

Qualification: Level 2 Technical Award in Constructing and Maintaining the Built Environment – Theory Exam

June 2018

1	Identify the area of the construction industry in which bridges and roads are designed and constructed.		
	Acceptable answer(s)	Guidance	Max marks
	Civil engineering.		1
2	Describe the purpose of the planning diagram shown in Figure 1.		
	<pre> graph LR Start[Start] --> A[A] Start --> B[B] A --> C[C] B --> C C --> D[D] B --> E[E] E --> F[F] D --> Finish[Finish] F --> Finish </pre> <p>Figure 1</p>		
	Acceptable answer(s)	Guidance	Max marks
	It is a precedence diagram (1) used for scheduling the tasks that comprise a project (1).		2

3	Explain why clients' representatives should attend formal site meetings with the contractor.		
	Acceptable answer(s)	Guidance	Max marks
	Formal site meetings offer the opportunity to discuss the program and receive progress reports (1). They also allow any issues to be discussed and resolved or reported back to the client (1). It is also an opportunity to respond to requests for additional information (1). To be made aware of any health and safety issues (1). To discuss build quality satisfaction (discuss likes and dislikes) (1). To discuss budget management (1). To provide the contractor with new specifications or request adaptations/alterations (1).		3
4	Name the type of drainage that uses land drains.		
	Acceptable answer(s)	Guidance	Max marks
	Subsoil water drainage (1).		1
5	State two benefits of using a cavity wall, rather than a solid wall construction method.		
	Acceptable answer(s)	Guidance	Max marks
	1 mark each for any of the following, to a maximum of 2 marks: <ul style="list-style-type: none"> To reduce damp penetration (1). Improved thermal insulation (1). Improved sound insulation (1). 		2
6	a) Describe what is meant by 'fixtures and fittings'. b) Give one example of a i) fixture ii) fitting.		
	Acceptable answer(s)	Guidance	Max marks
	a) Fixtures are items secured or fixed to the walls and floors of a building (1). Fittings are items that are free standing (1). bi) Fixtures; 1 mark for any of the following, to a maximum of 1 mark: <ul style="list-style-type: none"> fitted kitchens and sinks Integrated appliances fitted bathroom suite central heating systems 		a) 2 marks bi) 1 mark

	<ul style="list-style-type: none"> • stairs • door frames • door linings • skirting and architrave • light fixtures and electric sockets • alarm systems and fitted wardrobes. <p>bii) Fittings; 1 mark for any of the following, to a maximum of 1 mark:</p> <ul style="list-style-type: none"> • loose white goods (fridges etc.) • wardrobes • carpets • curtain rails/blinds • washing machines/dryers and cookers etc. 		bii) 1 mark
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7	<p>a) State two material properties that make masonry suitable for domestic construction.</p> <p>b) State one performance in use of expanded polystyrene.</p>		
	Acceptable answer(s)	Guidance	Max marks
	<p>a) 1 mark each for any of the following, to a maximum of 2 marks:</p> <ul style="list-style-type: none"> • strength/hard • density • durability • aesthetics. <p>b) 1 mark for any of the following, to a maximum of 1 mark:</p> <ul style="list-style-type: none"> • good insulator • low thermal conductivity. 		<p>a) 2 marks</p> <p>b) 1 mark</p>

8 The diagrams in Figure 2 show two common forms of domestic ground floor construction. Explain why a designer might specify a suspended timber ground floor, rather than the more common solid concrete ground floor, for a modern domestic property.

