



Examiners' Report Lead Examiner Feedback

January 2021

Pearson BTEC First
In Construction and the Built Environment
(21492E)
Unit 1: Construction Technology

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Introduction

This is the second sitting of the new 2018 Specification for the Unit 1: Construction Technology. Examination entries, compared to the previous exam sitting of January 2020, were significantly lower as a result of the covid-19 pandemic.

The external assessment now includes the application of mathematics in Learning Aim B, two further additional response questions, has an overall mark out of 60 (compared to the 2013 series of 50 marks) and the duration of assessment has increased to 75 minutes (from 60 minutes). Overall, the paper produced a suitable range of responses.

Lower ability learners often gave inaccurate or simplistic responses to questions and therefore gained limited marks. The more demanding questions provided learners with an opportunity to apply their knowledge in relation to construction scenarios and it was pleasing to see some extended answers that focused on the vocational context. In some cases, learners continued to provide responses which repeated information from the question stem or from previous question stems. In a number of other cases, candidates gave answers that appeared to reflect general knowledge rather than any detailed understanding of construction components or methods under consideration.

In preparation for future series, centres should focus on the analysis of the new 2018 Specification SAM (Sample Assessment Material) for this unit together with using this exam and its mark scheme as the basis for identifying and applying relevant more expansive solutions to the questions set. Learners should also be familiar with the full range of content from the unit specification and ought to be able to examine the application of these concepts in different scenarios. Learners should be able to sketch and label elements of construction as identified in the unit specification.

The ability to recognise the demands of a question is also important. Learners should understand the different responses required for different command words, for example, identify, explain or discuss.

Introduction to the Overall Performance of the Unit

Individual Questions

Question 1

This question was aimed at the understanding of the performance requirements required in buildings.

Targeted Specification Area: Learning Aim A.1

1a) Most learners were able to match each material/component to their intended performance requirement.

The correct responses were:

Sheep's wool- Thermal Insulation

Wall ties- Stability

In some cases learners incorrectly identified wall ties as being linked to the performance requirement of ventilation.

1b) Learners were required to identify two low embodied energy materials. Most learners were able to identify at least one type of low embodied energy material with more able learners able to correctly identify both correct responses.

The correct responses were:

A- Timber

D- Straw

1c) Learners were required to state two locations in a building where insulation material can be placed to reduce heat loss. Many learners were able to identify two locations correctly. Please refer to the marking scheme for suitable acceptable responses.

2-mark response example:

(c) State **two** locations in a building where insulation material can be placed to reduce heat loss.

(2)

1 Cavity walls

2 Roofs

2 marks awarded for the correct response.

1d) Learners were required to identify two purposes of weather resistant elements. Most learners were able to identify at least one weather resistant material correctly with more able learners able to correctly identify both correct responses.

The correct responses were:

A- To provide thermal comfort

E- To prevent dampness

Question 2

This question was aimed at learners understanding of the features of a site-based clearance activities.

Targeted Specification Area: Learning Aim B.1

Most learners were able to name at least one site-based clearance activity with the more able learners being able to state two acceptable responses.

Correct responses are included in the marking scheme. Additional acceptable responses also included:

- Waste/wastage/Debris
- Foundation of buildings
- Disused pipes
- Landfill

Some learners incorrectly stated aspects of site set-up or responses were to generalised. Incorrect responses included:

- Machinery
- Tools/equipment
- Dust/dirt-too general
- Rocks-too general
- Site cabins/accommodation-
- Toilets/portacabins
- Wildlife/natural habitats
- People/civilians

2-mark response example:

The screenshot shows a digital assessment interface. At the top, there is a toolbar with various drawing tools (eraser, pencil, highlighter, selection tools) and a text input field containing "Add a pre-defined ar" with a dropdown arrow. To the right, there is a "Reset Zoom" button. Below the toolbar, the question is displayed: "2 State two things that are removed from a site during site-based clearance activities." The answer area consists of two horizontal lines. The first line contains the handwritten answer "1 Brush-trees and Plants". The second line contains the handwritten answer "2 Unneeded buildings".

2 marks awarded for two correct responses.

