



Mark Scheme (Results)

Summer 2015

BTEC Level 1/Level 2 First Certificate in
Construction and the Built Environment

Unit 11: Sustainability in Construction
(21635E)

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- All marks on the mark scheme should be used appropriately.
- All marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if a candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt about applying the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed-out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Mark
1	1 mark for each correct answer: (A) Energy (E) Leakage of water	(2)

Question Number	Answer	Mark
2	1 mark for each environmental issue that needs to be considered when planning sustainable developments, up to 2 marks. Any two from: <ul style="list-style-type: none"> • Rising sea levels (1) • Ground settlement/stability/erosion (1) • Disturbance/destruction of local natural habitats/biodiversity/ relocation/conservation measures (1) • Trees/deforestation (1) • Use of greenfield site (1) • Pollution (1) <ul style="list-style-type: none"> • carbon emissions (1) • particulates (1) • light (1) • ground water (1) • noise (1) • waste management (1) • effluent (1) • (de)contamination (1) <p>Accept any other appropriate answers.</p>	(2)

Question Number	Answer	Mark
3	<p>1 mark for each way in which to reduce emissions from construction traffic, plant and machinery, up to 2 marks.</p> <p>Any two from:</p> <ul style="list-style-type: none"> • Use of modern fuel-efficient vehicles/machinery/equipment (1) • Electric/hybrid machines/vehicles (1) • Regular maintenance (1) • Regular servicing (1) • Locally sourced materials (1) • Buying in bulk/bulk delivery (1) • Variety of materials from one supplier (1) • Reduction of double handling of materials (1) • Minimise use/number of movements/trips/journeys (1) • Switch off when not in use (1) • Use of biofuels (1) • Catalytic converters (1) • Silencer/baffles (1) <p>Accept any other appropriate answers.</p>	(2)

Question Number	Answer	Mark
4	<p>1 mark for identifying a reason of covering skips.</p> <p>Any one from:</p> <ul style="list-style-type: none"> • Preventing materials from falling out (1) • Preventing lightweight materials/dust blowing out (1) <p>Accept any other appropriate answers.</p>	(1)

Question Number	Answer	Mark
5	<p>1 mark for each way to reduce high carbon emissions created during the manufacture of high energy materials, up to 2 marks.</p> <p>Any two from:</p> <ul style="list-style-type: none"> • Use of renewable/green energy (1) • Use of efficient plant/equipment/maintaining equipment (1) • Using existing plant/equipment efficiently (1) • Changing to more efficient manufacturing processes/methods (1) <p>Accept any other appropriate answers.</p>	(2)

Question Number	Answer	Mark
6	1 mark for each correct answer: (D) Maintaining a clean and tidy site (E) Providing on-site parking facilities	(2)

Question Number	Answer	Mark
7	A linked response that makes reference to any two of the following points. Up to 2 marks for each explanation. Any two from: <ul style="list-style-type: none"> • Site fencing (1) because this will prevent unauthorised access e.g. safety of local children (1) • Security patrol/guards (1) provides sense of security and wellbeing/reduces opportunity for undesirable activity (1) • CCTV (1) provides a deterrent for undesirable activity (1) Accept any other appropriate answers.	(2)

Question Number	Answer	Mark
8	1 mark for a reason that a developer requires a financial return. Any one from: <ul style="list-style-type: none"> • To make a profit/to make money • To provide a return on investment • To enable the developer to remain solvent • To fund future projects / developments Accept any other appropriate answers.	(1)

Question Number	Answer	Mark
9	<p>1 mark for each cost that needs to be considered in the life cycle costing of a building over its full life, up to 2 marks.</p> <p>Any two from:</p> <ul style="list-style-type: none"> • Land cost (1) • Design cost (1) • Finance costs (1) • Statutory fees (1) • Building cost e.g. materials/labour/plant(1) • Service costs e.g. electricity/gas/water/telecoms/rates/council tax (1) • Facilities management costs (1) • Repairs/maintenance costs (1) • Insurance costs (1) • Refurbishment costs (1) • Conversion/adaptations costs (1) • Demolition costs (1) <p>Accept any other appropriate answers.</p>	(2)

Question Number	Answer	Mark
10 (a)	<p>1 mark for a reason why biomass boilers contribute towards sustainable development.</p> <p>Any one from:</p> <ul style="list-style-type: none"> • Use of non-fossil fuels (1) • Use of sustainable/renewable fuels (1) • Environmentally friendly / sustainable (1) • Because they are carbon lean (accept neutral) (1) <p>Accept any other appropriate answers.</p>	(1)

