

# Mark Scheme (Results)

## Summer 2010

### Principal Learning

## Construction

### CB301 Design the Built Environment: The Design Factors

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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.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the 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 the 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 regarding the application of 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)	<p>Site location, views and neighbours -</p> <p>Description of any two of the following:</p> <ul style="list-style-type: none"> <li>• Location of the site will influence both land and house values.</li> <li>• Size and shape of the site will determine the road layout and density of the houses/buildings.</li> <li>• The type, usage, size, scale and architectural style of surrounding properties will influence the design of the proposed building(s).</li> <li>• Views into and out of the site will affect the layout of the building, location of specific rooms and the degree of prominence of the building(s).</li> <li>• Access and circulation including vehicular and pedestrian circulation patterns, rights of way and accessibility.</li> <li>• Availability of services including mains, public transport and shops, banks, schools etc.</li> <li>• Supply and demand influences land prices which will impact upon the type and market sector of development.</li> <li>• Enterprise action zone may focus development to certain types of project.</li> <li>• If the site is located close to a source of noise and disturbance, measures will need to be incorporated into the design.</li> <li>• Potential problems with neighbours for example noise, conflict etc.</li> <li>• Electromagnetic services eg local sub-station, electricity pylons may affect the orientation and type of the building.</li> <li>• Level of urban decay will affect the type of project considered suitable for the site.</li> <li>• Where specific designs and materials may be required to ensure harmony with the locality eg national parks.</li> <li>• Orientation of building in order to maximize solar gain and natural daylight. This may be limited by the location and shape of the site.</li> <li>• Planning objections by local community or neighbours of the site could affect initial design eg to apply with local materials or architectural style.</li> <li>• Site topography may result in a split level or elevated design.</li> </ul> <p>Any other appropriate answer.  1 mark for a brief description  2 marks for a clear description  No marks awarded for identification only</p>	(4)

Question Number	Answer	Mark
1 (b)	<p>Employment and the local labour market -</p> <p>Description of any two of the following:</p> <ul style="list-style-type: none"> <li>• The existence of an educated/skilled workforce will attract businesses to locate to an area with a corresponding demand for industrial and commercial premises.</li> <li>• An area in need of regeneration and with high levels of unemployment will limit the demand for new development unless government incentives are in place to attract new businesses.</li> <li>• The level and type of employment will influence the type, quality, size and density of residential development.</li> <li>• The development of transport facilities such as road infrastructure, public transport, rail and air, local airport and waterways.</li> <li>• The existence of a main industry in an area attracts subsidiary industries eg suppliers.</li> <li>• The availability of large amounts of cheap land attracts those industries that require a large area for their operations eg oil refineries etc.</li> <li>• The local need for key worker housing</li> <li>• Training opportunities including apprenticeships based on historical industries.</li> <li>• Skill base for use of traditional local raw materials.</li> </ul> <p>Any other appropriate answer.</p> <p>1 mark for a brief description 2 marks for a clear description No marks awarded for identification only</p>	(4)

Question Number	Answer	Mark
2	<p>Functions of artificial lighting a designer needs to plan for -</p> <p>Description of any three of the following:</p> <ul style="list-style-type: none"> <li>• Task lighting ie reading, writing, operating equipment etc.</li> <li>• Amenity lighting ie general illumination of interiors by natural and artificial light.</li> <li>• Deliberate aesthetic effect, ie display lighting, or dramatic lighting of certain types of interior eg restaurants, night clubs.</li> <li>• Provision of safety ie in and around buildings.</li> <li>• Permanent security lighting and lighting activated by motion sensors.</li> <li>• Emergency exit and route identification. Also low level DC supplied lighting in case of power failure.</li> </ul> <p>Any other appropriate answer.</p> <p>1 mark for a brief description 2 marks for a clear description No marks awarded for identification only</p>	(6)

Question Number	Answer	Mark
3	<p>Crime reduction measures for a new home -</p> <p>Description of any three of the following:</p> <ul style="list-style-type: none"> <li>• External doors fitted with a minimum of a 5- lever mortise lock or multi-locking system.</li> <li>• Front entrance doors should have a toughened glass panel to improve visibility.</li> <li>• Front doors should be positioned so they do not project past the façade of the building.</li> <li>• Windows should be positioned so that they can provide surveillance.</li> <li>• Window opening lights should be lockable.</li> <li>• Visible burglar alarm.</li> <li>• External security lighting.</li> <li>• Front fences and walls identify the resident’s territory but should not obscure visibility from within the house.</li> <li>• Gated communities and security fencing.</li> <li>• Pitched rather than flat roofs for those parts of the building that terminates at the first floor level eg attached garages.</li> <li>• Access to the rear of houses should be controlled possibly by alley gates where appropriate.</li> <li>• CCTV.</li> <li>• Internally beaded glazing used for windows or doors.</li> <li>• Provision of garage within the boundaries of the property.</li> </ul> <p>Any other appropriate answer.</p> <p>1 mark for a brief description  2 marks for a clear description  No marks awarded for identification only</p>	(6)