1-mark response example:

The screenshot shows a digital assessment interface. The question is displayed: "2 State two things that are removed from a site during site-based clearance activities." The answer area consists of two horizontal lines. The first line contains the handwritten answer "1 natruel gasses Such as methane". The second line contains the handwritten answer "2 General rubbish".

1 mark awarded for the correct response of general rubbish.

Question 3

This question was aimed at learners understanding of the differnt types of internal floor finishes.

Targeted Specification Area: Learning Aim C.1

This was well answered by many learners. The different types of internal floor finish are clearly stated in the Topic area C.1 of the unit specification.

The correct responses are included in the marking scheme.

Correct responses are included in the marking scheme.

Additional acceptable responses also included:

- Floorboards
- Polish
- Wax
- Wood stain

2-mark response example:

3 Name **two** types of internal floor finish.

1 floor Tiles

2 wooden decking

2 marks awarded for two correct responses.

1-mark response example:

3 Name **two** types of internal floor finish.

1 Varnish

2 Carving

1 mark awarded for the correct response of varnish.

Question 4

This question was aimed at the understanding of sustainability methods in construction.

Targeted Specification Area: Learning Aim A.1

Learners were required to identify two methods used in sustainable construction that minimum the impact on the natural environment. Most learners were able to identify at least one method with more able learners able to correctly identify both correct responses.

The correct responses were:

- A- Recycling
- B- Use of local suppliers

Question 5

This question was aimed at the understanding of the superstructure of roofs.

Targeted Specification Area: Learning Aim C.3

5a) Learners were required to state one type of timber rafter used in roof construction. Many learners were unable to identify a suitable type of timber rafter. Please refer to the marking scheme for suitable acceptable responses.

1-mark acceptable response example:

5 (a) State **one** type of timber rafter used in roof construction.

(1)

Jack rafter.

1 mark awarded for a correct response.

1-mark acceptable response example:

5 (a) State **one** type of timber rafter used in roof construction.

(1)

~~Jack rafter~~ common rafter.

1 mark awarded for a correct response.

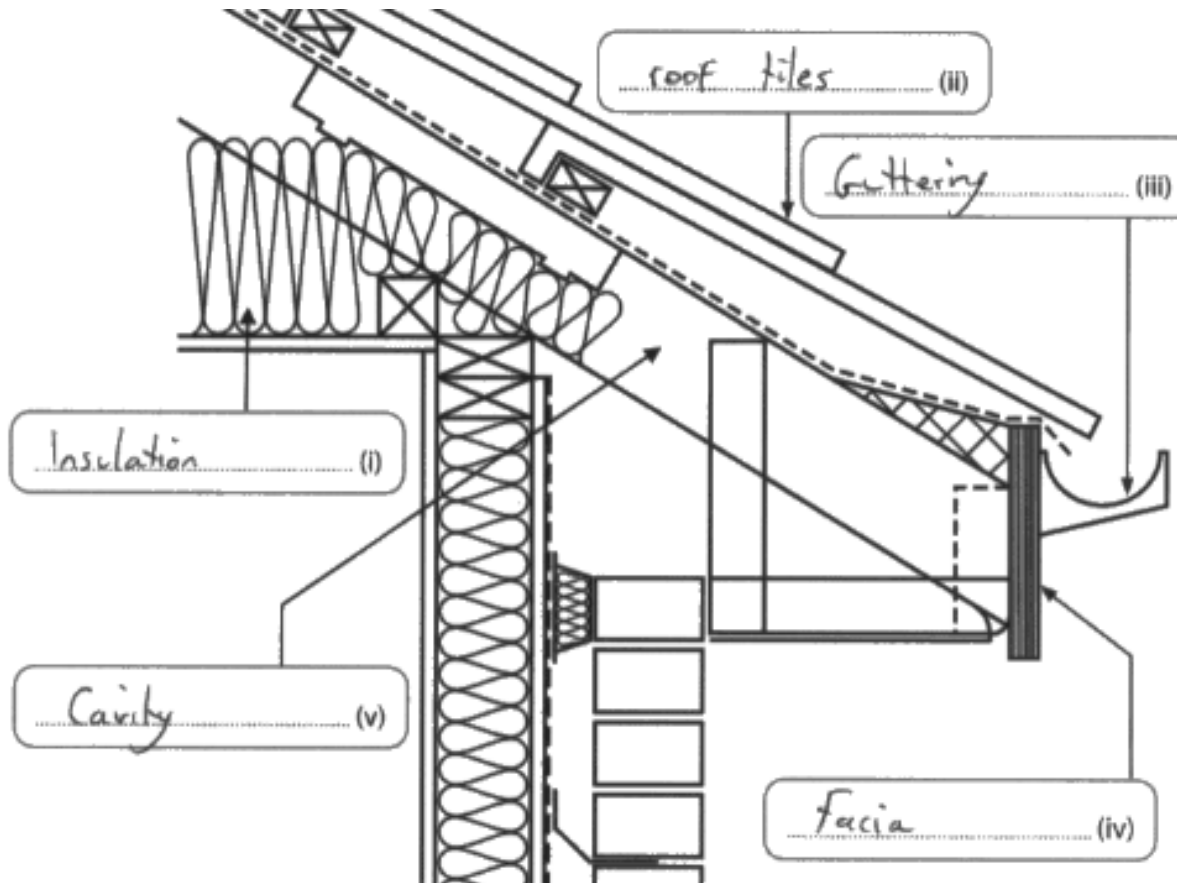
5b) Learners were required to label the five components/materials of an eaves detail shown in