Question Number	Answer	Mark
10 (b)	<p>A linked response that makes reference to any two of the following points. Up to 2 marks for each explanation.</p> <p>Any two from:</p> <ul style="list-style-type: none"> • Fuel storage space required (1) because fuel is bulky/has to be stored on site (1) • Transportation access/movement on site (1) because fuel has to be delivered to site (1) • Higher maintenance requirements (1) because burners need cleaning/flue needs cleaning (1) • Higher initial costs (1) because the cost of boiler and installation is higher than alternative fuel installations (1) • Availability of fuel supplies (1) because the correct type of biomass fuel for the boiler has to be used/is not sold locally (1) • Fuel needs to be kept dry (1) if it is to burn cleanly and efficiently (1) • Need for user maintenance (1) as ash bin requires emptying (1) • Uses agricultural land to produce fuel (1) that would otherwise be used for food production (1) <p>Accept any other appropriate answers.</p> <p>Do not accept cheap(er)/dear(er)/expensive unless related to a specific cost such as purchase, installation, running costs etc.</p>	(4)

Question Number	Answer	Mark
11	<p>1 mark for each document setting out requirements for comfort, health and conservation of fuel and power, up to 2 marks.</p> <p>Any two from:</p> <ul style="list-style-type: none"> • Building Regulations /Building Regulations (Part L) (1) • Code for sustainable homes (1) • Building Research Establishment Environmental Assessment Method / BREEAM (1) • Health and Safety at Work Act 1974 (1) • British Standards (1) • Control of Substances Hazardous to Health (COSHH) (1) <p>Do not mark down for lack of or wrong dates</p> <p>Accept any other appropriate answers.</p>	(2)

Question Number	Answer	Mark
12	<p>1 mark for a way thermal mass can reduce energy requirements.</p> <p>Any one from:</p> <ul style="list-style-type: none"> • Storing heat for use later use (1) • Keeping building cool / absorbing heat to minimise internal temperature gain (1) <p>Accept any other appropriate answers.</p>	(1)

Question Number	Answer	Mark
13	<p>1 mark for a sustainable roofing material.</p> <p>Any one from:</p> <ul style="list-style-type: none"> • Re-constituted slates (1) • Timber shingles/wood (1) • Slate (1) • Elements of green roofs, e.g. sedum, soil, plants (1) <p>Green roof on its own is not acceptable as this is a form of construction, not a material.</p> <p>Do not accept other thatch materials, e.g. straw, reeds etc.</p> <p>Accept any other appropriate answers.</p>	(1)

Question Number	Answer	Mark
14	<p>1 mark for a reason why specifying modular dimensions reduces waste.</p> <p>Any one from:</p> <ul style="list-style-type: none"> • Less/no cutting of materials onsite (1) • Materials will be the correct size/multiple of modular size (1) • Buyer can calculate/estimate the quantities required more accurately (1) <p>Accept any other appropriate answers.</p>	(1)

Question Number	Answer	Mark
15	<p>A linked response that makes reference to any two of the following points. Up to 2 marks for each explanation.</p> <p>Any two from:</p> <ul style="list-style-type: none"> • Reduction in landfill requirements (1) because the volume of the waste is greatly reduced/animal habitats are preserved (1) • Pathogens / chemicals / pests are destroyed (1) because of the high temperatures of incineration (1) • Potential for electricity generation / district heating (1) because of the energy produced through the incineration process (1) • Raw materials can be salvaged (1) because these can be sorted as part of the process (1) • Reduction in pollution/rodents at landfill sites (1) as only ash is taken to landfill (1) • Potential lower transport costs (1) transporting waste to an appropriate landfill site (1) <p>Do not accept fast/easy/cheap for any marks without justification.</p> <p>Accept any other appropriate answers.</p>	(4)

Section B

Question Number	Answer	Mark
16	<p>1 mark for each correct answer:</p> <p>(A) Road sweeping (B) Wheel cleaning</p>	(2)

Question Number	Answer	Mark
17	<p>A linked response that makes reference to any two of the following points. Up to 2 marks for each explanation.</p> <p>Any one from:</p> <ul style="list-style-type: none"> • Provides a social area (1) for people to meet (1) • Provides an area for children to play (1) improving health/recreation/in a safe place/where parents can see them (1) • Reduced density of housing (1) so people are not living so close to each other/do not feel cramped (1) • Nice views/aesthetics (1) will make residents feel better (1) <p>Accept any other appropriate answers.</p>	(2)

