



Mark Scheme (Results)

January 2015

BTEC Level 1/Level 2 First Award
Construction and the Built Environment

Unit 1: Construction Technology
(21492E)

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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	<p>1 mark for each of:</p> <p>A – Informing the Health and Safety Executive (HSE) E – Risk assessments</p> <p>Accept no variations</p>	(2)

Question Number	Answer	Mark
2	<p>Any two from the following site set-up activities:</p> <ul style="list-style-type: none"> • fencing (1) • gates (1) • security of the site (1) • temporary lighting (1) • decontamination works (1) • temporary water supply (1) • temporary electricity supply (1) • installation of site telephones and telecommunications (1) • temporary drainage (1) • temporary roads (1) • signage (1) • creation of storage compounds and hard standing (1) • temporary works required to construct and support (1) • site facilities eg. first aid (1). <p>Accept any other appropriate answers.</p> <p>Accept misspellings.</p> <p>Up to a maximum of two marks.</p>	(2)

Question Number	Answer	Mark
3(a)	<p>1 mark for each of:</p> <p>A – Plasterboard B – Blockwork</p> <p>Accept no variations</p>	(2)

Question Number	Answer	Mark
3(b)	<p>1 mark for each of:</p> <ul style="list-style-type: none"> • cavity (1) • wall (1) • floor (1) • roof/loft/ceiling/attic (1) • basement/cellar (1) • draught strips/doors/apertures (1) • double/triple glazing/windows (1). <p>Accept misspellings.</p> <p>Up to a maximum of two marks.</p>	(2)

Question Number	Answer	Mark
3(c)	D – Cross-wall	(1)

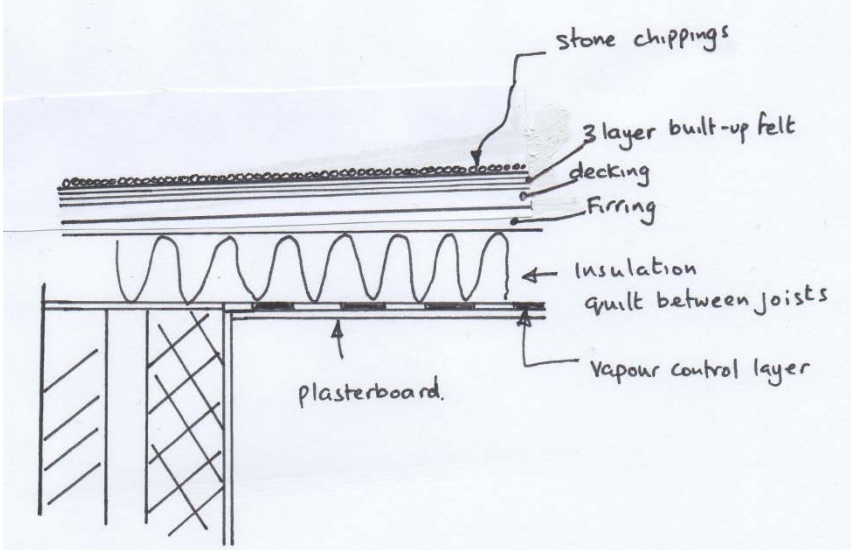
Question Number	Answer	Mark
4	<p>One mark for each of type of pointing used in facing brickwork:</p> <ul style="list-style-type: none"> • bucket handle/tooled (1) • recessed (1) • flush (1) • weathered/struck (1). <p>Do not accept 'Gunning'.</p> <p>Accept misspellings.</p> <p>Up to a maximum of two marks.</p>	(2)