Diagram 1. Many learners achieved at least three marks with more able learners labelling all five components/materials correctly.

However, some learners did not answer this question, or, gave incorrect answers for (iv) fascia/timber/plywood or (v) rafter/timber.

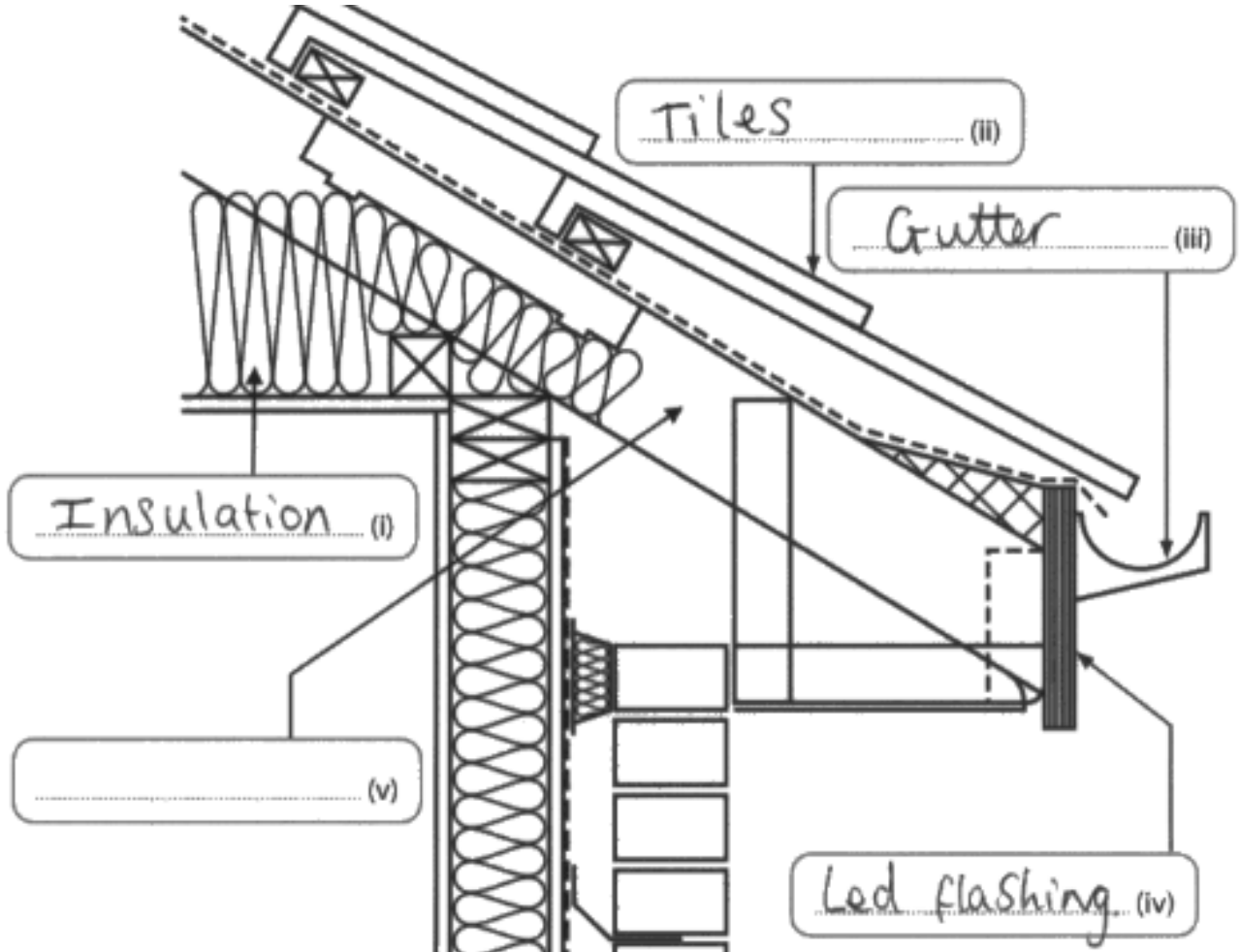
The correct responses are available in the marking scheme for review.

