6720-22-004/504 Level 2 Technical Award in Designing and Planning the Built Environment the Built Environment – Theory Exam

June 2018

<table>
<tr><td>1</td><td colspan="3">The list below shows different urban environments in order of increasing size.
Name the two missing urban environments.

1. Isolated dwelling.
2.
3. Village.
4. Small town.
5. Large town.
6.</td></tr>
<tr><td></td><td>Acceptable answer(s)</td><td>Guidance</td><td>Max marks</td></tr>
<tr><td></td><td>2 = Hamlet (1)
4= City/ conurbation (1)</td><td></td><td>2</td></tr>
<tr><td>2</td><td colspan="3">Identify two local amenities that can enhance physical wellbeing.</td></tr>
<tr><td></td><td>Acceptable answer(s)</td><td>Guidance</td><td>Max marks</td></tr>
<tr><td></td><td>1 mark each for any of the following, to a maximum of 2 marks:

Outdoor recreation space such as:
• Parks
• Dedicated walk/paths
• Sports fields/running tracks
• Outdoor gyms

Indoor facilities such as:
• Gyms
• Pool
• Fitness centre
• Dance/aerobic studio
• cycle path/lanes.</td><td></td><td>2</td></tr>
</table>

3	Identify **two** factors that support a sustainable community.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	1 mark each for any of the following, to a maximum of 2 marks: • Environment • Equity/thriving economy • Housing and the built environment • Social and cultural • Governance • Transport and Connectivity • Services • Education • safety		2
4	Explain why it is important to maintain a balance between public and private housing stock.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	Only having private housing makes it difficult for some people to get suitable accommodation (1). It can create a spiral of increased rents (1) and provide poor quality living conditions (1). This can also force up prices of property and only the wealthy can afford to buy (1) A good supply of public housing provides a fairer rental system (1) and gives people the opportunity to live in affluent areas at an affordable rate (1). It allows low paid key workers to live in the heart of the community (1). By putting more people in the heart of the community, a better community spirit is formed (1). Businesses benefit as their workers are close by (1) and it allows people of different backgrounds and classes to live close together and integrate (1). Public housing also provides an opportunity for the lower paid to purchase part ownership and to get onto the property ladder (1). Avoiding long waiting lists for council (1)	Coherent linked explanation that highlights the key benefits of a good balance between public and private housing. *A maximum of 2 marks can be achieved by correctly identifying what public and private housing is;* Private housing is either owned or being purchased by the occupier (1) whereas public housing is owned by the local authority (1) The remaining 5 marks can come from the below; If the candidate produces a list the maximum score they can attain is 2. To achieve 2 marks their list must be very comprehensive and consider most of the key elements listed below	7

5	Describe **one** aesthetic consideration an architect **must** consider when designing a new property in a town centre.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	One mark for correctly identifying a consideration and **one** for a brief description. • Materials (1) – will they compliment or blend with existing material choices and how will they will weather etc. Possible design limitations to achieving the desired form 1) • Size (1) – important to consider modular sizes as found in existing buildings (1) • Massing (1) - how the shape and size of the building is used to minimise energy usage and maximise passive solar gain(1) • Scale (1) which is dependent on the intended user and their needs (1) • Streetscape (1) – how the building will sit within the existing built environment (1) • Local vernacular (1) – respecting the existing style and architectural/historical elements i.e. roof shape, window and door styles etc. (1)		2
6	Describe what is meant by an 'SIP system'.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	Structurally insulated panel. (1) A composite panel which sandwiches a layer of insulation between 2 outer layers of sheathing board such as ply or OSB (1).		2

7	Complete the table shown in Figure 1 by stating a primary **and** secondary function for external walls and external doors.		

	Primary function	Secondary function
External walls		
External doors		

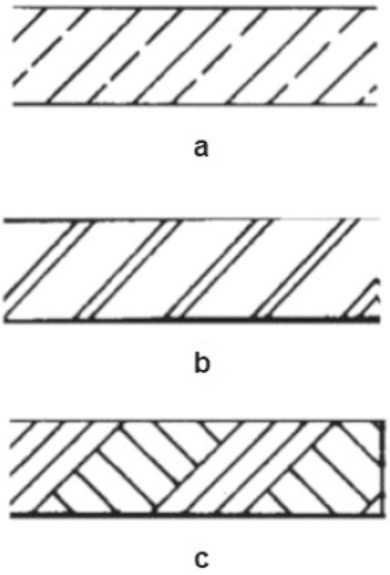
Figure 1

	Acceptable answer(s)	**Guidance**	**Max marks**
	External Wall - 1 mark for a primary function and 1 mark for a secondary function **Primary** – support, strength, stability, enclosure, weatherproofing **Secondary** – aesthetics, durability, thermal efficiency, acoustic efficiency, privacy. **External Door** - 1 mark for a primary function and 1 mark for a secondary function **Primary** – access and egress, security, weatherproofing, thermal properties **Secondary** – aesthetics, durability, thermal efficiency, acoustic efficiency, to split/part two rooms.	1 mark for each appropriate answer, to a max of 2 per element and 4 in total.	4

