- C** Tap flow restriction devices
- D** Silt traps on temporary drains
- E** Sustainable urban drainage

**(Total for Question 9 = 2 marks)**



**10** A key concept of sustainability is protecting aspects of the natural environment.

State **one** aspect of a local natural environment that must be protected in a sustainable development.

.....  
.....

**(Total for Question 10 = 1 mark)**

**11** Give **two** ways infrastructure can be designed to reduce the use of private cars.

1 .....

.....

2 .....

.....

**(Total for Question 11 = 2 marks)**

**12** Describe **two** ways a developer can liaise with the local community to minimise the impact of a construction project on the community.

1 .....

.....

.....

2 .....

.....

.....

**(Total for Question 12 = 4 marks)**

**TOTAL FOR SECTION A = 30 MARKS**



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## Section B: Urban Regeneration

Read the source materials below and then answer the questions.



(Source: © Simon Farrer)

### Building 1: 1898 Hotel

**Building 1** is a disused hotel that was constructed towards the end of the nineteenth century. Over the years the building has been extended to the rear and the front. The building fills the majority of the site and does not leave space for a car park. The building is in a poor condition and is currently vacant. The windows are boarded up.

The original part of the building is constructed of solid brick walls with a slate roof. The window frames were made of softwood with single glazing and no draught proofing. Heating was originally provided through a solid fuel boiler and open fires. The plumbing uses lead pipes. The ceilings are lathe and plaster. The floors are timber floorboards fixed to timber joists.

The building has gone through various adaptations, repairs and maintenance over the years. The more recent extensions have used different materials from the original building. Asbestos materials have been used to provide fire protection. Fluorescent tube lighting has been introduced into some of the rooms. Some of the windows have been replaced with uPVC.

The building is located in the same deprived, densely populated urban area as Building 2. The local council is working on a regeneration project for this area which may involve the demolition of Building 1, which would be replaced by five new houses.







(Source: © Simon Farrer)

### **Building 2: 2010 New Build Flats**

**Building 2** is a block of flats built in 2010 on the site of a disused warehouse. The five-storey building has a timber frame, as the developer wanted to use a sustainable construction form. The frame has brick cladding and rendered finish walls. The pitched sections of the roof are covered in artificial slate. The building has been built to the current Building Regulations.

There is recycled glass mineral wool insulation in the walls and floors. There is sheep's wool insulation in the roof. Sound insulation between flats is provided and energy efficient heating is provided to each flat. The windows are double glazed. All doors and windows are draught proof. There is an automatic door control system with an intercom and CCTV.

The building has similar architectural features to other buildings in the area. The design has incorporated storage areas for refuse, and the layout provides an inner courtyard area for resident car parking. This is accessed via security gates.

The building is located in the same deprived, densely populated urban regeneration area as Building 1.



**13** Identify **two** sustainable design and technology solutions used in Building 2 that will reduce heat loss.

1 .....

.....

2 .....

.....

**(Total for Question 13 = 2 marks)**

**14** The bricks from Building 1 can be recycled to produce crushed hardcore.

(a) Identify **one** use for crushed hardcore in the construction of the new houses.

**(1)**

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.....

(b) Identify **two** materials used in Building 1 that require disposal at a specialist disposal site.

**(2)**

1 .....

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2 .....

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**(Total for Question 14 = 3 marks)**

**15** Explain **one** cost advantage, for the developer, of the site for Building 2.

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**(Total for Question 15 = 2 marks)**



**16** Building 1 is being replaced by five new houses.

Give **one** way that new houses can maximise natural light.

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**(Total for Question 16 = 1 mark)**

**17** Explain **two** reasons why using timber in the structural frame in Building 2 helped the developer to minimise the environmental impact of the building.

1 .....

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2 .....

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**(Total for Question 17 = 4 marks)**



18 Discuss the current social impact on the local community of Building 1 and Building 2.

Dotted lines for writing the answer to question 18.

(Total for Question 18 = 8 marks)

TOTAL FOR SECTION B = 20 MARKS
TOTAL FOR PAPER = 50 MARKS