4-mark response example:



4 marks awarded: Four component/materials correctly labelled.

3-mark response example:



3 marks awarded: Three component/materials correctly labelled.

Question 6

This question was aimed at the understanding of superstructure of walls.

Targeted Specification Area: Learning Aim C.1

Learners were required to complete three diagrams to show each type of brickwork pointing stated.

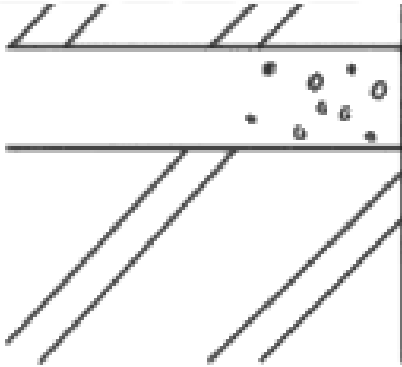
This was poorly attempted by learners. Pass learners were able to produce sketch diagrams of sufficient detail to achieve two marks.

However, weaker learners did not attempt any responses or sketch details were very poor or inaccurate.

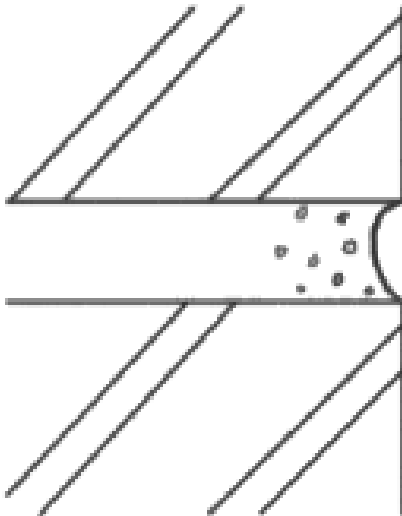
Centres should consult with the mark scheme to consider the detail required for a sketch question of this type.

Centres also need to understand that this type of question will continue to be included in future examinations.

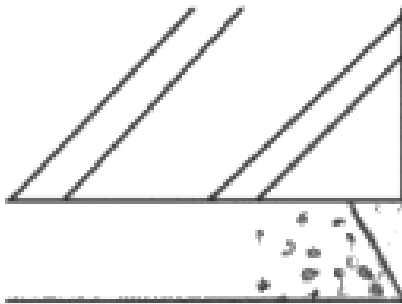
3-mark response example:



(ii) Bucket handle

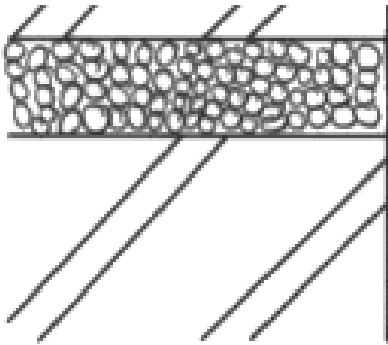


(iii) Weathered

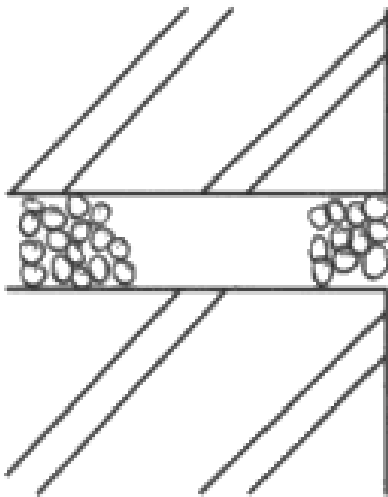


3 marks awarded for three correct details.