Question Number	Answer	Mark
4	<p>Design measures to reduce long term maintenance costs -</p> <p>Description of any four of the following:</p> <ul style="list-style-type: none"> <li>• Specify components that require little maintenance eg PVCU for windows, doors, fascia and soffit boarding.</li> <li>• Use of high quality and durable materials.</li> <li>• Where wear and tear is naturally occurring at openings in the structure ie doors, lifts etc. ensure higher quality and durable materials are used.</li> <li>• Use of high quality services equipment and sanitary ware.</li> <li>• Inclusion of access hatches in floors, ceilings, walls to allow ease of services maintenance.</li> <li>• Use of isolation valves.</li> <li>• Minimise areas of external decoration.</li> <li>• Ensure components and materials are suitable for the local climate ie extra wind bracing, fixings for roof trusses in exposed locations etc.</li> <li>• Use Secured by Design criteria to reduce the likelihood of vandalism.</li> <li>• Where possible specify pitched rather than flat roofs.</li> <li>• Where dampness will be a problem to a floor finish eg bathrooms etc. specify an alternative to chipboard.</li> <li>• Ensure a cyclical maintenance plan is produced that covers key areas.</li> <li>• Self-cleansing glazing.</li> <li>• Using locally sourced materials.</li> </ul> <p>Any other appropriate answer.</p> <p>1 mark for a brief description 2 marks for a clear description No marks awarded for identification only</p>	(8)



Question Number	Answer	Mark
5	<p>Factors that could influence the decision of timber frame or brick and block wall -</p> <p>Description of any three of the following:</p> <ul style="list-style-type: none"> <li>• Strength and stability.</li> <li>• Resistance to weather.</li> <li>• Fire resistance.</li> <li>• Resistance to the passage of heat.</li> <li>• Resistance to the passage of sound.</li> <li>• Aesthetics.</li> <li>• Speed of construction.</li> <li>• Range of external finishes.</li> <li>• Drying out time.</li> <li>• Cost.</li> <li>• Dead weight of the wall affecting design of the foundation.</li> <li>• Restricted site access.</li> <li>• Waste management.</li> <li>• Lead times.</li> <li>• Environmentally-friendly sustainable design.</li> <li>• Consumer confidence/client preferences.</li> </ul> <p>Any other appropriate answer</p> <p>1 mark for a brief description 2 marks for a clear description No marks awarded for identification only</p>	(6)

Question Number	Answer	Mark
6	<p>Design measures to reduce a scheme's effect on the environment -</p> <p>Description and evaluation of two of the following:</p> <ul style="list-style-type: none"> <li>• Super thermal insulation.</li> <li>• Minimal energy consumption.</li> <li>• Wind turbines.</li> <li>• Solar/photovoltaic panels.</li> <li>• South facing buildings to maximise daylight.</li> <li>• Triple glazing.</li> <li>• Green roofs.</li> <li>• Geothermal heat pumps.</li> <li>• Combined heat and power units fuelled by waste timber.</li> <li>• Biomass boilers fed by biomass fuel.</li> <li>• Heat exchange wind driven ventilation.</li> <li>• Airtightness ie 2ac/hr @ 50 Pa.</li> <li>• Conservatory to harvest solar energy.</li> <li>• Thermal mass.</li> <li>• Heating systems.</li> <li>• Sustainable urban drainage systems (SUDS).</li> <li>• Sustainable sourcing of materials.</li> <li>• Appropriate use of recycled materials.</li> <li>• Rainwater harvesting.</li> <li>• Grey water systems.</li> <li>• District heating systems fuelled from sustainable sources.</li> </ul> <p>Any other appropriate answer.</p> <p>1 mark for a brief description with no evaluation.  2 marks for a clear description with no evaluation.  2 marks for a brief description that is evaluated  3 marks for a clear description that is evaluated.  No marks for identification only</p>	(6)

Question Number	Indicative Content	
7	<p>Elements that constitute a good design in terms of a housing development-</p> <p>Coherent and balanced evaluation of the following:</p> <ul style="list-style-type: none"> <li>• The buildings exhibit architectural merit.</li> <li>• Internal spaces and layout allow for adaptation, conversion or extension.</li> <li>• The buildings outperform the statutory minima eg the Building Regulations.</li> <li>• The scheme makes use of advances in construction or technology that enhances its performance, quality and attractiveness.</li> <li>• The inclusion of, or proximity to, community facilities eg shops, schools, play areas, parks etc.</li> <li>• Features that reduce the development's environmental impact.</li> <li>• Easy access to public transport.</li> <li>• A mix of accommodation that reflects the needs of the local community.</li> <li>• The design offers value for money and best use of resources.</li> <li>• The development has a distinctive character.</li> <li>• The development exploits the immediate landscape or topography.</li> <li>• The buildings and layout are easy to find your way around.</li> <li>• The scheme integrates with existing streets and surrounding development.</li> <li>• The streets are pedestrian, cycle and vehicle friendly.</li> <li>• Public spaces and pedestrian routes are safe.</li> <li>• Car parking is well integrated and situated so it supports the streetscene.</li> <li>• Inclusion of community green spaces.</li> </ul> <p>Other acceptable answers would be considered.</p>	
Level	Mark	Descriptor
	0	No rewardable material
1	1-5	Description of one or two undeveloped and/or unsupported ideas. May lack cohesion. No evaluation. Lacks appropriate terminology.
2	6-10	Clear description of points for development. Limited evaluation. Minimal use of appropriate terminology.
3	11-15	Some discursive elements covering several aspects but points not fully developed or limited range. Some evaluation. Some use of appropriate terminology.
4	16-20	Good range and development of relevant points. Clear evaluation. Sound use of appropriate terminology.

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