

6720-044 and 544 March 2018

6720-35 Level 3 Advanced Technical Diploma in Constructing the Built Environment (Design and Planning) (540)

| Q | Acceptable answer(s) | Guidance | Max marks |
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| 1 | Any two of the following at one mark each. <ul style="list-style-type: none"> Dense monolithic concrete walls and floors. Tanking (Bitumen). Drained cavity systems. | Do not accept DPM, DPC or techniques for dewatering the site, e.g. pumps. | 2 |
| 2 | Any two of the following at one mark for identification and one mark for a brief description as shown. <ul style="list-style-type: none"> Tiles (ordinary roofing tiles, fitted as they would be to a sloping roof). Timber boards (match boarding or shiplap fixed to horizontal or vertical battens). Plastic board sections (proprietary, fixed in same way as timber boards). Masonry (brickwork/blockwork/rendered). All other suitable answers. | n/a | 4 |
| 3 | Any three of the following at one mark each. <ul style="list-style-type: none"> Higher quality product. Controlled production costs. Reduced build time on site. Reduced labour requirement. Better thermal insulation. Better sound insulation. Better airtightness. Increases efficiency. | Do not accept formulaic responses like 'time', 'cost' and 'quality' unless further developed. Reference to economy of scales will be accepted for 1 mark. | 3 |
| 4 | Marks as shown to a maximum of three . <ul style="list-style-type: none"> The choice of foundation is not dependent on the bearing capacity of the ground here (1). The deep strip would be preferred because fewer man-hours are required to create it (1). Less-skilled trades are required or more cost effective (either for max 1 mark).The use of ready-mix concrete is cleaner and easier to manage (1). To aid future conversion (1). No foundation blocks needed (1) Or any other suitable answer. | n/a | 3 |

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| 5 | <p>A linked explanation of the steps taken to address the relevant issues, up to four marks as shown.</p> <ul style="list-style-type: none"> • Access for construction plant and cranes (1) (use mini-hoists, work at night and on Sundays) (1). • Accommodating modular construction into non-modular buildings (1) (use bespoke modules) (1). • Replacing traditional materials with modern materials (1) (sympathetic materials matching) (1). • Use of Site Waste Management Plans or SWMP (1). <p>All other suitable answers.</p> | <p>Do not accept conservation areas or similar. The answer must relate to modern methods of construction.</p> | 4 |
| 6 | <p>A linked summary of the steps taken to address the relevant issues, up to four marks as shown.</p> <ul style="list-style-type: none"> • Fire detection systems linked to positive actions: smoke alarms linked to sprinklers or closing doors (1). • Compartmentation (1) Fire doors and components (1): Confinement/slowdown of fire/resist for a certain time. • Material specification: choose low flammability materials (1) or treat flammable materials (1). <p>All other suitable answers.</p> | n/a | 4 |
| 7 | <p>Any two of the following at one mark each.</p> <ul style="list-style-type: none"> • Local roads. • Existing structures. • Existing services. • Trees or wildlife (either for max 1 mark) <p>All other suitable answers.</p> | n/a | 2 |
| 8a) | <p>Deep basements, underground stations, tunnel approaches, pumping stations (any 1).</p> | n/a | 1 |
| 8b) | <p>Because the excavation is very deep and battered slopes are prohibitive (1).</p> | n/a | 1 |
| 9 | <p>Any two of the following at one mark for identification and one mark for a descriptive statement, to a maximum of two marks per method.</p> <ul style="list-style-type: none"> • Bolts (1): fitted into pre-drilled or punched holes (1), fitted to end plates or flanges (1), on-site (1). • Rivets (1): fitted into pre-drilled or punched holes (1), still seen but no longer used (1), on-site (1). • Welds (1): stronger (1), neater (1), high level of skill required (1), off-site (1). | n/a | 4 |
| 10 | <p>A coherent justification that includes three of the following arguments.</p> | n/a | 3 |

