



Pearson



Mark Scheme

January 2018

NQF 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 for:  Stability – measuring wall-tie spacing Strength – compressive testing of concrete	(2)

Question Number	Answer	Mark
1(b)	1 mark each for any three of the following: <ul style="list-style-type: none"> <li>• roof (1)</li> <li>• floor (1)</li> <li>• walls (1)</li> <li>• partitions (1)</li> <li>• stairs (1)</li> <li>• lifts (1)</li> <li>• doors (1)</li> <li>• windows (1)</li> <li>• foundation (1)</li> <li>• beam (1)</li> <li>• ceiling (1)</li> <li>• (structural) frame (1)</li> </ul> <p><b>Accept any other appropriate answers.</b> Up to a maximum of three marks.</p>	(3)

Question Number	Answer	Mark
1(c)	1 mark each for any two of the following: <ul style="list-style-type: none"> <li>• Double/ triple glazing (1)</li> <li>• (heavy-density) blockwork (1)</li> <li>• (sound insulation) quilt (1)</li> <li>• plasterboard layers (1)</li> <li>• flooring mats (1)</li> <li>• carpeting (1)</li> <li>• acoustic ceilings (1)</li> <li>• cellulose (1)</li> <li>• foam (1)</li> </ul> <p><b>Accept any other appropriate answers.</b> Up to a maximum of two marks.</p>	(2)

Question Number	Answer	Mark
1(d)	A– External walls D– Window openings	(2)

Question Number	Answer	Mark
1(e)	1 mark for: <ul style="list-style-type: none"> <li>• Prevents water penetration</li> <li>• Weather resistant (barrier)</li> </ul>	(1)

	<b>Accept any other appropriate answers.</b> Up to a maximum of one mark.	
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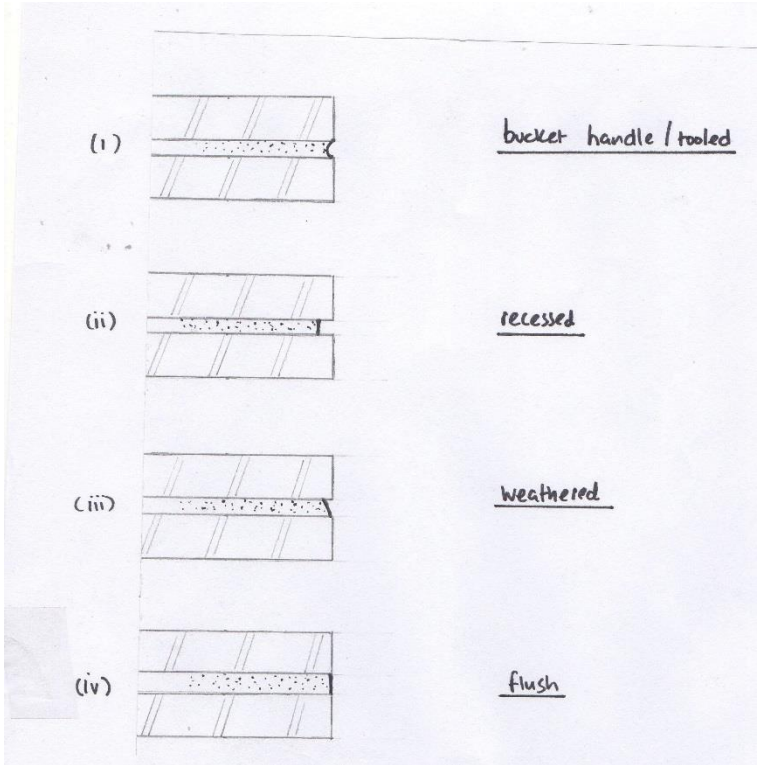
Question Number	Answer	Mark
2(a)	A- Trench fill E- Strip	(2)

Question Number	Answer	Mark
2(b)	<p>2 marks for each reason explained. 1 mark for identification of a reason, and 1 mark for explanation of that reason.</p> <ul style="list-style-type: none"> <li>• To support the load of the building (1) by spreading the load over a greater area (1)</li> <li>• Cost effective in poor ground conditions (1) due to combination of foundation and floor slab (1)</li> <li>• Flexibility of design considerations (1) and has the ability to cope with mixed/poor ground conditions (1)</li> <li>• Could be used in mining areas (1) to prevent damage to the building during settlement (1)</li> </ul> <p><b>Accept any other appropriate answers.</b> Up to a maximum of four marks.</p>	(4)