8	State the planning permission considerations when planning to demolish a historic building.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	Identification that if a building has sufficient historical status it could achieve listed building status (1) this will limit what can be done without prior permission (1). If the building is not listed the area in which it stands may be a conservation area, or a national park or other designated area (1). If the building has an article 4 direction that has been applied, thus removing permitted development rights (1).	If the candidate simply lists LBC and CA then the max marks to be allowed is 1.	2

9	Identify **two** documents, other than drawings, that would be submitted with a planning application for a large development.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	1 mark each for any of the following, to a maximum of 2 marks: • application form • design and access statement • flood risk analysis environmental impact assessment • heritage statement • land survey.		2
10	Summarise the key factors that can affect a material specification.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	Factors to consider include; the use of the building and the demands this will put on the materials in use (1),operational performance required for the location i.e. high winds, coastal demands (1) status such as listed building or CA (1), available budget (1), local vernacular i.e. the style of key building elements and material choices (1), availability of materials i.e. can they be locally sourced and consideration of lead times (1), availability of skilled labour that can work with the building materials (1), timescales i.e. prefab and dry form verses in-situ and wet trades etc.(1).The environmental performance such as thermal conductivity or u values that can be achieved (1). The requirements for ongoing maintenance (1). Appropriate fire rating for building use (1).	If the candidate produces a list the maximum score they can attain is 2. To achieve 2 marks their list must be very comprehensive and consider most of the key elements listed below.	4
11	Describe the common cause for the deteriorating brickwork in Figure 2.  Figure 2		
	Acceptable answer(s)	**Guidance**	**Max marks**

	The deterioration is called 'spalling' (1) and is commonly caused by the freeze thaw cycle (1). Frost damage which is caused when bricks become saturated and the moisture freezes, it then expands (1), causing the brick face to delaminate (1).		2
12	Describe the benefits of using structural steel frames in the retail sector.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	Speed of erection in comparison to other methods (1), reduced labour costs due to dryness of form (1) wide spans providing clear floor area (1), flexibility of layout (1), the ability to add more floors (mezzanine) after construction (1), Durability leading to reduced maintenance costs over the life of the building(1).		3
13	Compare the performance of timber and concrete as structural framing materials in terms of strength and durability.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	The answers will consider that concrete is stronger and more robust (1) than timber. Concrete structures can take much more load (1) and perform better in the event of fire (1). Timber is a greener material and is renewable (1). Timber requires protection form the weather (1) but it is more flexible for alteration after the building is constructed (1). Concrete performs better in compression, but timber performs better in tension (1), however, concrete can be reinforced to improve the performance overall (1). Both materials are limited slightly in terms of the size of clear span that can be achieved, but concrete can be used over much larger spans than timber (1).	A coherent and linked comparison that details the main features of both materials and considers them against each other. If the candidate simply describes the performance of concrete and timber, but does not make comparisons the marks will be limited to a max of 2. Similarly, if the candidate lists the key features the marks will again be limited to 2. However, to achieve 2 marks for a list, they must correctly identify at least 4 features of each material.	4

14	Identify the following construction materials shown in Figure 3.  Figure 3		
	Acceptable answer(s)	**Guidance**	**Max marks**
	a) Stone (1) b) Brick (1) c) Earth (1)		3
15	State **two** benefits of using a model to present a design to a client.		
	Acceptable answer(s)	**Guidance**	**Max marks**
	1 mark each for any of the following, to a maximum of 2 marks: Benefits include: Ability to show the relative size, scale and massing of a new design in relation to the surroundings (1) and is easier to understand for a non-technical person (1). The model is then tactile for the client to interact with. (1)		2

16 Calculate the area of flooring materials required for the property in Figure 4.

Allow 10% for wastage within your answer.

You **must** show all your working out.