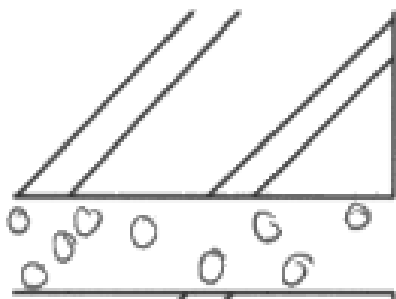
1-mark response example:



(ii) Bucket handle



(iii) Weathered



1 mark awarded for a correct response to (i) flush

Question 7

This question was aimed at the understanding of superstructure of floors.

Targeted Specification Area: Learning Aim C.2

Learners were required to explain two reasons why engineered joists are used instead of solid timber joists in the upper floor construction of low-rise buildings. The command verb used for this question is explain, therefore 1 mark was allocated to the identification of a reason and 1 mark for a linked explanation of the stated reason.

This question was generally poorly answered by many learners. More able learners were often able to achieve 2 marks.

1 mark advantage responses were awarded for:

- More stable
- Less waste
- Quicker to install

0 mark advantage responses included:

- Cheaper (on its own)
- Quicker/Quick (on their own)
- Stronger
- Won't rot
- Lasts longer

Please refer to the marking scheme for all suitable responses.

4 mark response example:

Q07

7 Engineered timber joists are often used in the upper floors of new low-rise buildings. Explain **two** reasons why engineered joists are used instead of solid timber joists.

1 they are prefabricated, which means it reduces on site build time
(could reduce wages for building companies)

2 They produce ~~less~~ ^{minimal} on site waste meaning time does not have to be spent separating and recycling materials
(could reduce wages for building companies)

4 marks awarded: Two acceptable linked responses given.

2-mark response example:

7 Engineered timber joists are often used in the upper floors of new low-rise buildings. Explain **two** reasons why engineered joists are used instead of solid timber joists.

1 because engineered joists are smaller than solid timber joists and it will make a low-rise house

2 also they are a lot quicker to build because they use up less materials

2 marks awarded:

First response contains no rewardable material.

Second response identifies quick to install - see Bullet Point (BP) 2 of the marking scheme and efficient use of materials - see BP3.

Question 8

This question was aimed at the performance requirements of low-rise construction, associated with loads on a building.

Targeted Specification Area: Learning Aim A.1

Learners were required to explain two reasons why an architect would need to take into consideration the loading applied to a building.

The command verb used for this question is explain, therefore 1 mark was allocated to the identification of a reason and 1 mark for a linked explanation of the stated reason.

Some learners were able to achieve identification marks for correctly stated reasons, but then often failed to understand the need to develop a linked explanation from it.

This question was generally poorly answered by many learners. Often learners gave generic incorrect responses and did not relate their responses to the question stem and loading. More able learners were often able to achieve 2 marks.

1 mark advantage response for:

- So the building is stable
- For safety reasons
- So it does not collapse

0 mark advantage response for:

- The loading may not be sustainable (unclear)

Please refer to the marking scheme for all suitable responses.

4-mark response example:

8 An architect has been commissioned to design a low-rise office building.

Explain **two** reasons why the architect would need to take into consideration the loading applied to the building.

1 To know what materials and frames need to ~~be~~ be suitable for the load applied.

2 To know what foundations that are going to be needed so the building doesn't sink

4 marks awarded:

The first response relates to materials and Bullet Point (BP) 2 of the marking scheme.

The second response relates to BP 3 of the marking scheme.

2-mark response example:

8 An architect has been commissioned to design a low-rise office building.

Explain **two** reasons why the architect would need to take into consideration the loading applied to the building.

1 To prevent structural failure.

2 To make sure the build is stable.

2 marks awarded:

The first response 'To prevent structural failure' relates to BP1. No linked response has been included.

