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Mark Scheme (Results)

Summer 2012

Principal Learning

Construction and the Built Environment (CB304/01)

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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	Types of renewable energy source that could be used include: • Biomass – fuel that is usually wood pellets, wood chips and wood logs • Wind - energy is generated when the wind rotates a turbine's blades which drive a generator to produce electricity. • Solar - electricity systems capture the energy from the sun's radiation and convert it into electricity. They will work in any weather, as long as there is daylight. • Hydro – flowing water that drives a turbine which powers a generator. • Geothermal - ground source heat pumps use the constant temperature of the soil at 1 metre below the surface as their heat source. • Air source heat pumps extract heat from the air by a unit that is sited outside the property. • Tidal – movement of water that powers a generator. Any other appropriate response **Max 2 marks for each of any two descriptions.** **1 mark for a simple description.** **2 marks for a more detailed description.** **No mark for identification only**	**(4)**

Question Number	Answer	Mark
2	Duties of an employee under the Health and safety at Work Act 1974 include: • To take reasonable care of their own health and safety • To take reasonable care of others affected by their actions/inactions • To co-operate with the employer on health and safety issues • Not misuse anything provided in the interests of health and safety • Not interfere with anything provided in the interests of health and safety	**(4)**

	Any other appropriate response **Max 2 marks for each of any two descriptions.** **1 mark for a simple description.** **2 marks for a more detailed description.** **No mark for identification only.**	

Question Number	Answer	Mark
3	Measures that could be used to control noise include: • Isolation of the source, via location, enclosure • Use of barriers, mufflers or silencers • Reducing on-site cutting, drilling, impact etc • Replacement or alteration of machines • Use of quieter materials - such as rubber liners • Carrying out preventive maintenance • Sound absorption room • Restricting start/ finish times and timing of activities • Controlled timing of activities/operations • Limit exposure time • Hearing protection zones Any other appropriate response **Max 2 marks for each of any two descriptions.** **1 mark for a simple description.** **2 marks for a more detailed description.** **No mark for identification only.**	**(4)**

Question Number	Answer	Mark
4	Types of portable energy supply include: • Petrol / diesel / gas generators engine • Liquid petroleum gas bottles • Propane gas bottles • Batteries • Wind turbine • Fuel cell power sources • Solar panel power chargers • Compressed air Any other appropriate response **Max 2 marks for each of any two descriptions.** **1 mark for a simple description.** **2 marks for a more detailed description.** **No mark for identification only.**	**(4)**

Question Number	Answer	Mark
5	Requirements contained within the Provision and Use of Work Equipment Regulations include: • The work equipment should be suitable for use • The equipment should be maintained in a safe condition • The equipment should be inspected by a competent person • Record kept of regular inspection • Elimination of risks where possible • Risks controlled by hardware measures – suitable guards, emergency stop buttons • Risks controlled by software measures – safe systems of work • Provision of adequate training, information and instruction to work equipment users • Mobile equipment suitable for carrying people • The work equipment to be suitable for the intended use • Work equipment accompanied by suitable safety measures -protective devices, markings, and warnings Any other appropriate response **Max 2 marks for each of any three descriptions.** **1 mark for a simple description.** **2 marks for a more detailed description.** **No mark for identification only.**	**(6)**

Question Number	Answer	Mark
6	Methods of protecting adjacent buildings include: • Provision of flying shores to provide structural support • Provision of raking shores to provide structural support • Provision of dead shores to provide structural support • Use of protective screens for example scaffolding or netting • Use of water bags during use of explosives • Use of hoarding to control flying debris • Use of fencing to control movement of personnel and plant • Vibration less demolition systems • Underpinning to provide structural support • Fire prevention methods for example control of flammable material, control of sparks • Preventing uncontrolled collapse • Permanent strengthening techniques • Weather protection for example screening Any other appropriate response **Max 2 marks for each of any three descriptions.** **1 mark for a simple description.** **2 marks for a more detailed description.** **No mark for identification only.**	**(6)**

