

Mark Scheme (Results)

January 2020

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(a)	1 mark for each of: Plasterboard layers – Sound insulation Flashings – Weather resistance	(2)

Question Number	Answer	Mark
1(b)	1 mark for each: B – Wind E – Self-weight	(2)

Question Number	Answer	Mark
1(c)	1 mark for each of: <ul style="list-style-type: none"> • Bricks (1) • Blocks (1) • Plastics (1) • Timber (1) • Metals (1) • Glass (1) • Slate (1) • Stone (1) • Concrete (1) • Plasterboard (1) • Roof tiles (1) <p>Do not accept components that could be reused, e.g. staircases, doors, fireplaces. Up to a maximum of two marks</p>	(2)

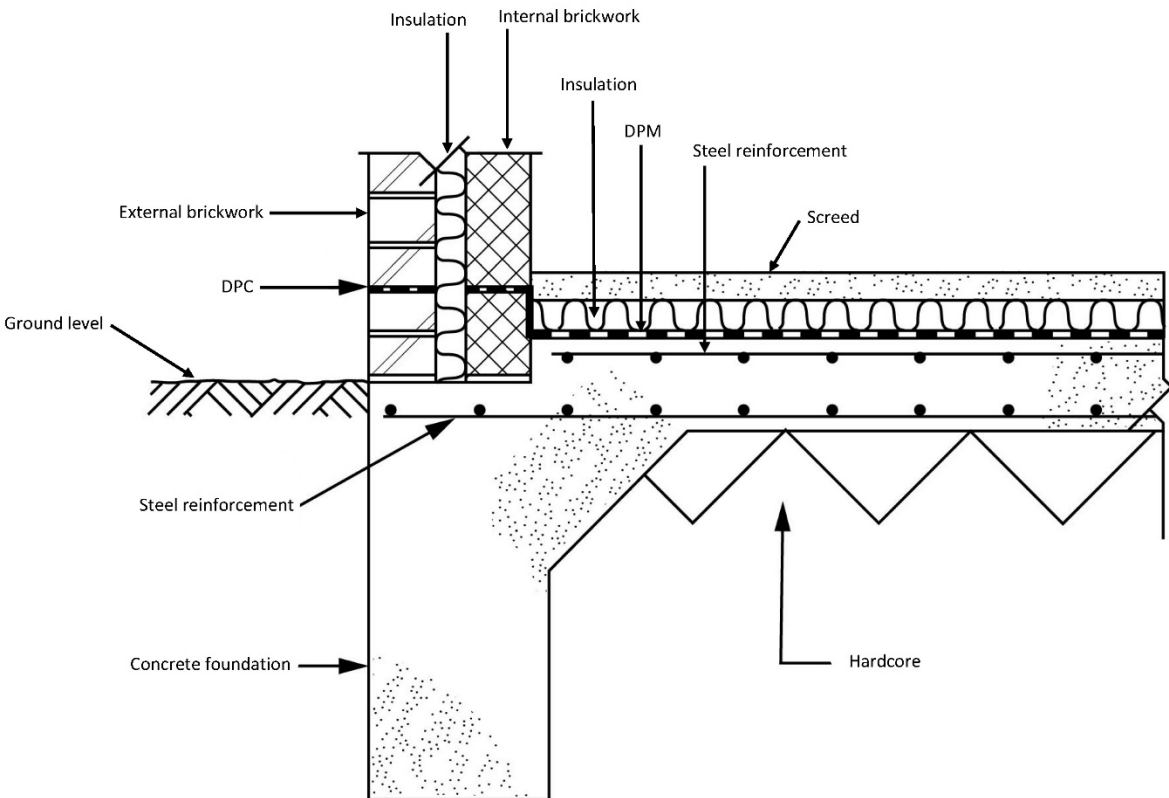
Question Number	Answer	Mark
1(d)	1 mark for each: A - Triple glazing D - Carpeting	(2)

Question Number	Answer	Mark
1(e)	1 mark for each: B - Floor E - Wall	(2)

Question Number	Answer	Mark
2	1 mark for each of: <ul style="list-style-type: none"> • Site accommodation (1) • Welfare facilities (1) • Storage accommodation (1) • Compounds (1) • Fixed plant (1) • Fire precaution measures (1) • Fire assembly points (1) <p>Up to a maximum of two marks</p>	(2)

Question Number	Answer	Mark
3	1 mark for any of: <ul style="list-style-type: none"> • timber (1) • timber stud/stud (1) • metal stud (1) • blockwork (solid) (1) • glazed (1) • clay block/brick (1) • paramount (1) • demountable (1) <p>Up to a maximum of one mark</p>	(1)

Question Number	Answer	Mark
4	1 mark for each: <ul style="list-style-type: none"> (i) - DPC/PVC/Bitumen (ii) - Brickwork/external wall (iii) - Cavity fill/concrete (iv) - Concrete/strip foundation <p>Up to a maximum of four marks</p>	(4)