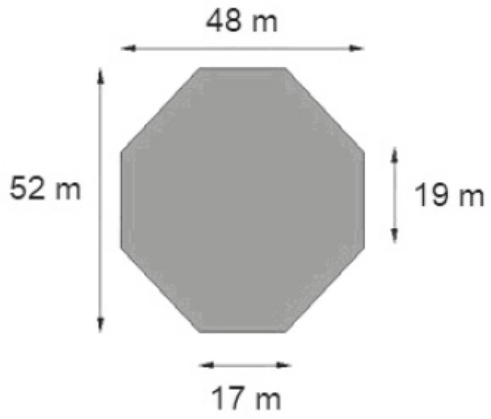


Figure 4

Acceptable answer(s)	Guidance	Max marks
Overall size of shape = 48 x 52 = 2496 m^2 (1 mark) Ddt 4 x corners at: 48-17/2 = 15.5 m and 52-19/2= 16.5 m = 4 * ½ base x height = 4 * 127.88 = 511.50 m^2 (1 mark) Total for floor = 2496 – 511.50 = 1984.50 m^2 (1 mark) Add 10% = 2182.95 m^2 (1 mark) Or Central Colum 52 x 17 = 884 m^2 Trapezium side (19+52) / 2 x 15.5 = 550.25 m^2 (1 mark) There are two sides 550.25 x 2 = 1,100.5 m^2 (1 mark) Add all together 884 + 1100.5 = 1984.5 m2 10% = 198.45 (1 mark) Add % to total 1984.5 + 198.45 = 2182.95 = 2182.95 m^2 (1 mark)		4

<table>
<tr><td>17</td><td colspan="3">Explain the differences between presentation drawings and working drawings.</td></tr>
<tr><td></td><td>Acceptable answer(s)</td><td>Guidance</td><td>Max marks</td></tr>
<tr><td></td><td>A clear linked explanation that indicates that the drawings used for a public display will be an image of the finished building (1) which will show the materials (1) and colour schemes (1) and often shows the building in the setting it is to be placed in i.e. street views with people and landscaping features etc (1).

The drawings used by the builder to construct from will be technical (1), they will include plans, elevations and sections (1), and component and specific details (1), they will show the materials as hatched patterns (1) and will contain dimensions and fixing notes (1). So that the Local Authority can see that the proposals meet current building standards and the client can see the quality and finish of the proposal (1).</td><td>To obtain any marks the candidate must make reference to at least one description from both of the paragraphs.</td><td>4</td></tr>
<tr><td>18</td><td colspan="3">A village close to a large town has been identified as a suitable location for a new small town. The plan is to construct between 5000 and 6000 new homes and all the necessary infrastructure and facilities needed to support the community.

Discuss the considerations the local authority must make to ensure the success of this proposal, in terms of design and sustainability.</td></tr>
<tr><td></td><td>Acceptable answer(s)</td><td>Guidance</td><td>Max marks</td></tr>
<tr><td></td><td>0-3 marks:
Thoroughness of response
Poor coverage only referencing a limited number of factors from the indicative content.
No supporting statements.

Relevance
Factors considered in isolation and not linked directly to the project i.e. consideration of aesthetics without considering the possibility of existing buildings in the small village having historical, cultural or architectural significance etc.

Accuracy
Descriptions are brief and may include poor use of correct terminologies and elements of confusion.

Considered
No or very limited consideration of how the key factors interact with each other and the cause and effect of good/bad decisions.

Supported
The candidate draws no conclusions from their discussion.</td><td>Indicative content;

• Environment, equity, economy, housing, social and cultural governance
• transport
• services
• need for a water supply
• aesthetics - new and innovative/sustainable, whilst preserving and respecting protected buildings
• style
• density
• materials
• safe by design
• balance of public and private housing
• open spaces
• access
• wellbeing,
• planning applications
• supporting drawings</td><td>9</td></tr>
</table>

	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. **Relevance** The majority of factors considered are accurate and make clear references to the project. **Accuracy** Logical application of knowledge and accurate use of key terminologies. Most factors are accurately linked to the project. **Considered** Some consideration of how the key factors interact with each other and the Cause/effects/impacts/consequences of good/bad decisions. **Supported** Links made between key factors and some conclusions drawn regarding their social, economic and environment impact. **7-9 marks:** **Thoroughness of response** Thorough discussion with detailed explanations, which consider a comprehensive range of key factors from the indicative content. **Relevance** All or nearly all points are clearly and accurately linked to the project. **Accuracy** Good use of terminology and understanding of town and country planning and the key factors that underpin this process. **Considered** Clearly explains how all or nearly all of the factors interact with each other in an in-depth and evidence manner. Thoroughly considers a wide range of social, economic and environmental impacts of such a project and the role key stake holders have to ensure its success. **Supported**	• plans • elevations • models • environmental impact assessments • expanding conurbation • encouraging other cultures	

	Any conclusions drawn will make clear references to the social, economic and environmental impact of key decisions.		