The second response 'To make sure the building is stable' also relates to BP1 and that the building is designed safely.

2 marks for a combined linked response are awarded.

Question 9

This question was aimed at the applications of mathematics applied to a construction site and preconstruction works.

Targeted Specification Area: Learning Aim B.1

9a) Learners were required to determine the perimeter of the building plot indicated.

This was well answered by pass learners.

Most learners were able to show a correct method to add the sides of the building plot and produce a correct answer of 54 m.

Some learners incorrectly added their perimeter values but did achieve a method mark.

2-mark response example:

(a) Determine the perimeter of the building plot. (2)

+	12	
	10	
	7	
	5	
	5	
	15	
	54m	
	2	

.....54.....m

2 marks awarded for a correct method and answer.

1-mark response example:

(a) Determine the perimeter of the building plot.

(2)

$$5 + 5 = 10 + 7 = 17$$

$$17 + 10 = 27 + 12 = 39 + 15 = 44$$

44 m

1 mark awarded for a correct method with an incorrect answer. The learner has incorrectly added $39 + 15 = 44$ the method is correct

9b) Learners were required to show the method required to determine the area of the site indicated.

This was also well answered by pass learners.

Most learners were able to show a correct method.

2-mark response example:

(b) Show that the area of the building plot is 145 m^2 .

(2)

$$5 \times 5 = 25 \text{ cm}^2$$

$$10 \times 12 = 120 \text{ cm}^2$$

$$25 + 120 = 145 \text{ cm}^2$$

2 marks awarded for a fully correct method shown. The learner has used Method 3 in the marking scheme to correctly calculate the area of the building plot.

Question 10

This question was aimed at the sub-structure groundworks activity of the inclusion of a damp proof membrane in a raft foundation.

Targeted Specification Area: Learning Aim B.2

Learners were required to explain two reasons why a damp-proof membrane is used in the construction of a raft foundation/building.

Some learners were able to achieve identification marks for correctly stated reasons, but then often failed to understand the need to develop a linked explanation from it.

This question was generally poorly answered by many learners. Often learners gave generic incorrect responses and did not relate their responses to the question stem or a damp-proof membrane. More able learners were often able to achieve 2 marks.

1 mark response included:

- Prevents moisture rising
- It's waterproof

0 marks awarded for:

- Provides weather resistance-too general
- Acts to provide insulation

Please refer to the marking scheme for all suitable responses.

2-mark response example:

Explain **two** reasons why a damp-proof membrane is used in the construction of buildings.

1 a damp-proof membrane is used to keeping places dry ~~that~~ & stopping water from getting into these places.

2 also used to create slight heat

2 marks awarded:

For the first response see Bullet Point (BP) 1 of the marking scheme for 2 marks awarded.

The second response includes no rewardable content.

Further 2-mark response example:

of buildings.

1 To help prevent moisture entering the building and causing damage to the inside and things inside the building.

2 it can also act as a insulator so its cheaper to use one instead same proof membrane and insulator foam.

2 marks awarded:

1 mark awarded for the first part of Bullet Point (BP) 1 of the marking scheme.

1 mark awarded for the second part of BP 2 of the marking scheme.

No marks awarded for the second response.

Question 11

This question was aimed at the understanding of Structural Insulated Panels (SIPs).

Targeted Specification Area: Learning Aim A.2/C.1

Learners were required to explain the advantages and disadvantages of using Structural Insulated Panels (SIPs) for a housing development.

Some learners were able to achieve identification marks for correctly stated advantage or disadvantage, but then often failed to understand the need to develop a linked explanation from it.

This question was generally poorly answered by many learners.

Often learners gave generic incorrect responses and did not relate their responses to SIPs. More able learners were often able to achieve 2 marks.

1 mark acceptable responses included:

- More sustainable form of construction/environmentally friendly
- Will keep the heat in
- Well insulated
- Will reduce heat loss

0 mark unacceptable responses included

- Cheap
- Can be expensive
- Lasts longer
- They are expensive

Please refer to the marking scheme for all suitable responses.