Question Number	Answer	Mark
5	<p>Marks should be awarded for appropriate placing of the components/materials of the diagram.</p> <p>One mark awarded for each label or fill pattern.</p> <p>Up to a maximum of five marks</p>  <p>1 mark for concrete foundation 1 mark for steel reinforcement 1 mark for ground level 1 mark for internal blockwork 1 mark for external brickwork 1 mark for DPC/DPM 1 mark for insulation (wall or floor) 1 mark for hardcore 1 mark for screed 1 mark for wall ties</p>	(5)

Question Number	Answer	Mark
6	<p>One mark for identification and one mark for an explanation of the advantage/disadvantage, up to a maximum of two marks per explanation.</p> <p>Two marks for one advantage explained:</p> <ul style="list-style-type: none"> • Traditional/simple method of construction (1) understood by site staff / no need for specialist site staff (1). • Suitable for low-rise construction / domestic loadings (1) in ground with moderate/good bearing capacity (1). • Foundation can be stepped (1) making it suitable for use on sloping ground (1). <p>Two marks for one disadvantage explained:</p> <ul style="list-style-type: none"> • May not be cost effective in some soil conditions (1) as variable ground conditions may require additional excavation or additional depth/width of concrete foundation (1). • Can be hazardous to bricklayers/site staff (1) as trench support may be required (1). • Other foundation types can take greater loads (1) as they spread the load better / transfer loads to a stronger bearing stratum (1) <p>Accept any other appropriate answers. Up to a maximum of four marks</p>	(4)

Question Number	Answer	Mark
7(a)	<p>1 mark for any of:</p> <ul style="list-style-type: none"> • Provide ventilation (1) • Provide light (1) • Provide aesthetics (1) • To allow for the installation of doors/windows (1) • To allow people to see out of the building for security purposes / to enjoy the views / visual amenity (1) • Allow access and egress <p>Up to a maximum of one mark</p>	(1)

Question Number	Answer	Mark
7(b)	<p>1 mark for any of:</p> <ul style="list-style-type: none"> • Lintel (1) • Sill (1) • Window (1) • Door/Door frame (1) • Threshold (1) • Damp-proof course (1) • Cavity trays (1) • Cavity closers (1) • Weepholes (1) • Mullion(1) • Arch(1) • Reveal(1) 	

	<ul style="list-style-type: none"> Window frame (1) <p>Up to a maximum of one mark</p>	(1)
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Question Number	Answer	Mark
8(a)	1 mark for: <ul style="list-style-type: none"> Wall (1) <p>Up to a maximum of one mark</p>	(1)

Question Number	Answer	Mark
8(b)	Two marks for any of the following explanations of a reason why the use of straw bales is a sustainable form of construction. One mark for a reason identified and 1 mark for a linked explanation, up to 2 marks per explanation. Up to a maximum of four marks <ul style="list-style-type: none"> Natural material (1) low embodied energy material/does not need finite resources to be produced (1). Has very good thermal insulation properties (1) achieves a very high resistance to the passage of heat/energy savings (1). Often available locally (1) therefore producing less emissions from transport (1). Fully biodegradable (1) no issues with disposal at the end of the life of the building (1). <p>Accept any other appropriate answers.</p>	(4)

Question Number	Answer	Mark
9	40 x 0.6 x 2.4 (1) 57.6 (1) <p>Two marks awarded for the correct answer.</p>	(2)

Question Number	Answer	Mark
10	<p>One mark for a benefit identified, and 1 mark for a linked explanation, up to 2 marks for an explanation. Up to a maximum of four marks</p> <p>Any two from the following explanations of the benefits of using eco-joists instead of solid timber joists:</p> <ul style="list-style-type: none"> • Reduce wastage on-site (1) because joists are made to measure (1) • Lower total installation costs (1) because it is easy to handle/quick to install (1) • Efficient/sustainable use of material (1) as section is more efficient structurally/lighter (1) • Long spans are possible (1) as a result of greater depths of sections possible (1) • They have a good strength to weight ratio (1) allowing for a lightweight floor structure (1) • The void/holes in web (1) allows for easy installation of services (1). <p>Accept any other appropriate answers.</p>	(4)