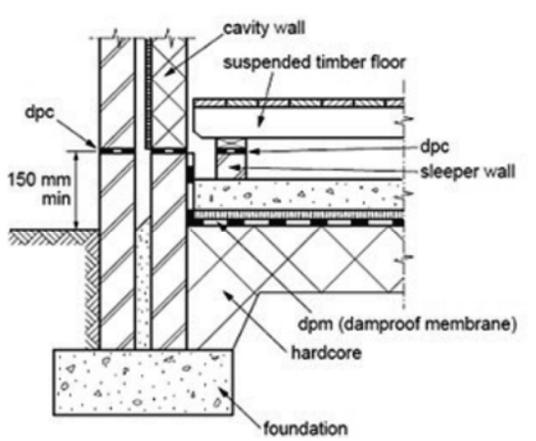
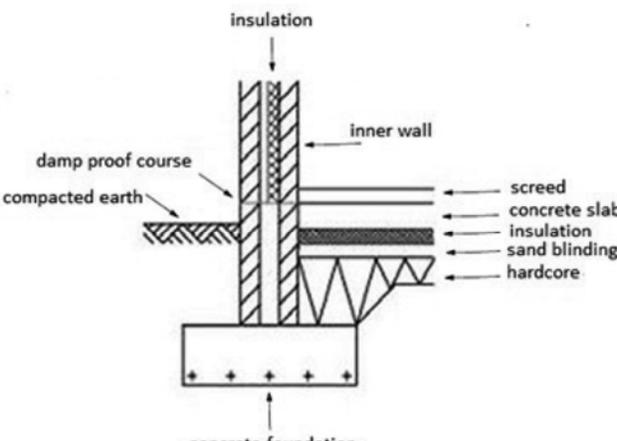
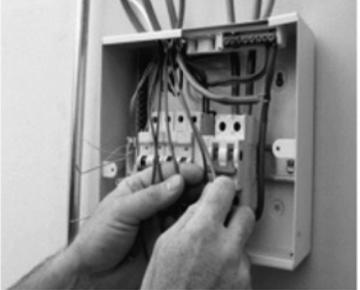
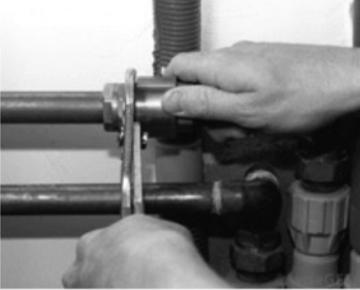



Figure 2

	Acceptable answer(s)	Guidance	Max marks
	<p>A linked explanation of where suspended timber floors out-perform solid concrete floors in terms of the given context, maximum of 4 marks.</p> <ul style="list-style-type: none"> • Suspended timber floors provide a more economical and less resource - intensive option by reducing excavation costs (1). • More aesthetically pleasing when finished in tongue and groove boards (1) and is not reliant on additional floor finishes (1). • Application of rigid insulation between the joists (1) can provide good thermal and acoustic insulative qualities (1). • Less likelihood of rising damp (1) because of the void between the ground and floor surface (1). • The void beneath the floor (1) allows for easier installation of services and any future adaptations (1). • Timber is a renewable source (1) making it more sustainable than concrete (1). • Less affected by ground movement (1) unlike a concrete slab which is less tolerant due to its high compressive and low tensile strength (1). • The suspended timber floor passes all the weight to the earth instead of the foundation unlike a solid ground floor (1). 		4
9	<p>In terms of application and maintenance, compare the following internal wall finishes for a bathroom.</p> <ul style="list-style-type: none"> • Gypsum plaster. • Ceramic wall tiles. 		
	Acceptable answer(s)	Guidance	Max marks
	<p>A linked comparison of gypsum plaster and ceramic wall tiles; 1 mark for each mark, up to 4 marks.</p> <p>Gypsum plaster is a wet finish and tiles are a dry finish (1) and the consequent wait for the plaster to set and harden (1). Ceramic tiles prevent the passage of water whereas gypsum plaster is water-soluble (1). Ceramic tiles are self-finishing whereas plaster walls are generally finished with emulsion paint or wallpaper (1). Both jobs require trained personnel to do the work but plastering is generally considered to be more skilled and is generally not attempted as a DIY task (1). Choice depends on intended use with tiles being more common in kitchens, utility rooms and bathrooms and plaster in reception rooms and bedrooms (1). Both are easy to clean but tiles are generally easier to maintain as they can be replaced individually (1). Ceramic tiles offer better hygiene (1). Gypsum plaster is faster to apply (1). Gypsum is not as aesthetically pleasing (1).</p>		4

