

Examiners' Report/ Lead Examiner Feedback

January 2017

NQF BTEC Level 1/Level 2 Firsts in
Construction and the Built
Environment

Unit 1: Construction Technology
(21492E)

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Introduction

This report has been written by the Lead Examiner for BTEC Construction and the Built Environment Unit 1 – Construction Technology. It is designed to help you understand how learners performed overall in the exam. For each question, there is a brief analysis of learner responses. You will also find some example learner responses at Level 2 Pass, Merit and Distinction. We hope this will help you to prepare your learners for future examination series.

Grade Boundaries

Introducing external assessment

The new suite of 'next generation' NQF BTECs now include an element of external assessment. The external assessments for NQF BTEC Construction are timetabled paper-based examinations.

What is a grade boundary?

A grade boundary is where we set the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade (Distinction, Merit, Pass and Level 1 fallback).

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries – this means that they decide what the lowest possible mark should be for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Awarding grade boundaries is conducted to ensure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in external assessments

Each test we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries for each test, because then it wouldn't take into account that a test might be slightly easier or more difficult than any other.

Grade boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link: <http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

Grade	Unclassified	Level 1 Pass	Level 2 Pass	Level 2 Merit	Level 2 Distinction
Boundary Mark	0	11	21	31	41

General Comments

This was the fifth time that this paper has been sat and, 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 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. Candidates should understand the different responses required for different command words, for example, identify, explain or discuss.

Question 1

This question was aimed at the understanding of the performance requirements required of low-rise buildings.

Targeted Specification Area: Learning Aim A.1

1(a) Most learners correctly identified the correct answers of:

Intumescent paint- Fire resistance

Carpeting - Sound insulation

2 mark response example:

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 ☒.

1 Low-rise buildings have specific performance requirements.

(a) Draw a line to match each material to its performance requirement.

Each material has only one performance requirement. (2)

Material	Performance requirement
Intumescent paint	Weather resistance
Carpeting	Strength
	Fire resistance
	Sustainability
	Sound insulation

1(b) Learners were required to identify two systems used for the specification of materials. The two correct answers were:

A – British Standards

E – Strength classification

Most learners despite were able to identify one system correctly with more able learners able to correctly identify both systems.

2 mark response example:

(b) Identify **two** systems used for the specification of materials. (2)

- A British Standards
- B Considerate Contractors Scheme
- C Mood boards
- D Thermal mass
- E Strength classification

1(c) Learners were required to identify two ways in which cavity walls achieved their required strength and stability. The two correct answers were:

B – Height restrictions

E – Wall tie spacing

Most learners despite were able to identify the correct response of wall tie spacing but only the more able learners were able to identify the correct response of height restrictions.

2 mark response example:

(c) Identify **two** ways in which cavity walls achieve their required strength and stability. (2)

- A Grading of hardcore
- B Height restrictions
- C Sound insulation
- D Wall tie spacing
- E Hemp rendering

1 (d) Learners were required to identify two methods used to slow the spread of fire in a building. The two correct answers were:

B – Sprinkler system

E – Compartments

Most learners despite were able to identify the correct response of sprinkler systems but only the more able learners were able to identify the correct response of compartments.

2 mark response example:

- (d) Identify **two** methods used to slow the spread of fire in a building. (2)
- A Smoke detection
 - B Sprinkler system
 - C Compartments
 - D Refuge areas
 - E Provision of ventilation

(Total for Question 1 = 8 marks)

Question 2

This question was aimed at the preconstruction phase of a construction project.

Targeted Specification Area: Learning Aim B.1

Learners were required to name two legal requirements that should be completed during the desk-based preconstruction phase of a construction project. The correct responses may be seen in the marking scheme but can also be taken directly from the unit specification under the desk-based preconstruction section, legal requirements. Often learners became confused between the desk-based preconstruction and site-based construction phases giving incorrect responses such as site clearance, installation of site compounds etc.

1 mark response example:

2 Name **two** legal requirements that should be completed during the desk-based preconstruction phase of a construction project.

1 Risk assessment

2 ~~blueprints~~ ~~blueprints~~ blueprints

Total for Question 2 = 2 marks

1 mark awarded: The first response of risk assessment is awarded 1 mark. The second response is not a legal requirement.

1 mark response example:

2 Name **two** legal requirements that should be completed during the desk-based preconstruction phase of a construction project.