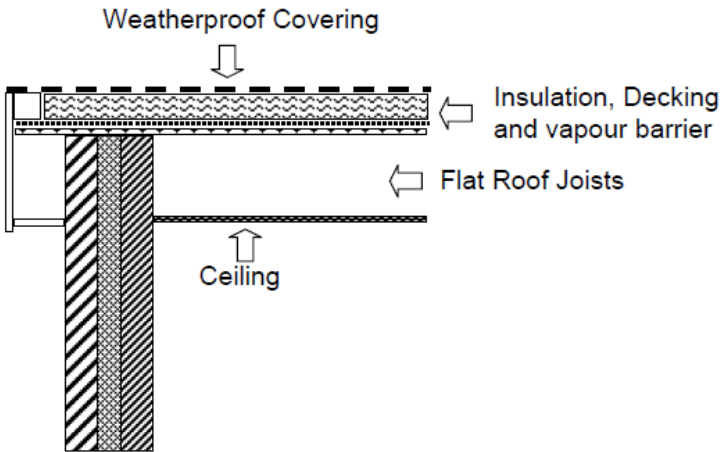
Question Number	Answer	Mark
5(a)	<p>One mark for each hazard identified:</p> <ul style="list-style-type: none"> • naturally occurring gas eg. methane, radon etc (1) • collapse of the trench/sides of the excavation (1) • likelihood of collapse due to type of soil (1) • materials too close to the edge causing collapse (1) • instability or collapse of adjacent structures (1) • protection of third parties (1) • movement of ground water (1) • confined space (1) • access and egress (1) • overburden (1) • standing water/flooding (1) • an unguarded trench causing danger to public/vehicles (1) • proximity of excavation plant (1). <p>Do not accept 'collapse' on its own. Do not accept cut through a cable, damage drainage pipes, damaging cables, damaging water pipes, damaging a gas pipe.</p> <p>Accept any other appropriate answers.</p> <p>Up to a maximum of two marks.</p>	(2)

Question Number	Answer	Mark
5(b)	<p>One mark per identification of method, and 1 mark for explanation of that method.</p> <p>Any two from the following ways to locate existing underground electric cables:</p> <ul style="list-style-type: none"> • consultation with utility companies (1) because they may be able to provide records of service locations (1) • cable avoidance tool/CAT (1) so that drawings can be checked for accuracy/enables identification of cables not included on drawings (1) • trial holes (1) so that the exact depth and location can be seen (1) • local knowledge (1) because locals may have first-hand experience of seeing the services installed (1). <p>Accept any other appropriate answers.</p> <p>Do not accept - cordon off, cover with materials, use signs.</p> <p>Up to a maximum of four marks.</p>	(4)

Question Number	Answer	Mark
5(c)	<p>1 mark for a method of permanent control of sub-soil water:</p> <ul style="list-style-type: none"> • land drainage/drainage (1) • diaphragm wall/sheet piling (1). <p>Accept any other appropriate answers.</p> <p>Do not accept pump, sump, damp proof membrane/DPM/ damp proof course/DPC and pump water out.</p> <p>Up to a maximum of one mark.</p>	(1)

Question Number	Answer	Mark
6	<p>One mark for each correct label:</p> <p>Label i) insulation Label ii) wall plate/timber wall plate Label iii) damp-proof course/DPC Label iv) sleeper wall/ honeycomb sleeper wall/brick wall/honeycomb brickwork wall/ honeycomb wall. Brickwork/brick on its own is also accepted</p> <p>Accept no variations</p>	(4)

Question Number	Answer	Mark
7	<p>Accept fill patterns in place of annotation – one mark for each label or fill pattern:</p> <ul style="list-style-type: none"> 1 mark for stone chippings/solar reflective paint 1 mark for three layer built up roofing felt/single ply membrane 1 mark for decking 1 mark for furring (piece)/laser cut insulation 1 mark for joist (falls could also be achieved by sloping joists, tapered joists, firrings across the joist run and reducing firrings) 1 mark for insulation /fill pattern 1 mark for vapour barrier/fill pattern 1 mark for plasterboard 1 mark for soffit 1 mark for fascia/verge 1 mark for wall plate 1 mark for holding down strap 1 mark for drip 1 mark for waterstop/watercheck 1 mark for triangular fillet 1 mark for flashing <p>Example of an acceptable sketch with appropriate labelling and fill patterns.</p> 	(5)

	<p>Warm Deck Roof</p> 	
	<p>Accept similar valid alternative sketches. Up to a maximum of five marks.</p>	

Question Number	Answer	Mark
8(a)	<p>One mark for the identification of an environmental benefit, and one mark for the linked explanation of that benefit. Two marks for any of the following explanations of a benefit:</p> <ul style="list-style-type: none"> • reduces quarrying emissions/impact on animal habitat/ecosystems/landscape/natural environment/energy use from processing new materials (1) because there is no need to quarry the hardcore (1) • reduces transport emissions/noise pollution (1) because there is no need to transport the hardcore materials to/from site (1) • conserves landfill space (1) because the waste material (recycled bricks) remains on site (1). <p>Accept any other appropriate answers.</p> <p>Up to a maximum of two marks.</p>	(2)

Question Number	Answer	Mark
8(b)	<p>One mark for a definition:</p> <ul style="list-style-type: none"> • the amount of energy required to produce materials/components (1) • the amount of energy that has been used so far by a material (1) • The total energy used in the processes up to the point of use (1). <p>Up to a maximum of one mark.</p>	(1)