Acceptable 6 mark response included:

Advantages of SIPs are that they are prefabricated - this reduces on site build time. Another advantage is that they are ~~re~~ sustainable (as made from wood) so it has minimal impact on the environment through CO₂ pollution. Lastly, they provide high levels of thermal insulation meaning that central heating systems are used less, reducing CO₂ pollution and global warming.

One disadvantage is that they are flammable, so in the event of a fire damage would be extensive and cost a lot

(Total for Question 11 = 6 marks, Q11_Total)

to fix/repair. Another is that they are prone to rot when exposed to moisture, meaning they will not last a particularly long time. Lastly, they are prone to be attacked by pests (like wood worm (in areas that suffer badly from this)) affecting the longevity of the building.

6 marks awarded:

Two linked advantages and one linked disadvantage of SIPs have been included, please refer to the marking scheme.

Acceptable 4 mark response included:

a ~~the~~ advantage of using SIPS is there sustainable because there made to sit so less less waste which is just thrown away but a disadvantage is because there made of wood on the outside there not very good fire Resistant compared to other ~~things~~ ^{products} you could use

4 marks awarded:

2 marks given for Bullet Point 6 of marking scheme.

2 marks given for Bullet Point 11 of marking scheme.

Question 12

This question was aimed at the understanding of the implications of building on a greenfield site and was included the sustainability methods of construction section of the specification.

Targeted Specification Area: Learning Aim A.1

Learners were required to discuss the factors that may influence a property developer building on a greenfield old farm site.

This is a new 6 mark extended response question and the marking scheme gives a detailed list of the advantages and disadvantages of building on the greenfield site.

Most learners attempted this question. Most achieved 2 marks or better.

Please refer to the marking scheme for all suitable responses.

4-mark example response:

12 A property developer is planning a new housing area on a greenfield site located on ~~16000~~²¹⁰⁰⁰ the edge of a city.

The greenfield site is currently old farming land but does have public footpaths and rights of ways passing through it.

The area of the site is ^{8 houses} 1600 m². Each house planned for the development will require an area of 200 m². The developer estimates that the approximate profit per sold house will be £35,000. 280000 profit

$$\begin{array}{r} 35 \\ 8 \\ \hline 280000 \\ 4 \end{array}$$

Discuss the factors that may influence the property developer building on the site.

The good points about the site is that the land probably comes cheap as it's not being used. It's also ideal for some people because it's quieter yet not too far from civilisation, which is an advantage because people might like shopping in the city. However it's hard to get planning permission on greenbelt land as there isn't much left of it so it's

Unlikely the government will give it to you. As well
 it's never been build on which ~~is~~ makes it
 difficult to build on and more likely to sink
 over time. People who use the path will also
 have an eyesore ~~or~~ making them (Total for Question 12 = 6 marks)
 unhappy because they can't walk in nature anymore.

~~Good~~
~~edge of a city~~ ~~secluded~~ - ~~hard to get planning~~
 but not too far ~~permission~~
~~no body using it~~ - so could - people who use the path
 be cheap ~~will be affected~~ ~~eyesore~~
~~big profit~~ ~~isn't able to use path?~~
 overall I think they ~~shouldn't build on~~
 shouldn't build on the land ~~because~~ locals use it
 for walks.

4 marks awarded: Demonstrates some accurate knowledge and understanding. Some of the points made are relevant to the context in the question, but the link was not always clear. Displays a partially developed discussion which considers some different aspects and some considerations.

Acceptable 2-mark response example:

Discuss the factors that may influence the property developer building on the site.

$$\frac{1600}{200} = 8$$

$$35000 \times 8 = 280,000$$

~~the price~~ if they were to build over the 1600m² that they have, they will build 8 houses meaning that the approximate profit made will be £280,000. This shows that this is a very high profit and the developer would most likely build on this site.

2 marks awarded: Demonstrates isolated elements of knowledge and understanding, there are major gaps or omissions.

Limited discussion which contains generic assertions rather than considering different aspects and the relationship between them.

Question 13

This question was aimed at the understanding of the sub-structure of ground floors.

Targeted Specification Area: Learning Aim B.2

Learners were required to discuss the advantages and disadvantages of two floor types, concrete beam and block and suspended timber.

Marks were awarded dependent on the detail of points identified and described and as to whether the learner had made a balanced discussion of both construction forms. Most learners attempted this question. Many achieved some marks. Learner marks were mostly in mark band 1 or at the lower end of mark band 2. Some high mark band 2 and occasional mark band 3 learner work was also seen.