1 health and safety

2 security

Total for Question 2 = 2 marks

1 mark awarded: The first response of health and safety is awarded 1 mark. The second response is not a legal requirement.

Question 3

This question was aimed at hazards associated with groundwork activities.

Targeted Specification Area: Learning Aim B.2

Learners were required to explain two control measures that should be used to reduce the risk of accidents when excavating to a depth of 1.5m. The command verb used for this question is explain, therefore 1 mark was allocated to the identification of a control measure and 1 mark for a linked explanation of the stated benefit.

This question was satisfactorily attempted by learners. Some learners were able to achieve 1 mark for the identification of an advantage but then often failed to understand the need to develop a linked explanation from it. More able learners were often able to achieve 3 or 4 marks. Suitable linked correct responses may be seen in the marking scheme.

3 mark response example:

3 Explain **two** control measures that should be used to reduce the risk of accidents when excavating to a depth of 1.5m.

1. *Sence of the area around it so people can't just accidentally fall in*

2. *Safety gear hard hat ~~high~~ high viz jacket gloves*

(Total for Question 3 = 4 marks)

3 marks awarded: The first explanation is an appropriate linked response, see bullet point 4 of the marking scheme. The second response is awarded 1 mark for the identification high visibility jacket but then did not include a linked response.

4 mark response example:

3 Explain **two** control measures that should be used to reduce the risk of accidents when excavating to a depth of 1.5m. 4 Q03

1 Using Timber framing to help support the sides of the excavation, when excavating to a depth of 1.5m, so they do not collapse in.

2 Having barriers or fencing to stop heavy machinery coming within a certain distance of the excavation, so the weight of the machinery doesn't cause the sides of the excavation to collapse in.

(Total for Question 3 = 4 marks) 4

4 marks awarded: The first response identifies the control measure of providing timber support with a linked explanation to support the sides so that they do not collapse in. 2 marks awarded. The second response identifies the control measure to barrier or fence of the area, with a linked explanation to stop heavy machinery coming within a certain distance of the trench which could cause the sides of the excavation to collapse. 2 marks awarded.

Question 4

This question was aimed at the components of a roof.

Targeted Specification Area: Learning Aim C.3

4(a) Learners were required to name two types of timber rafter used in the construction of pitched roofs. The correct responses may be seen in the marking scheme but can also be taken directly from the unit specification under superstructures of roofs-components of a roof. Only more able learners were able to achieve marks for this question, many left the question blank or gave incorrect responses such as softwood, hardwood, eaves etc.

2 mark response example:

4 (a) Name **two** types of timber rafter used in the construction of pitched roofs. (2)

1 Jack rafters

2 hip rafters

2 marks awarded for two correct responses of jack rafters and hip rafters.

4(b) Learners were required to state one purpose of a timber wall plate used in roof construction.

This question was satisfactorily answered by learners who were often able to state that the wall plate offered stability or support to the roof.

1 mark example response:

(b) State **one** purpose of a timber wall plate used in roof construction. (1)

Helps to keep the roof stable and upright to avoid the roof from collapsing.

(Total for Question 4 = 3 marks)

1 mark awarded: The response of 'Helps keep the roof stable and upright' is acceptable for the award of 1 mark.

1 mark example response:

(b) State **one** purpose of a timber wall plate used in roof construction. (1)

To support the load on the roof.

(Total for Question 4 = 3 marks)

1 mark awarded: The response of 'to support the load on the roof' is acceptable for the award of 1 mark.

Question 5

This question was aimed at aspects of the sub-structure groundworks activity of foundations.

Targeted Specification Area: Learning Aim B.2

5(a) Learners were required to state two functions of a foundation. The correct responses may be seen in the marking scheme but can also be taken directly from the unit specification under sub-structure groundworks-functions of a foundation. Most learners were able to achieve 1 mark for answers linked to the foundation providing a base from which construction can take place or that it assists in the stability of a structure. More able learners often provided two correct responses.