10	It has been calculated that it will take exactly 1740 bricks to repair a damaged wall.		
	Why should the buyer order 2000 bricks?		
	Acceptable answer(s)	Guidance	Max marks
	1 mark each for any of the following, up to 2 marks: <ul style="list-style-type: none"> to make an allowance for cutting allow 'because bricks are bought by the 1000' to make an allowance for wastage to have spares for carrying out snagging/repairs more cost effective to buy more in case there are faulty or damaged bricks. 		2
11	A building has been badly damaged by water over the years and requires refurbishment.		
	Identify three tasks that could be undertaken to make the property more waterproof.		
	Acceptable answer(s)	Guidance	Max marks
	1 mark each for any of the following, up to 3 marks: <ul style="list-style-type: none"> repoint the brickwork replace windows and doors as required clean out drip grooves replace old and broken rainwater goods replace roof coverings fix plumbing leaks install a DPC if missing or damaged ventilate and insulate the building to reduce condensation new sealant/mastic around doors and windows repair/replace drain pipes as an alternative to rainwater goods brickwork bonding tight and strong. 		3
12	Name one part of the superstructure that must be inspected in a condition survey.		
	Acceptable answer(s)	Guidance	Max marks
	1 mark for any of the following, up to 1 mark: <ul style="list-style-type: none"> roof/rafters/trusses internal walls external walls floors doors and windows any suitable superstructure material that could be used for the external/internal walls. 		1

13	<p>a) Name one building service that must be carried out by a competent and qualified person.</p> <p>b) List one check that a competent and qualified person is required to carry out.</p>		
	Acceptable answer(s)	Guidance	Max marks
	<p>a) 1 mark for any of the following, up to 1 mark:</p> <ul style="list-style-type: none"> • gas • electric. <p>b) 1 mark for listing a check for either Gas or Electric.</p> <p>Gas – 1 mark for any of the following, up to 1 mark:</p> <ul style="list-style-type: none"> • leaks • integrity of joints • clear flow of air to appliances and flue gases to outside • checking the boiler. <p>Or</p> <p>Electric - 1 mark for any of the following, up to 1 mark:</p> <ul style="list-style-type: none"> • integrity of circuits • earthing or double insulation • bonding • appropriately sized cables • no overloading of circuit. 		<p>a) 1 mark</p> <p>b) 1 mark</p>
14	<p>An excavator removes 64 m³ of soil from a trench. The soil bulked by 35% on removal from the ground. The bulk density of the soil is 1800 kg/m³. The soil was loaded on to tipper-trucks with a capacity of 20 tonnes.</p> <p>Determine how many trucks were needed.</p> <p>You must show all your working out.</p>		
	Acceptable answer(s)	Guidance	Max marks
	<p>Volume of soil after removal from ground = $64 \times 1.35 = 86.4 \text{ m}^3$ (1 mark)</p> <p>Mass of soil = $86.4 \times 1800 = 155520 \text{ kg} = 155.52 \text{ tonnes}$ (1 mark)</p> <p>Number of lorries required = $155.52/20 = 7.78$ (call it 8) (1 mark)</p>	<p>2nd and 3rd marks rely on earlier calculations, any earlier answer that is incorrect will lose a mark, however the incorrect value will be carried forward and marks will be awarded for appropriate calculations.</p>	3

15	Explain why a client may request a condition survey when purchasing a domestic property.		
	Acceptable answer(s)	Guidance	Max marks
<p>1 mark for each point, up to 3 marks:</p> <p>A condition survey will provide the prospective buyer a non-invasive but detailed and extensive evaluation of a property's condition (1) which the client can use to get estimates for repairs or necessary home improvements etc (1). Calculate projected energy costs based on ratings given (1), to obtain projected home insurance costs based on rebuild valuations (1) and to make a more informed assessment of the property's asking price, taking into consideration the modifications required (1).</p> <p>To ensure that no extra money is needed to fix up the property (1). To ensure that the property is safe (1). To ensure that the property has been built correctly (1). To check how much it will cost them to renovate and whether the price of renovation will be small enough to mean that when they sell the house they make a profit (1). If there is any damage then once the client has bought the property then the client will have to pay for the damages (1).</p>			3
16	Name the construction or building service trades that carry out each of the activities in Figure 3.		
	<div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p style="text-align: center;">Figure 3</p>		
	Acceptable answer(s)	Guidance	Max marks
<p>1 mark for each, up to 3 marks</p> <p>a) Plastering. b) Electrical work. c) Plumbing or Gas.</p>			3