The marking scheme gives a detailed list of the advantages and disadvantages of each floor type.

The mark bands and level descriptors are included in the mark scheme for question 13.

9 mark example response:

On one had the architect could use concrete beam and block floors. Advantages of using those are they are fire resistant - meaning in the event of a fire, damage and repair cost is minimal also it prevents spread of fire as concrete does not burn. Also, it will be better in areas that flood - as concrete is extremely durable and will not rot or become damaged ^{by moisture} (like timber). However, ^{disadvantages} ~~negatives~~ of using this are that it is not sustainable - as concrete pollutes the environment through CO₂ increasing global warming. Also another disadvantage is that to buy the concrete needed it will be very expensive - increasing the overall cost ~~of the~~ that the architect has to pay.

On the other hand, they could use suspended timber floors. Advantages of using these include that it is environmentally and eco friendly - as timber is sustainably sourced and you can grow more of it and it does not

pollute through CO₂. Another advantage is it is cheaper than concrete to buy - so the

TOTAL FOR PAPER = 60 MARKS

Q13_Total 7

Question
Number

15

Overall cost for the architect will be reduced, this could lead to an increased profit. However, ~~negatives~~^{disadvantages} of using suspended timber floors are that they are flammable - meaning in the event of a fire damage will be more extensive and repair costs higher (unlike) concrete beam and block floors. Another disadvantage is that timber is less durable than concrete, meaning in the event of a flood it is more likely to become damaged and rot, by exposure to moisture. In conclusion, personally I would use concrete beam and block floors as they are fire resistant and durable, meaning they are minimal maintenance and ~~more durable~~ are less likely to complain ~~as~~ as chance of damage is less. The people who own the property are less likely to experience problems and therefore complain to the architect.

9 marks awarded: This is a well-developed and logical discussion of both types of floor options.

5 mark example response:

Suspended timber floors are light weight meaning it is easy to install and remove additionally it is cheaper and is more sustainable due to being a renewable material. However, it can have dry rot or could be infested. Additionally it may eventually warp or twist causing noisy floors.

Concrete beams and block floors are not able to dry rot or get infested. However it is quite heavy and when installed it is hard to remove. But it ~~is~~ has better sound insulation due to high density and it is fire insulated. It may be more expensive.

5 marks awarded:

The advantages and disadvantages of both forms of floor construction have been discussed in a balanced manner. Most points made were relevant to the situation in the question and some linked responses included.

The submission was in the middle of MB2.

The learner demonstrates a good understanding of concrete beam and block floors and suspended timber floor construction.

3-mark example response:

An advantage for using block floors and concrete beams would be they are both strong to ~~use~~ use in and easy to construct with people know what they are doing. Also can be brought on site ~~safe~~ and then used for construction. A disadvantage would be the CO₂ to be produced and they can be expensive to buy in.

The advantages of using suspended timber floors would be they are easy to construct into a building and can be manufactured locally. A disadvantage would be they use trees which take oxygen out the ground and produce more CO₂.

I would go for the concrete beams and block floor because they have been used in the past which shows they are good.

3 marks awarded:

Some points made were relevant to the situation in the question although the response was basic in detail and explanation. The learner demonstrated a basic understanding of both floor types. The response was accepted as being at the top of MB1

Summary

Based upon the performance of the paper, learners should:

- Revise construction details of key elements of the construction of a domestic dwelling in order that sketch details items can be produced for future series of the paper
- Be able to label key components/materials shown in construction details use the correct terminology and spelling.
- Be able to complete written response answers linked to scenario or question stem settings. Often learner responses were generic in nature and not linked to the question stem.
- Be able to understand that when command verbs such as explain are used in questions, that a linked explanation is required to achieve two marks per response.

The individual questions highlighted above indicate numerous good examples of linked responses. These should be reviewed with learner groups, in a practice activity, to demonstrate their understanding of the command verb used.

- Learners should understand that the extended response question, the final item of the paper (in this case Q13), is mark banded. To access higher mark band marks learners should understand the need to address both construction options indicated and link their responses to the question stem/scenario.



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Welsh Assembly Government

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