Question Number	Answer	Mark
3	<p>1 mark for any of:</p> <ul style="list-style-type: none"> <li>• lintel (1)</li> <li>• sill (1)</li> <li>• threshold (1)</li> <li>• damp-proof course (1)</li> <li>• cavity tray/closer (1)</li> <li>• weepholes/ vent (1)</li> <li>• jamb (1)</li> <li>• head (1)</li> </ul> <p><b>Accept any other appropriate answers.</b> Up to a maximum of one mark.</p>	(1)

Question Number	Answer	Mark
4	<p>1 mark for each label:</p> <p>(i) screed (sand and cement) (1) (ii) insulation (1) (iii) DPM (damp proof membrane) (1) (iv) concrete (1) (v) hardcore (1)</p> <p><b>Accept any other appropriate answers.</b> Up to a maximum of five marks.</p>	(5)

Question Number	Answer	Mark
5	<p>1 mark for an identified disadvantage and 1 mark for a linked explanation, up to 2 marks.</p> <ul style="list-style-type: none"> <li>• May be prone to insect/rodent infestation (1) as made of foam, which can provide materials for pest nests (1)</li> <li>• Potentially less fire resistant than other methods (1) as panel dependent on the fire-rated plasterboard used, if faulty occupants may be at risk of burns and smoke inhalation (1)</li> <li>• SIPS panels need to be carefully protected (1) as they can be damaged by moisture (1)</li> <li>• Difficult to make changes to the layout/design (1) as the panels are factory made with openings preformed (1)</li> <li>• Lack of on-site knowledge/familiarity with SIPS construction (1) leading to potential quality control issues (1)</li> <li>• Accurate manufacturing dimensions are required (1) because errors are difficult to adjust on site (1)</li> <li>• Lead time may be long (1), which could mean delays on site(1)</li> <li>• Due to the size and weight of SIPS (1) specialist plant and equipment may be needed (1)</li> <li>• Lack of industry/ public confidence (1) due to a relatively modern form of construction (1)</li> </ul> <p><b>Accept any other appropriate answers.</b> Up to a maximum of two marks.</p>	(2)

Question Number	Answer	Marks
6	<p>1 mark for each correct pointing/joint.</p>  <p><b>Accept similar valid alternative sketches.</b> Up to a maximum of 4 marks.</p>	(4)

Question Number	Answer	Mark
7	<p>Any two from the following explanations of two economic advantages of a concrete beam and block floor.</p> <p>1 mark per advantage identified, and 1 mark for a linked explanation, up to 2 marks per explanation.</p> <ul style="list-style-type: none"> <li>• Reduces construction costs (1) as intermediate working platform established as soon as units are in place allowing other trades to commence work sooner (1)</li> <li>• Reduced installation time/ installation cost (1) as construction can take place in adverse weather conditions/as components are prefabricated/ semi-skilled work can be used (1)</li> <li>• Beams can span long distances (1) reducing the need for costly intermediate support (1)</li> </ul> <p><b>Accept any other appropriate answers.</b> Up to a maximum of four marks.</p>	(4)

Question Number	Answer	Mark
8	2 marks for one disadvantage explained.	(4)



	<p>1 mark for a disadvantage identified, and 1 mark for a linked explanation, up to 2 marks per explanation</p> <ul style="list-style-type: none"> <li>• Lack of flexibility in the ability to move or modify the partition once constructed (1) as heavy/solid form of construction (1)</li> <li>• Lack of ability to conceal wiring/ incorporate insulation within partition (1) because there are no voids within the construction form unlike metal or timber partition types (1)</li> <li>• Installation is slow/more time consuming/ labour intensive (1) because sections cannot be slotted/crimped or constructed together easily/ blockwork may require a finish (1)</li> <li>• Requires drying out time (1) unlike metal and stud partitions (1)</li> <li>• Increased dead load on the building (1) which requires substantial support (1)</li> <li>• Rigid form of construction (1) so more susceptible to movement/ cracking/ requires expansion joints (1)</li> </ul> <p><b>Accept any other appropriate answers.</b> Up to a maximum of four marks.</p>	
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Question Number	Answer	Mark
9	B- Writing method statements D- Preparing risk assessments	(2)
Question Number	Answer	Mark
10	<p>Any two from the following explanations of the maintenance disadvantages of a flat roof form compared to a pitched roof for a low-rise building project.</p> <p>1 mark per disadvantage identified, and 1 mark for a linked explanation, up to 2 marks per explanation.</p> <ul style="list-style-type: none"> <li>• Water run-off can be poor/ puddles/ ponding (1) which could lead to the roofing material breaking down/leading to leaks (1)</li> <li>• Extremes of temperatures cause expansion and contraction of the membrane (1) in comparison to slates/tiles, which are unaffected by sunlight/heat (1)</li> <li>• Can be easily damaged (1) if used for access purposes (1)</li> <li>• Trapped water vapour can expand (1) leading to blistering on the membrane (1)</li> <li>• Flat roofs are expensive to maintain (1) as they do not last as long as pitched roofs (1)</li> <li>• Materials are not as long lasting (1) therefore require more frequent replacement (1)</li> </ul> <p><b>Accept any other appropriate answers.</b></p>	(4)