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| | <ul style="list-style-type: none"> • Primary schools = children, children eat soil (pica), which must therefore be uncontaminated/ particular susceptibility of young children (1). • Those working on the site should not be exposed to dangerous chemicals in contaminated land (1). • Working on contaminated land may release leachates into water table (1). • Dusts or vapours released during construction can be dangerous both then and afterwards (1). • Low availability of land means brownfield sites need to be remediated (1). <p>Or any other suitable answer.</p> | | |
| 11 | <p>A coherent explanation that includes three of the following points.</p> <ul style="list-style-type: none"> • Glulam is more sustainable than steel. • Glulam has lower embedded energy than steel. • Glulam is more aesthetically pleasing than steel. • Glulam can more easily be formed in a curved shape. • Glulam does not corrode, but steel does. • Glulam can be treated to behave better in fire than steel will. • Glulam is an electrical insulator, no need for bonding. | n/a | 3 |
| 12a) | <p>A coherent explanation of the following. Marks as shown to a maximum of three marks in total.</p> <p>A DPM below the concrete protects the concrete bed (1) from the ingress of moisture (1) and harmful salts (1) whereas placing the DPM above the concrete is simpler (1).</p> | n/a | 3 |
| 12b) | <p>A coherent explanation of the following. Marks as shown to a maximum of three marks in total.</p> <p>There is a risk of damage (1) to the DPM during placement of the concrete (1) whereas if the DPM is placed above this will not happen (1) but concrete is at risk from moisture and salts (1).</p> | n/a | 3 |
| 13a) | <p>Any two of following at one mark each.</p> <ul style="list-style-type: none"> • High winds • Heavy rain • Low temperatures, e.g. snow/ice (max 1 mark) • High air temperatures • Excessive sunshine • Fog (poor visibility). | n/a | 2 |
| 13b) | <p>Any one of following at one mark.</p> <ul style="list-style-type: none"> • Noxious fumes • Reduced oxygen levels | n/a | 1 |

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| | <ul style="list-style-type: none"> • Fire. • Flooding/drowning • Asphyxiation due to dust, grain or other contaminants. | | |
| 14a) | <p>Any one of the following at one mark for identification.</p> <ul style="list-style-type: none"> • Concrete breakers and pokers (used to break-up concrete and to compact fresh concrete). • Sanders, grinders, disc cutters (used to smooth off surfaces or remove irregularities). • Hammer drills (used to drive items into solids and to create holes). • Chainsaws (used to reduce the size of large pieces of timber and similar). • Scabblers, needle guns (used to roughen the surface of concrete). • Wacker plate | Do not accept drill or electrical drill. | 1 |
| 14b) | <p>Any two of the following for one mark.</p> <ul style="list-style-type: none"> • Special low-vibration tools. • Anti-vibration gloves. • Limit daily exposure. • Regular monitoring of workers. <p>Any other suitable answer.</p> | n/a | 2 |
| 15 | <p>A coherent explanation of the following. Marks as shown to a maximum of four marks in total.</p> <p>They will be complying with the law (1), they can see where they are doing well and where they are doing less well (1), they will be able to correlate activities with incidents (1), they will have information to support changes in working practices (1), they will be able to monitor the changed working practices (1) and they will have the data needed by the HSE in case of an investigation (1).</p> | <p>Accept:</p> <p>Improving the firm's image (1) Reducing insurance costs (1) Training (1)</p> | 4 |
| 16 | <p>A coherent explanation of the following. Marks as shown to a maximum of four marks in total.</p> <p>The construction process involves the use of many materials which are hazardous to health (1). The responsible people must find out what the health hazards are (1), assess the risks involved (1), provide control measures to reduce harm to health (1), and make sure that they are used (1) or they may be legally liable (1).</p> | n/a | 4 |
| 17 | <p>One mark for identification, one mark for a short description of any two of the following:</p> <ul style="list-style-type: none"> • Architect: creates design and concept for the building. | Also accept CDM. | 4 |