Question Number	Answer	Mark
8(c)	<p>One mark for an identification and one mark for the linked explanation. Any two from the following reasons why each method contributes to a building's sustainability.</p> <p>Building orientation:</p> <ul style="list-style-type: none"> • can reduce energy use (1) because buildings can be orientated to benefit from solar gain (1) • can reduce the need for artificial light (1) because buildings can be orientated to maximise daylight (1) • can reduce heating energy (1) by maximising the potential of internal thermal mass (1) • allows maximisation of use of solar panels (1) because buildings can be orientated to maximise sunlight (1). <p>Prefabricated elements:</p> <ul style="list-style-type: none"> • minimises construction waste (1) because prefabricated elements are accurate (1) • minimising impact on the local environment (1) as construction is fast/quick (1) • can be well sealed (1) because they have greater quality control/so reduces heat loss (1). <p>Accept any other appropriate answers.</p> <p>Up to a maximum of four marks.</p>	(4)

Question Number	Answer	Mark
9	<p>One mark for each identification and one mark for the linked explanation. Any two from the following reasons why high-density blockwork is used in walls where sound insulation is required:</p> <ul style="list-style-type: none"> • High mass (heavy) material (1) requires more sound energy to make it vibrate (1) • The surface is textured (1) which therefore diffuses the sound waves (1). • High density structures easily incorporate a cavity (1) which provides discontinuity of sound travel paths (1). <p>Accept any other appropriate answers.</p> <p>Up to a maximum of four marks.</p>	(4)

Question Number	Answer	Mark
10	<p>One mark for an identification and one mark for the linked explanation. Any two from the following reasons why metal studs are suitable:</p> <ul style="list-style-type: none"> • can be easily/quickly/cheaply moved (1) because it does not require a foundation/is lightweight (1) • it allows for ease of concealment of wiring (1) because there is a void within the construction/studs are perforated to allow cables to pass through (1) • installation is easy/quick/cheap (1) because sections slot/crimp together/the building can be occupied earlier (1). <p>Accept any other appropriate answers.</p> <p>Up to a maximum of four marks.</p>	(4)

Question Number	Indicative content	Mark
11	<p>Timber frame</p> <p>Advantages:</p> <ul style="list-style-type: none"> • can use off-the-shelf designs • roofs can be constructed at ground level prior to delivery of the timber frame • internal trades can start immediately whilst external envelope is being completed • reduction in drying time as no wet internal finishes are used • a large number of houses can be erected in a single day using one team • quicker overall completion time • reduced site labour therefore saving money • non-skilled labour can be used as during times of high demand bricklayers may be difficult to source • more energy efficient than brick cavity wall when constructed to current standards • a variety of external finishes can be applied facilitating contemporary/variety of design • can be more cost effective <p>Disadvantages:</p> <ul style="list-style-type: none"> • lead time could negate the time advantage if bespoke designs are required • susceptibility to decay of timber when exposed to excessive moisture • less public confidence in this structural form • the company may not have experience in timber frame construction. <p>Brick cavity wall</p> <p>Advantages:</p> <ul style="list-style-type: none"> • public confidence in traditional construction • aesthetically pleasing/traditional form of construction i.e. facing brickwork • good restriction of moisture passing through a building • good thermal insulation properties via the air gap and use of inner leaf thermally efficient concrete blocks. <p>Disadvantages:</p> <ul style="list-style-type: none"> • at times of high demand bricks are on extended delivery schedules • bricklayers are more difficult to obtain during periods of high demand • speed of construction can be slower in 	(8)

		<p>comparison to timber frame</p> <ul style="list-style-type: none"> • requirement to have more skilled operatives involved in the development. <p>Accept any other appropriate answers.</p>	
Level	Mark	Descriptor	
	0	No material deserving of reward.	
1	1–3	Basic arguments on both sides identified, or only one side considered. The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/directly linked to the situation in the question. No conclusion produced or the conclusion is a consequence of only one side of the argument being considered.	
2	4–6	Arguments for and against are described, but there will be more emphasis on one side than the other. The answer will be unbalanced. A conclusion is present, but this is either implicit or as a result of unbalanced consideration of the arguments. There is little or unfocused justification of the conclusion. Most points made will be relevant to the situation in the question, but the link will not always be clear.	
3	7–8	Balanced explanation of both sides for and against. A conclusion is produced which is justified and clearly linked to the consideration of arguments for and against, and their relative importance to the situation. The majority of points made will be relevant and there will be a clear link to the situation in the question.	

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Welsh Assembly Government