	Up to a maximum of four marks.	
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Question Number	Indicative content	Mark
11	<p>Discuss the economic benefits of using sustainable methods for the new apartment block.</p> <p><u>Use of materials to reduce energy costs:</u></p> <ul style="list-style-type: none"> <li>• Insulation in wall, floors and roof</li> <li>• Installation of double/triple glazing.</li> </ul> <p><u>Recycling of old demolished building to reduce the purchasing of new materials/components:</u></p> <ul style="list-style-type: none"> <li>• Use of crushed brickwork for hardcore</li> <li>• Potential re-use of components of old building</li> <li>• Reduction in the cost of dealing with potential pollution issues.</li> </ul> <p><u>Use of green or low embodied materials:</u></p> <ul style="list-style-type: none"> <li>• Can be cost effective in the long term (despite initial costs, which can be greater than some non-renewable materials to be used)</li> <li>• Buyer’s perceptions of using green or low embodied materials could be a selling point.</li> </ul> <p><u>Use of locally supplied construction materials:</u></p> <ul style="list-style-type: none"> <li>• Closer proximity reduces travel time of delivery vehicles therefore possible reduction in material costs and reduction in pollution/emissions</li> <li>• Local knowledge of suppliers means they are better placed to satisfy local preferences and offer discounts</li> <li>• Supply chains are generally shorter, leading to greater certainty and predictability of delivery times, which could reduce cash flow cost issues</li> <li>• Good public relations for the developer as demonstrates an investment in the local community and could boost the economy locally.</li> </ul> <p><u>Building orientation:</u></p> <ul style="list-style-type: none"> <li>• To take full advantage of natural light and solar gains reducing the need for artificial lighting and reduce heating/energy costs thus saving finite resources.</li> </ul> <p><u>Use of pre-fabricated timber frame structure:</u></p> <ul style="list-style-type: none"> <li>• Frames manufactured off-site resulting in reduced wastage on site</li> <li>• Quicker construction form reducing the ongoing site establishment and site management costs</li> <li>• Easier to incorporate high levels of insulation within the structure resulting improved U-values and reduced energy consumption.</li> </ul>	(8)

	<p><u>The incorporation of alternative energy sources into the building design with resulting advantages:</u></p> <ul style="list-style-type: none"> <li>• use of photovoltaic roof tiles/panels reduces reliance on national grid and provides opportunities to generate income through a feed in tariff</li> <li>• potentially small-scale wind turbine and even biomass fuelled heating system to further reduce energy costs (potential if this is to form part of a sustainable community apartment block)</li> <li>• Ground source.</li> </ul> <p><u>Consideration of the economic benefits of other sustainability methods including:</u></p> <ul style="list-style-type: none"> <li>• rainwater harvesting</li> <li>• grey water recycling systems</li> <li>• Sustainable urban drainage systems</li> <li>• Issues relating to the use of brownfield sites</li> </ul> <p><b>Accept any other valid response.</b></p>	
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Level	Descriptor	Mark
0	No rewardable material	0 marks
1	A few points identified, <b>or</b> one point described in some detail. 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. The learner has demonstrated a basic understanding of the economic benefits of sustainable methods.	1-3 marks
2	Some points identified, <b>or</b> a few points described. Consideration of more than one viewpoint but there will be more emphasis on one of them. The answer is unbalanced. Most points made will be relevant to the situation in the question, but the link will not always be clear. The learner has demonstrated a good understanding of the economic benefits of using sustainable methods.	4-6 marks
3	Range of points described, <b>or</b> a few points explained in depth. The majority of points made will be relevant and there is a clear link to the situation in question. The learner has demonstrated a developed understanding of the economic benefits of using sustainable methods.	7-8 marks

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