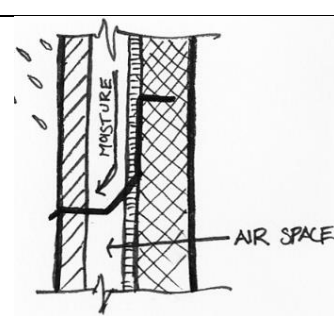


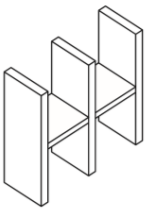
BTEC First Construction and the Built Environment

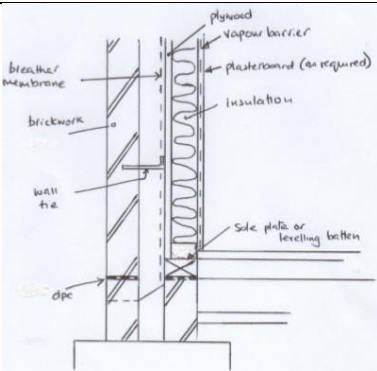
Knowledge Planner

This document is intended to help you prepare for you January 2020 examination for Unit 1: Construction Technology.

The key knowledge required for this exam is included below. This is presented in the format of a question (what you need to know) and then an example answer to the question.

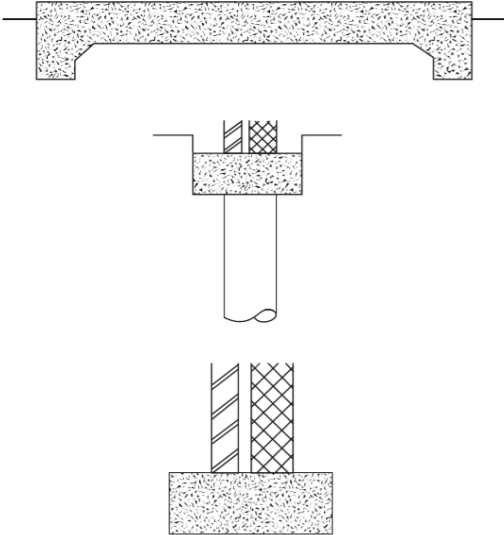
PART A: PERFORMANCE REQUIREMENTS	
Strength and stability	
<ul style="list-style-type: none"> State two functions of buildings 	<ol style="list-style-type: none"> Provide safety Protect from weather
<ul style="list-style-type: none"> State two types of load that buildings are designed to resist 	<ol style="list-style-type: none"> Snow Self-weight
<ul style="list-style-type: none"> What material is a slump test is used to measure the properties of? 	Concrete
<ul style="list-style-type: none"> What materials properties are measured using stress grading? 	Timber
<ul style="list-style-type: none"> Sketch the structure of a typical cavity wall 	
<ul style="list-style-type: none"> State one way loads are transferred from the roof of a building to its foundation. 	Loads are transferred through the walls to the foundation.
Fire resistance	
<ul style="list-style-type: none"> State two fire-resistant materials 	<ol style="list-style-type: none"> Plasterboard Blockwork
<ul style="list-style-type: none"> Give two design features that will reduce the spread of fire in a building. 	<ol style="list-style-type: none"> Cavity fire barriers Fire doors
Thermal insulation	
<ul style="list-style-type: none"> Identify three purposes of thermal insulation in a building. 	<ol style="list-style-type: none"> Reduction in energy costs Provide an acceptable u-value / comply with building regulations Reduction of heat loss
<ul style="list-style-type: none"> State two types of thermal insulation. 	<ol style="list-style-type: none"> Sheep's wool Glass fibre
<ul style="list-style-type: none"> Describe what is meant by a U-value. 	A U-value is a measure of how easy it is for heat to pass through a material.
<ul style="list-style-type: none"> Identify two locations where thermal insulation may be installed. 	<ol style="list-style-type: none"> Wall cavities Loft
Sound insulation	
<ul style="list-style-type: none"> Give two purposes of sound insulation 	<ol style="list-style-type: none"> Keeps sound/noise out of a building