2 mark example response:

5	(a) State two functions of a foundation.	
		(2)
1	<i>Stop the building from moving</i>	
2	<i>To make a building more stable</i>	

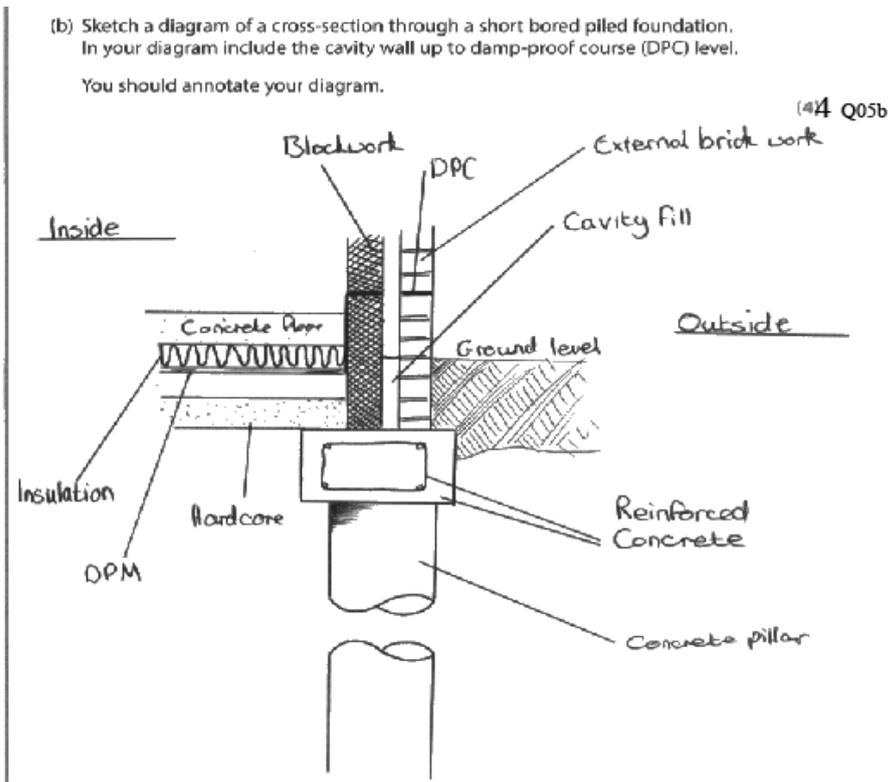
2 marks awarded: The first response is acceptable for 1 mark, please refer to the marking scheme. The second response is also acceptable for 1 mark as the foundation is accepted as making a building more stable.

5(b) Learners were required to sketch a cross-section through a short bored piled foundation. Learners were also requested to detail the sketch to include the cavity wall up to damp-proof course (DPC) level.

In this examination series a greater number of learners completed meaningful sketch details often achieving 3 or 4 marks. However, some learners either did not attempt a response or focused incorrectly on a past exam series detail.

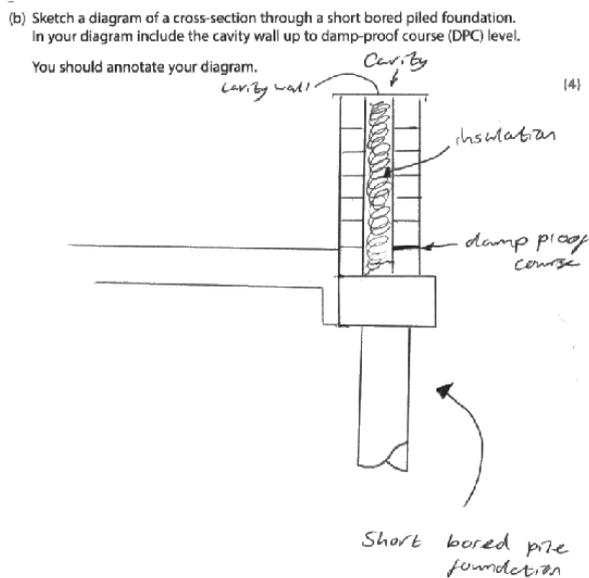
Centres should consult with the mark scheme to consider the detail required for a sketch question of this type. Centres also need to understand that this type of question will continue to be included in future examinations.

4 mark example response:



4 marks awarded: The learner has produced a pile foundation detail and 4 marks are awarded as a minimum of four components/parts are shown.

4 mark example response:



4 marks awarded: The learner has produced an appropriate pile foundation detail and although not fully labelled 4 marks are awarded as four components/parts are shown.

Question 6

This question was aimed at the superstructure of floors .