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| | <ul style="list-style-type: none"> Architectural technologist: makes the architects ideas work, through dimension, specifications and turns the drawing into something that can be built Landscape architect: designs the external works: hard and soft. Structural engineer: carries out all the structural calculations for the design. Civil engineer: design and calculations for roads/paths/bridges/retaining walls. Services engineer: designs installation of cold water/electricity/gas/telecoms/drainage/HVAC. <p>Any other suitable answer.</p> | | |
| 18 | <p>Tree Preservation Order (1) Plus one mark for a coherent description of when it is used. A Tree Preservation Order is an order made by a local planning authority in England to protect specific trees, groups of trees or woodlands in the interests of amenity. (1)</p> | n/a | 2 |
| 19a) | 1990 | n/a | 1 |
| 19b) | 1984 | n/a | 1 |
| 20 | <p>A clear explanation that identifies the key elements of buildability and what it is. A list is not acceptable and marks will be capped at two for a simple list. The candidate needs to explain what it is and the benefits of this approach. Appropriate marks awarded in accordance with what the candidate has written.</p> <p>Buildability is – a pre-construction exercise that looks at the design from the perspective of those that will manufacture, install and carry out the construction works (1). It involves consideration of the following, what is being built, desired quality, prefabrication opportunities, standard component sizes, ease of installation, practicality, flexibility, health and safety, building regulations/complying with the law and sustainability (any two at one mark each).</p> <p>The advantages of the approach are, increased efficiency, reduction in waste, speedier construction times, value for money, increased flexibility, ease of maintenance, reduced risk (any two for two marks).</p> <p>Or any other appropriate consideration – up to a max of five marks.</p> | n/a | 5 |

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| <p>21</p> | <p>A linked explanation that outlines the three functions of the NHBC. Marks to be awarded in line with their relative merits to the actual role of the NHBC.</p> <p>The NHBC are: Approved private inspectors/Insurance (warranty) providers/Creators of standards to comply with the building regulations. (1)</p> <p>The NHBC set the standards that the houses are built to, these standards ensure compliance with the Building Regulations (1) and can be seen as an alternative to the approved documents (1). Builders submit the plans and specifications and the NBC will check them against the requirements of their standards (1). When works are approved the NHBC will inspect work on site to ensure they are as designed and to the correct standard (1) any work not to the required standard will need to be done again until it complies (1). On completion of the works the NHBC will issue a certificate and this will then trigger the insurance warranty (1), these are typically for 10 years. (1)</p> | <p>Also accept: advice on new designs and materials (1) and interpretation of building regulations (1).</p> | <p>5</p> |
| <p>22a)</p> | <p>Evaluation to include three characteristics of one of the following: Timber/steel/concrete frame/cross wall/fin wall/panelised system.</p> | <p>Also acceptable: One mark for naming the structure form to be used and two additional marks for naming two characteristics of this structure form.</p> | <p>3</p> |
| <p>22b)</p> | <p>Either raft or pile foundations could be used (1). Other foundations are unsuitable with soil of variable strength (1). A raft or pile foundation is more appropriate as it is easier and less costly (1).</p> | <p>n/a</p> | <p>3</p> |

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| <p>22</p> | <p>Intention:</p> <p>The aim of this question is to allow candidates an opportunity to demonstrate knowledge and understanding of the sustainable methods and techniques used to construct a new build commercial building, including the selection of appropriate foundations and specification of an appropriate structural form, and convert an existing domestic building to provide access, both to and within that building, for elderly and disabled persons, using good health and safety practices.</p> <p>Band 1 (1 – 4 marks) The learner identifies a limited number of the design factors and construction methods to be used, but there is little in the way of description. The learner’s response lacks detail and is not clearly linked to the scenario. To access higher marks in this band, learners must consider the specified methods in the correct chronological order.</p> <p>Band 2 (5 – 8 marks) The learner identifies a wide range of the design factors and construction methods to be used and supports this with brief descriptions. The learner’s response is detailed but incomplete and has clear links to the scenario in most cases. To access higher marks in this band, learners must specify appropriate health and safety practices for each method specified.</p> <p>Band 3 (9 – 12 marks) The learner identifies a comprehensive range of the design factors and construction methods to be used and supports this with in-depth descriptions. The learner’s response is detailed and complete and has clear and accurate links to the scenario. To access higher marks in this band, learners must provide evidence of having considered the cost and efficacy of each of the methods specified.</p> | <p>Indicative content: sub and superstructure forms, primary and secondary elements, components and materials, performance expectations, environmental issues, access and disability issues, renewable energy, sustainable construction techniques, types and uses of foundations, practical implementation of health and safety regulations, factors that affect design, constraints on design.</p> <p><i>For no awardable content, award 0 marks.</i></p> | <p>12</p> | <p>301.1.1, 301.2.1, 301.3.2, 302.1.2, 302.2.3, 303.3.2, 312.1.1, 312.1.2, 312.2.2, 312.2.3 AO4</p> |
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