Question Number	Answer	Mark
7	Costs that could apply to a construction project include: • Acquisition costs of the buildings / structures • Acquisition costs of the land • Investment costs for the purchase of land and buildings • Design costs for new project • Construction costs including materials • Operating costs for example utilities • Maintenance costs including cleaning / redecoration • Repair costs for damages • Heating, ventilation and air conditioning costs. • Power and lighting costs. • Disposal costs for example costs associated with demolition and removal of waste Any other appropriate response **Max 2 marks for each of any three descriptions.** **1 mark for a simple description.** **2 marks for a more detailed description.** **No mark for identification only**	**(6)**

Question Number		Indicative Content
8		Benefits of using district heating systems include: • Lower capital costs - the cost of installing a single heating unit is likely to be considerably cheaper than installing multiple small units in individual factories. • Lower energy costs - a building purchases only the heat it needs to meet its requirements. • Lower operating and maintenance costs - With district energy a single unit requires on-site maintenance and thus contributes to lower annual maintenance contracts than multiple units. • Stable competitive energy rates - Central DH systems can convert to the least costly and most available fuel, and thus achieve economies of scale with volume purchasing. • Cleaner environment - having one unit operating at peak efficiency means less waste and less CO_2 and other pollutants. • Having the option for alternative fuels reduces the dependence on fossil fuels and thus become CO_2 neutral. • Can utilise waste incineration as an energy source. • Can utilise waste heat from industrial processes. Any other appropriate response
Level	Mark	Descriptor
	0	No rewardable material/identification only
1	**1-2**	Limited understanding of district heating systems demonstrated with one or two benefits briefly explained
2	**3-4**	Clear understanding of district heating systems demonstrated with some benefits explained in more detail
3	**5-6**	Sound understanding of district heating systems demonstrated with a range of benefits fully explained

Question Number		Indicative Content
9		Methods that can be used to ensure the materials are sustainable include: • The use of locally sourced materials and components, eg bricks, window fabricators, timber cladding supplier, roof tiles etc. • Environmental impact in terms of specification. • Environmental impact in terms of distance travelled. • Sourcing, selection and use of sustainable materials. • Extraction of raw materials. • Fresh water used in the manufacturing process. • Impact of chemicals, additives and treatments. • Recycling of waste materials. • Manufacture related CO_2 emissions. • Reclaiming of materials. • Fuel usage. • Manufacture and transport of ancillary equipment. • Transport of finished material. • Consider demolition requirements. • Consider maintenance requirements over the building lifecycle. • Manufacture of ancillary equipment. • Use non-toxic materials. • Reduce fuel used in manufacture, transport etc. • Methods of assembly. Any other appropriate response
Level	Mark	Descriptor
	0	No rewardable material / No marks for identification only
1	**1-4**	Limited understanding of sustainable materials demonstrated with one or two methods briefly described and no application to the scenario
2	**5-8**	Clear understanding of sustainable materials demonstrated with some methods described in more detail and increasing application to the project scenario
3	**9-10**	Sound understanding of sustainable materials demonstrated with a range of methods fully described specifically focussed on the project scenario.

Question Number		Indicative Content
10		Safe working practices to be observed when using ladders include: • Ladder to comply with British and EU standards • Inspected before use • Correct type and length • Correct industrial rating • Placed on firm level base • Secured to prevent movement • Tied to the landing place • Positioned at correct angle • Maintain three points of contact • Used by one person at a time • Avoid overloading • Avoid overreaching • Face the ladder when descending • Clean mud etc off footwear • Use a shoulder bag for carrying tools • Ascend and descend using one rung at a time • Preventing operatives using any other means of access to the scaffolding, eg using a goods hoist or climbing the scaffolding Any other appropriate response
Level	Mark	Descriptor
	0	No rewardable material / No marks for identification only
1	**1-4**	Poorly structured report with no introduction or conclusion. Limited understanding of safe working practices demonstrated with one or two practices briefly described, and no application to the scenario.
2	**5-8**	Reasonably well structured report which attempts introduction and conclusion. Clear understanding of safe working practices demonstrated with some practices described, and increasing application to the project scenario.
3	**9-10**	Well structured report with clear introduction and conclusion. Sound understanding of safe working practices demonstrated with a range of practices described, specifically focussed on the project scenario.

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