Targeted Specification Area: Learning Aim C.2

Learners were required to identify five components/materials of a wall and timber upper floor. This was satisfactorily attempted by most learners with many achieving 2 marks for (i) wall ties and (ii) insulation. More able learners were often able to name 4 components/materials correctly. The component of the section which most learners struggled to identify correctly was part (v) the joist hanger.

4 mark example response:

6 Diagram 1 shows a section through a wall and timber upper floor.
Label the five components/materials of the wall and timber upper floor section shown in Diagram 1.

Diagram 1

(Total for Question 6 = 5 marks)

4 marks awarded: The candidate has correctly identified four components/materials of the floor section shown. The response for part (v) is incorrect.

2 mark example response:

6 Diagram 1 shows a section through a wall and timber upper floor.

Label the five components/materials of the wall and timber upper floor section shown in Diagram 1.

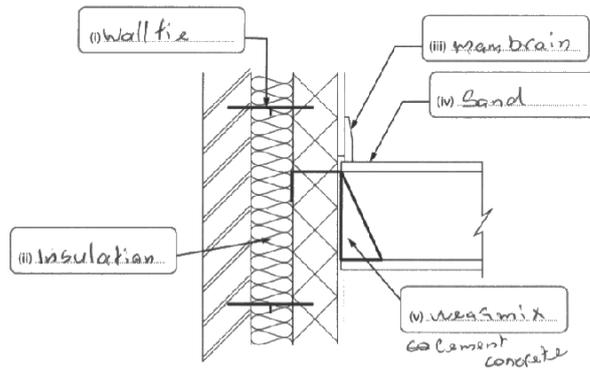


Diagram 1

(Total for Question 6 = 5 marks)

2 marks awarded: The candidate has correctly identified the two components/materials of wall ties and insulation. The responses for part (iii) to (v) are incorrect.

Question 7

This question was aimed at aspects of common structural forms for low-rise construction.

Targeted Specification Area: Learning Aim A.2

7(a) Learners were required to explain one benefit to the developer of using sustainable building techniques. The command verb used for this question is explain, therefore 1 mark was allocated to the identification of a benefit and 1 mark for a linked explanation of the stated benefit.

This question was poorly attempted by learners. Some learners were able to achieve 1 mark for the identification of a benefit but then often failed to understand the need to develop a linked explanation from it.

The response that energy efficient/more sustainable homes would increase the demand for the developer's product was given by a small number of learners.

7(b) Learners were required to explain two ways the use of timber framed construction could help the developer to meet the demand of housing stated. The command verb used for this question is explain, therefore 1 mark was allocated to the identification of a benefit and 1 mark for a linked explanation of the stated benefit.

This question was poorly attempted by learners. Some learners were able to achieve identification marks but then often failed to understand the need to develop a linked explanation from it. The marking scheme identifies appropriate linked responses to answer this question. Learners often did not provide a complete description of their identified explanation. Learners often gave simplistic responses such as quicker to build/faster to build, but did not include a comparator e.g. 'it is quicker to build than brick/masonry construction' or 'it is faster to build than a concrete form'.

Learners achieved 1 mark by identifying any of the following:

- Quick to build
- Fast to build
- Timber is a sustainable material
- It is eco-friendly

Responses awarded 0 marks included:

- Easier to build
- Quicker
- Faster
- Cheap/cheaper to do
- No wastage
- Recyclable materials
- Lighter

2 mark example response:

(b) Explain **two** ways the use of timber framed construction could help a developer to meet this demand of completing 2000 sustainable homes within six months. (4)

1. Timber frames can be pre-fabricated which means they don't have to be assembled on site so they can be built quicker - which means more of the houses can be built in a shorter amount of time.
2. Timber frames are easier to work with and they are easy to construct/install, so because of that the houses can be built quicker which helps the developer meet his deadline.

(Total for Question 7 = 6 marks)

2 marks awarded: The first response is an acceptable linked response. Please refer to bullet point 5 in the marking scheme. The second response indicates that timber frames are 'easier to work with, quicker to construct/install' but there is included no comparator.

1 mark example response:

(b) Explain **two** ways the use of timber framed construction could help a developer to meet this demand of completing 2000 sustainable homes within six months. (4)

1. The frames can be delivered pre-constructed, so they won't have to build them onsite.
2. Timber is easier to get hold of and is cheaper to buy.