17	Describe the purpose of barrier cream for personal protection when working on a building site.		
	Acceptable answer(s)	Guidance	Max marks
	Barrier cream is used to protect workers' hands (1) by providing a physical barrier between the skin and contaminates/detergents/irritants (1).	The candidate should be given one mark for mentioning protection from any relevant contaminates such as alkali in cements etc. Also accept harsh substances.	2
18	a) What does 'CDM' stand for in 'CDM Regulations'? b) State two of the main purposes of the CDM Regulations.		
	Acceptable answer(s)	Guidance	Max marks
	a) Construction Design and Management. b) 1 mark for each, up to 2 marks <ul style="list-style-type: none"> • defines roles and responsibilities. • plan works to ensure risks are managed. • to reduce risks/ensure safety • to ensure that the buildings are designed with the safety of the builders and inhabitants in mind (i.e. to produce safe and healthy buildings etc). 	a) Must answer fully to be awarded 1 mark.	a) 1 mark b) 2 marks
19	Explain how the job of a site carpenter differs from that of a bench joiner.		
	Acceptable answer(s)	Guidance	Max marks
	A linked explanation that examines the differences and similarities between the two jobs. 1 mark for each point, up to 5 marks: In general carpenters work outdoors on site (1) and joiners work indoors in workshops (1). Carpenters fix floors, roofs, stud work and frames (any 1) and hang doors, fix mouldings and fit units (any 1). Joiners make doors and frames, windows, units and stairs (any 1). Joinery work is sometimes considered more precise (1) but both develop much the same tool skills (1), use much the same tools and work with the same material (1). They could (and do) do each other's jobs where necessary (1). Joiners make furniture (1).		5

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A detached house is being extended to provide a porch at the front, an integral garage with access from the rear on the ground floor and two bedrooms above the garage.

Figure 4 below shows the building at a point during the construction stage.



Figure 4

Discuss the factors that should have been considered before commencing construction.

Acceptable answer(s)	Guidance	Max marks
<p>0-3 marks: Thoroughness of response Poor coverage only referencing a limited number of factors from the indicative content. No supporting statements.</p> <p>Relevance Factors are mostly considered in isolation and only a limited number are linked directly to the project</p> <p>Accuracy Descriptions are brief and may include poor use of correct terminologies and show elements of confusion.</p> <p>Considered Describes how a few of the factors interact with each other but with no supporting statements and only a limited comparative assessment of sub and superstructure elements and internal finishes etc.</p> <p>Supported The candidate draws no conclusions from their discussion.</p> <p>4-6 marks: Thoroughness of response Reasonable coverage of a broad range of factors from the indicative content, covering reasons for refurbishment, human resources and discussion of sub and superstructure elements. Most of the factors discussed are clearly linked to the project.</p>	<p>Indicative content</p> <ul style="list-style-type: none"> • Reasons for refurbishment/ extension • cost • effect on surrounding built environment • who to involve • procedures to be followed • consideration of type of new foundations and external walls • timber or concrete ground floors • flat or pitched roof • internal partitions • internal finishes • proximity issues • party wall issues 	<p>9</p>

	<p>Relevance The majority of factors considered are accurately linked to the refurbishment/extension project</p> <p>Accuracy Logical application of knowledge and accurate use of key terminologies. Most factors are accurately linked to the project</p> <p>Considered Clearly considers how the majority of the key factors interact with each other i.e. proximity issues affecting the roof shape and external wall design etc. (acoustically and fire protection – internal garage).</p> <p>Supported Links made between key factors and some conclusions drawn regarding reasons for extending, built environment and sub and superstructure decisions and internal finishes etc.</p> <p>7-9 marks: Thoroughness of response Thorough discussion with detailed explanations, which consider a comprehensive range of key factors from the indicative content.</p> <p>Relevance All or nearly all points are clearly and accurately linked to the project.</p> <p>Accuracy Good use of terminology and understanding of town and country planning and the key factors that underpin this process.</p> <p>Considered Clearly explains how all or nearly all of the factors interact with each other in an in-depth and evidenced manner. Considers the procedures that must be followed and the people to involve.</p> <p>Supported Any conclusions drawn will be the result of thorough analysis and consideration of the factors that will have the greatest impact on the success of the project.</p>		
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