Question Number	Answer	Mark
11	<p>Award 1 mark for identification of an advantage or disadvantage and 1 mark for extension/justification, up to 2 marks each.</p> <p>Candidates may provide one advantage + two disadvantages OR two advantages + one disadvantage for full marks.</p> <p>For 6 marks, the answer must address both advantages and disadvantages.</p> <p>Advantages of brownfield site:</p> <ul style="list-style-type: none"> • Environmental concerns likely to be less than for a greenfield site (1) enabling the planning process to proceed more quickly as a result of there being less likelihood of local resident objections (1). • Regeneration of brownfield site (1) council more likely to grant the property developer planning permission/improved social benefits (1). • Existing infrastructure may be in place (1) reducing initial infrastructure start-up costs (1). • Existing services can be utilised (1) with potential limited upgrades (1). • The housing development may bring more green areas into the locale (1) increasing the presence of flora and fauna and improving the local natural environment (1). • Proximity to urban areas (1) allows buyers to stay within a more preferred urban environment (1). • It will be cheaper than a greenfield site (1) because the land is more rundown (1) • Opportunity for reclaimed/recycled/reused materials (1) reducing the need for new materials (1) <p>Disadvantages of brownfield sites:</p> <ul style="list-style-type: none"> • Design options may be compromised (1) as a result of existing constraints such as infrastructure/existing services (1). • Increased traffic congestion/noise (1) as site location is inner city (1). • Existing structures and services issues (1) as existing structures may need demolishing and services may need relocating, incurring additional costs for the developer (1). • Contingency costs could be high (1) due to unforeseen situations, e.g. foundations, basements, storage tanks, pipelines (1). • Contamination issues due to previous industrial use (1) could incur costs to decontaminate and require specialist procedures (1). <p>Accept any other appropriate answers.</p>	(6)

Question Number	Answer	Mark
12	<p>The learner response should include the factors that may influence the developer's choice of structural form. The learner could discuss the increased speed of erection of timber frame forms linked to meeting housing demands or a quicker return on the investment of the money invested by the developer. The learner discussion may include some of the points listed and they may draw a conclusion as to why a timber frame form may be preferred by the developer.</p> <p>Timber frame 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 while the external envelope is being completed • Reduction in drying time, as no wet internal finishes are used • 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 • Variety of external finishes can be applied facilitating contemporary/variety of design • Can be more cost effective/cheaper • Timber frame is a sustainable form of construction • Developer could be looking at carbon footprint <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>Traditional cavity wall 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 comparison to timber frame • Requirement to have more skilled operatives involved in the development. 	(6)

Level	Mark	Descriptor
	0	No material deserving of reward.
1	1-2	<ul style="list-style-type: none"> • Demonstrates isolated elements of knowledge and understanding, there will be major gaps or omissions • Few of the points made will be relevant to the context in the question • Limited discussion which contains generic assertions rather than considering different aspects and the relationship between them • Demonstrates a basic understanding of the subject
2	3-4	<ul style="list-style-type: none"> • Demonstrates some accurate knowledge and understanding, with only minor gaps or omissions • Some of the points made will be relevant to the context in the question, but the link will not always be clear • Displays a partially developed discussion which considers some different aspects and some consideration of how they interrelate, but not always in a sustained way • Demonstrates a good understanding of the subject
3	5-6	<ul style="list-style-type: none"> • Demonstrates mostly accurate and detailed knowledge and understanding • Most of the points made will be relevant to the context in the question, and there will be clear links • Displays a well-developed and logical discussion which clearly considers a range of different aspects and considers how they interrelate, in a sustained way • Demonstrates a developed understanding of the subject

Question Number	Indicative content	Mark
13	<p>Advantages of a pitched roof:</p> <ul style="list-style-type: none"> • Aesthetically pleasing and will fit in with other nearby properties • Efficient in rain water drainage, so may lead to less maintenance issues • Creates more storage space-could convert to additional office space in the future • Potential to create increased floor space through adaptation. • Reduced maintenance costs. <p>Disadvantages of a pitched roof:</p> <ul style="list-style-type: none"> • Initial cost more expensive than a flat roof • Speed of construction slower than a flat roof • Access for maintenance is difficult • Tiles susceptible to movement in high winds. <p>Advantages of a flat roof:</p> <ul style="list-style-type: none"> • Ease of maintenance • Can be aesthetically pleasing • Speed of erection faster than a pitched roof therefore reduced initial cost • Can be adapted to form a roof garden/outdoor terrace/recreation area for office staff. <p>Disadvantages of a pitched roof:</p> <ul style="list-style-type: none"> • Not in keeping with surrounding buildings • Lifespan tends to be shorter than a pitched roof before some form of maintenance is required 	(9)

	<ul style="list-style-type: none"> • Water run-off can be poor resulting in ponding and maintenance issues • Solar reflective paint is required, which needs regular maintenance • Roof structure may need further reinforcing if additional loading placed on it. 	
Accept any other valid responses		

Level	Mark	Descriptor
	0	No material deserving of reward.
1	1-3	Basic argument for both types of roof identified, or only one roof type considered in more depth. The answer is likely to be in the form of a list. Points will be superficial/generic and not applied/directly linked to the options available to the developer. The learner demonstrates a basic understanding of pitched or flat roof construction.
2	4-6	Arguments for and against each roof type are given, but there will be more emphasis on one roof type for the housing development. The answer will be unbalanced. There is a little or unfocused justification of the question, but the link will not always be clear. The learner demonstrates a good understanding of pitched and flat roof construction.
3	7-9	Balanced discussion of both roof types, for and against. The majority of points will be relevant and there will be a clear link to the housing development. The learner demonstrates a developed understanding of pitched and flat roof construction.

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