	2. To provide confidentiality or privacy
<ul style="list-style-type: none"> State two types of sound insulation 	<ol style="list-style-type: none"> Carpets Double glazed windows
<ul style="list-style-type: none"> Identify two locations where sound insulation may be installed in a building. 	<ol style="list-style-type: none"> Floor Internal partition walls
<ul style="list-style-type: none"> Explain two reasons why high-density blockwork is used in walls where sound insulation is required 	<ol style="list-style-type: none"> High mass (heavy) material requires more sound energy to make it vibrate. The surface is textured which therefore diffuses the sound waves.
Weather resistance	
<ul style="list-style-type: none"> State two materials or components that are used to achieve weather resistance in buildings. 	<ol style="list-style-type: none"> Double glazing Lead flashing
<ul style="list-style-type: none"> State two different components of a building that are made from uPVC and provide weather resistance 	<ol style="list-style-type: none"> Soffits Double glazed window frames
Sustainability	
<ul style="list-style-type: none"> Give two reasons for the need for sustainability in construction 	<ol style="list-style-type: none"> To preserve/conservate finite resources for future generations To reduce building energy use
<ul style="list-style-type: none"> Explain two sustainable methods used in construction 	<ol style="list-style-type: none"> Prefabrication of building elements is sustainable as it uses less energy than building the elements on site. Using local suppliers is sustainable as it reduces carbon emissions as materials don't need to be transported as far.
<ul style="list-style-type: none"> Define the term embodied energy. 	The amount of energy required to produce materials/components
<ul style="list-style-type: none"> Name two low embodied energy materials used in construction 	<ol style="list-style-type: none"> Stone Sheep's wool
Common structural forms	
<ul style="list-style-type: none"> Explain two benefits of using a traditional brick cavity wall construction method when building houses. 	<ol style="list-style-type: none"> Good thermal insulation properties as a result of air gap and use of thermally efficient materials. This helps reduce energy costs / usage. Good sound insulation properties due to both high density materials used and the cavity
<ul style="list-style-type: none"> Identify the type of wall construction shown below. 	Cross-wall construction.
<ul style="list-style-type: none"> Explain two benefits of using structural insulated panels (SIPs) rather than a traditional construction form for a housing development. 	<ol style="list-style-type: none"> Requires less skilled labour to erect and therefore reducing labour costs. Reduction in onsite wastage due to pre-fabrication

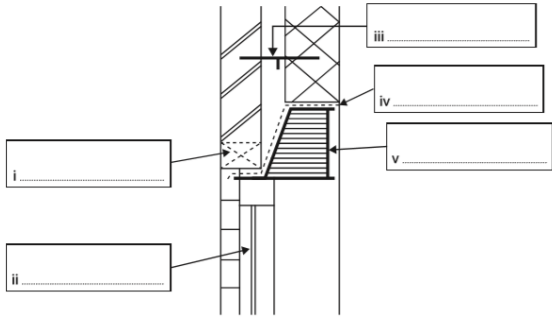
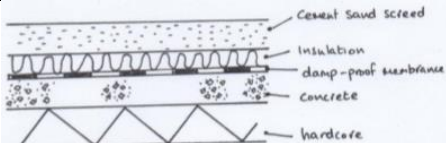
<ul style="list-style-type: none"> • Name two external finishes used with structural insulated panels (SIPs). 	<ol style="list-style-type: none"> 1. Brickwork 2. Paint
<ul style="list-style-type: none"> • Sketch a cross-section through an external wall of a timber-framed building 	
<ul style="list-style-type: none"> • Explain two way in which timber frame construction minimises the impact on the natural environment 	<ol style="list-style-type: none"> 1. Timber is a sustainable materials with low embodied energy. It is renewable / ethically sourced 2. Improves energy efficiency because it is easier to incorporate higher levels of insulation.

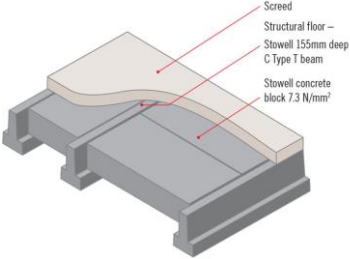

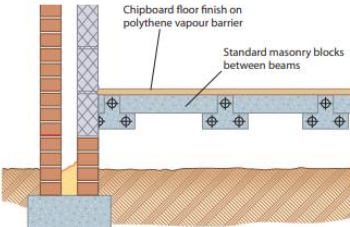
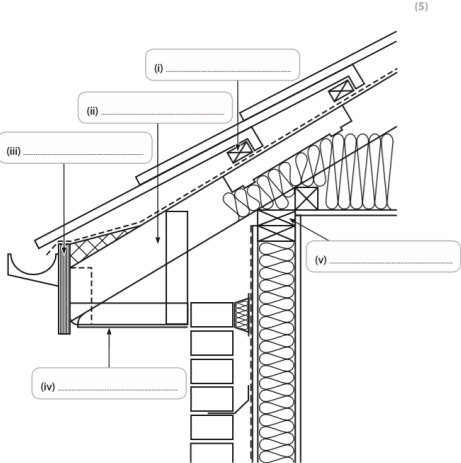
PART B: PRE-CONSTRUCTION WORK