(Total for Question 7 = 6 marks)

1 mark awarded: In the first response the learner states that the frame 'can be delivered pre-constructed' this identifies that the frame is prefabricated (1). The linked response is insufficient for the award of the second mark. The second response has no rewardable material.

Question 8

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

Targeted Specification Area: Learning Aim B.2

Learners were required to explain two disadvantages of using suspended timber ground floors instead of solid concrete ground floors for a housing development. The command verb used for this question is explain, therefore 1 mark was allocated to the identification of a disadvantage and 1 mark for a linked explanation.

This question was satisfactorily attempted by more able learners. Some learners were able to achieve 1 or 2 marks for the identification of a disadvantage but then often failed to understand the need to develop a linked explanation from it. The marking scheme indicates appropriate linked responses to answer this question.

Learners achieved 1 mark by identifying any of the following:

- Timber would/could rot
- Concrete is more durable/has a longer lifespan
- Timber ground floors are more expensive
- Not as stable as a solid floor
- Issues concerning expansion or warping

Responses awarded 0 marks included:

- Loading capacity
- Not as strong as concrete/solid floor
- Breaks easily
- Thermal heat losses are greater

2 mark example response:

8 An architect has specified the use of suspended timber ground floors instead of solid concrete ground floors in the construction of a large housing estate on a level site. The development needs to proceed quickly in response to a housing crisis and any repairs and maintenance on its completion should be minimal.

Explain **two** disadvantages of using suspended timber ground floors instead of solid concrete ground floors for this housing development.

1 Timber ground floors are not protected
(termites)
from wood mites, wood mites easily
damage the floor and weaken it.

2 Timber ground floors have to be replaced
where as solid concrete ground floors are
more robust.

(Total for Question 8 = 4 marks)

2 marks awarded: In the first response the learner has identified that timber can become infested (1) and explained that this can lead to damage and weakening (1). 2 marks awarded. The second response implies that concrete floors are stronger than timber floors; this is not an appropriate response. 0 marks awarded.

0 mark example response:

8 An architect has specified the use of suspended timber ground floors instead of solid concrete ground floors in the construction of a large housing estate on a level site. The development needs to proceed quickly in response to a housing crisis and any repairs and maintenance on its completion should be minimal.

Explain **two** disadvantages of using suspended timber ground floors instead of solid concrete ground floors for this housing development.

1. ~~The~~ first point is that more heat is lost from the suspended timber ground floor - it isn't sustainable.

2. Solid concrete ground floor is way more stronger than suspended timber ground floors

(Total for Question 8 = 4 marks)

0 marks awarded: The first response identifies heat loss through a timber floor. 0 marks awarded.

The second response identifies that a solid ground floor is stronger than a timber floor. 0 marks awarded.

Both statements are inaccurate as in the design of either a timber or solid ground floors the floor would be designed to take into account thermal and strength considerations.

Question 9

This question was aimed at the building on greenfield sites.

Targeted Specification Area: Learning Aim A.1

Learners were required to explain two additional costs that could occur as a result of building on the greenfield site location. The command verb used for this question is explain, therefore 1 mark was allocated to the identification of an additional cost and 1 mark for a linked explanation.

This question was poorly attempted by learners with only the more able learners being awarded marks. Some learners were able to achieve 1 mark for the identification of an additional cost but then often failed to understand the need to develop a linked explanation from it. Learners often therefore did not provide a complete description of their additional cost.

The marking scheme gives detailed linked explanations for this question.

Some students did not interpret the question well and gave a range of inaccurate or poor responses. Additional costs of the removal of trees or animal habitat were not accepted as these could also occur on a brownfield site. The important issue was to realise that 'trees with preservation orders' or 'relocation of protected animal species' were additional costs that a greenfield site could occur.

2 mark example response:

9 A developer is proposing to build a new housing estate and has the choice of either a brownfield or greenfield location.

Explain **two** additional costs that could occur as a result of building on the greenfield site.

1 Services like water and gas mains/pipes would have to be installed ~~to~~ in order for there to be running water etc... which would cost a lot of money because there's no pre-existing services

2 Excavations and removal of trees and plants would be more common on a greenfield site, so removal of this would cost more money and take up more time

(Total for Question 9 = 4 marks)

2 marks awarded: The first response identifies the need to install services 'as there are no pre-existing services'. 2 marks are awarded for a linked explanation, please refer to the marking scheme. The second response is related to the need to remove trees. 0 marks are awarded.