Question Number	Answer	Mark
18	<p>A linked response that makes reference to any two of the following points. Up to 2 marks for each explanation.</p> <p>Any two from:</p> <ul style="list-style-type: none"> • Cost effective (1) because it uses less energy than direct electric heating (1) • Thermally efficient (1) because it recovers latent heat from the air (1) • Reduction in carbon emissions/sustainable (1) because less fossil fuels are used in the generation of energy (1) • No fuel storage requirement (1) therefore less space required (1) • No combustible material used/emissions at the property (1) because it uses mains electricity supply (1) • Versatile (1) because it can provide cooling in the summer (1) • Low maintenance requirement (1) because the maintenance requirements are less than many other forms of heating (1) <p>Award only one mark for an explanation that is used more than once.</p> <p>Accept any other appropriate answers.</p>	(4)

Question Number	Answer	Mark
19	<p>1 mark for each water efficient fitting. Up to 2 marks for each description.</p> <p>Any two from:</p> <ul style="list-style-type: none"> • Low water use shower heads (1) deliver less water through aeration/reducing the volume of water (1) • Low water / dual flush toilet cisterns (1) gives a lower volume flushing option (1) • Push top/auto stop/percussion (1) the tap will run for a fixed amount of time/so the tap cannot be left running (1) • Contactless/sensor taps (1) will switch off when the hand is removed (1) <p>Accept any other appropriate answers.</p> <p>Do not accept euphemisms for flow restrictors, e.g. limiter cap.</p>	(4)

Question Number	Indicative content	Mark
20	<p>Comparison of sustainability of Building 1 and Building 2 in their current state</p> <p>Sustainable materials:</p> <p>Building 1</p> <ul style="list-style-type: none"> • Low embodied energy e.g. timber, timber can be recycled when the building is demolished. • Use of materials incorporating recycling technology. Potential use of sustainable materials. • Potential to use locally sourced materials. <p>Building 2</p> <ul style="list-style-type: none"> • Higher embodied energy e.g. bricks, bricks can be recycled when the building is demolished. • Building could contain hazardous material due to its age. • Insulation may not be a natural material. <p>Design and technology solutions:</p> <p>Building 1</p> <ul style="list-style-type: none"> • Built to current Building Regulations taking into account energy saving measures. • Air source heating system – energy efficient with no local emissions. • Water saving solutions. • High levels of thermal insulation. • High tech windows with triple glazing. • Low energy lighting • Low air leakage from building. • South facing to maximise natural light. • Timber frame construction will cut waste. • Surface water from the development may be part of a SUDs. <p>Building 2</p> <ul style="list-style-type: none"> • Built to 1960s Building Regulations that had lower standards of energy conservation. • Gas heating with local emissions. • Double glazing. • Open cavities with no insulation. • Lower levels of roof and floor insulation. • Building not orientated for maximum light. 	(8)

Social / community:

Building 1

- Shown close to road with no communal space.
- Development is on a greenfield site so may have interrupted others views and has taken away green space.
- High levels of insulation should reduce noise between apartments.
- Potential for high level of entry security.

Building 2

- Has a green area with trees providing a social space.
- Potential noise transmission between apartments due to low levels of insulation in floors.
- Entry security may not be high.

Operating and maintenance:

Building 1

- Should be designed for low maintenance with low maintenance materials and building techniques, e.g. uPVC rainwater goods and soffits and fascias and no high level redecoration required, materials should last the life of the building.
- Energy requirements minimised, reducing cost and emissions / use of carbon due to efficiency of systems fitted and insulation levels.
- Water use potentially reduced due to water saving solutions.

Building 2

- Maintenance required of cast iron rainwater goods, soffits and fascias.
- Energy requirements not minimised due to low efficiency of systems and building construction
- Little or no water saving solutions to reduce water use.

Learners are not required to cover all headings to get full marks.

Accept any other appropriate answer.

Level	Mark	Descriptor
	0	No material deserving of reward.
1	1–3	<p>Basic similarities and differences identified, or only similarities or differences considered. The answer is likely to be in the form of a list, and statements may be incomplete. Statements made will be superficial/generic and not applied to the context in the question. Statements will not contrast/link elements directly to each other.</p> <p>The learner displays limited knowledge.</p>
2	4–6	<p>Some similarities and differences identified, or a few key similarities or differences described, but this will include statements that do not contrast/link elements directly to each other. Consideration of both similarities and differences but there will be an inappropriate emphasis on one of them. The answer is unbalanced. Most points made will be relevant to the context of the question.</p> <p>The learner displays some knowledge.</p>
3	7–8	<p>Range of similarities and differences described, or a few key similarities and differences explained in depth. Balanced consideration of both similarities and differences, with all statements contrasting/linking elements directly to each other. The majority of observations made will be relevant in terms of the context in the question.</p> <p>The learner displays developed knowledge.</p>

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