1 mark example response:

9 A developer is proposing to build a new housing estate and has the choice of either a brownfield or greenfield location.

Explain **two** additional costs that could occur as a result of building on the greenfield site.

1 The cost of building new roads

2 The cost of getting rid of anything that is already here.

(Total for Question 9 = 4 marks)

1 mark awarded: The first response, 'the cost of building new roads' is linked to bullet point 1 of the marking scheme. 1 mark is awarded as there is no linked explanation. The second response is worthy of 0 marks.

Question 10

This question was aimed at the superstructure of roofs.

Targeted Specification Area: Learning Aim C.3

Learners were required to discuss the advantages and disadvantages of two types of roof structure to be used for a new housing development.

Learners should identify the issue/situation that is being assessed within the question using the mark bands provided in the mark scheme. Marks were awarded dependent on the detail of points identified and described and as to whether the learner had made a balanced explanation of the two roof structure forms linked to the project scenario.

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 -f each form of roof structure. Learners generally identified a few key points from one or both forms. Few learners provided a balanced argument with sufficient detail to achieve marks beyond those in mark band 2. Some learners provided detailed responses and achieved mark band 2 criteria marks and the points made were linked to the development of a new housing scheme.

The mark bands and level descriptors are included in the mark scheme for question 10.

4 mark example response:

10 A housing developer is proposing to build a new affordable housing development in a rundown area on the outskirts of a town. Nearby properties consist of modern two and three bedroom terraced housing plus a series of low-rise apartment blocks.

It is important that the development is completed quickly to meet an increase in demand for affordable homes in the area.

Flat	Pitched
- less main.	- Easier water run-off.
- cheaper.	- More floor space.
- More space to build on.	- Expensive.
- puddles on roof.	- Harder to maintain.
- Aesthetic pleasing	

The developer is considering two different types of roof. The options are:

- a pitched roof with interlocking concrete tiles
- a flat roof with three layers of built up felt.

Discuss the advantages and disadvantages of each of these roofs.

(8)

Advantages of Pitched Roof

- A pitched roof has a better water run-off.
- A pitched roof provides more floor space so you have more room inside the building.
- A pitched roof should normally last longer than a flat roof.

Disadvantages of a pitched roof.

- A pitched roof is more expensive than a flat roof because of the tiles and the insulation required.
- A pitched roof is harder to access which means its harder to maintain.
- Pitched roofs are generally expensive.

Advantages of a flat roof

- A flat roof requires less maintenance than a pitched roof.
- A flat roof is cheaper
- A flat roof provides more space to build further on.

Disadvantages of a flat roof.

- Puddles can occur on a flat roof.
- A flat roof can sometimes look less aesthetically pleasing as sometimes pitched roofs look better.

4 marks awarded: The learner response is at the bottom of mark band 2. Relevant points are identified only some with limited description. More than one viewpoint has been expressed. Most points made are relevant to the situation in the question but the link is not always clear. The learner has shown a good understanding of roof construction.

3 mark example response:

10 A housing developer is proposing to build a new affordable housing development in a rundown area on the outskirts of a town. Nearby properties consist of modern two and three bedroom terraced housing plus a series of low-rise apartment blocks.

It is important that the development is completed quickly to meet an increase in demand for affordable homes in the area.

The developer is considering two different types of roof:

The options are:

- a pitched roof with interlocking concrete tiles
- a flat roof with three layers of built up felt.

Discuss the advantages and disadvantages of each of these roofs.

(8)

The advantage of using a pitched roof is triangular so therefore it is strong. As it is angled the rain runs off into the gutter. A disadvantage is that it is expensive and not easy to put up, it takes longer to put up. A further advantage is that it looks nicer than a flat roof. A further disadvantage is that it does not look as modern as a flat roof.

A flat roof advantage is it looks modern, is cheap and easy to put up and to manufacture.

A disadvantage is that it is weak and when it rains all the water collects in the middle and it begins to sag and has a higher chance of collapsing when all the rain has

gathered in the middle. It tends not to be very well insulated.

3 marks awarded: The learner response is at the top of mark band 1. The learner has identified relevant points and some description has been included. Points made are superficial and not linked to the situation in the question. The learner has shown a basic understanding of the advantages and disadvantages of each roof type.

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