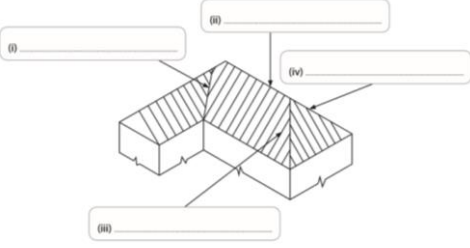
Preconstruction work	
<ul style="list-style-type: none"> State one different types of desk-based preconstruction work. 	Creating a scaled site construction plan.
<ul style="list-style-type: none"> State one example of site-based preconstruction work. 	Installation of gates and fencing
<ul style="list-style-type: none"> Identify two preconstruction stage legal requirements. 	<ol style="list-style-type: none"> Informing the HSE (Health and Safety Executive) Writing risk assessments and method statements
<ul style="list-style-type: none"> Define the terms access and egress 	Access is how you get on to a construction site and egress is how you exit the site.
<ul style="list-style-type: none"> Explain how a GANTT chart might be used during pre-construction work. 	A GANTT chart is used to plan and schedule the activities that need completing during a construction project. It is used to ensure that deadlines are met and allows site managers to ensure that materials arrive when they are needed.
<ul style="list-style-type: none"> Give two examples of demolition or clearance on a construction site. 	<ol style="list-style-type: none"> Existing structures like sheds or old buildings may need knocking down. Trees would need felling and any ground based plants clearing.
<ul style="list-style-type: none"> State two preconstruction site set-up activities. 	<ol style="list-style-type: none"> Installation of site accommodation. Gates and security on the site.
Sub-structure groundworks	
<ul style="list-style-type: none"> Hazards associated with groundworks 	
<ul style="list-style-type: none"> During the excavation of foundations on a large housing development site an XYZ Homes employee cut into an underground power cable. Explain two measures that XYZ Homes could have put in place to reduce the risk of damaging underground power cables 	<ol style="list-style-type: none"> Site manager to make contact with service providers to ensure, where possible, services are accurately located Ensure all service drawings are available to locate services on site
<ul style="list-style-type: none"> Name one method used to permanently control sub-soil water. 	Land drainage
<ul style="list-style-type: none"> Give two factors to be considered when designing earthwork support 	<ol style="list-style-type: none"> Depth of excavation Loading caused by construction plant
<ul style="list-style-type: none"> Sketch a diagram to show the timbering method of earthwork support for a trench. 	
<ul style="list-style-type: none"> Explain the function of a foundation. 	A building foundation actually performs a number of functions. The three most important are to bear the load of the building,

	<p>anchor it against natural forces such as earthquakes, and to isolate it from ground moisture.</p>
<ul style="list-style-type: none"> • Sketch three types of foundation. 	 <p>The image contains three cross-sectional diagrams of foundation types. The top diagram shows a wide, shallow foundation with a flat top and slightly wider base. The middle diagram shows a trench foundation, which is a narrow, deep hole filled with concrete, with a vertical wall and a flat top. The bottom diagram shows a pile foundation, which consists of a vertical pile driven into the ground, with a cross-section showing diagonal hatching and a cross-hatched pattern, resting on a concrete base.</p>
<ul style="list-style-type: none"> • Explain one advantage and one disadvantage of a trench/mass fill concrete foundation. 	<p>Advantage: Easier to construct because there are fewer operations needed as the concrete is poured directly into the trench.</p> <p>Disadvantage: Expensive if there are poor ground conditions because a higher volume of concrete is required.</p>

PART C: SUPERSTRUCTURES

Walls	
<ul style="list-style-type: none"> Name two types of pointing used in facing brickwork. 	<ol style="list-style-type: none"> Recessed Flush
<ul style="list-style-type: none"> State two functions of a wall. 	<ol style="list-style-type: none"> Transfer loads to foundations Provide shelter / protection from the weather
<ul style="list-style-type: none"> Explain two reasons why internal partition walls are often constructed using softwood. 	<ol style="list-style-type: none"> They are cost effective due to speed of construction / cheaper than hardwood Timber is a sustainable material therefore reducing carbon footprint
<ul style="list-style-type: none"> State two types of wall finishes that could be used on a building. 	<ol style="list-style-type: none"> Rendered brickwork Facing brickwork
<ul style="list-style-type: none"> State two components of a wall opening 	<ol style="list-style-type: none"> Weephole Lintel
<p>Diagram 1 shows a window head detail. Label the components of the window head detail.</p>  <p align="center">Diagram 1</p>	<ol style="list-style-type: none"> Weephole / cavity vent Window (glass) Wall tie Cavity tray / cavity gutter Lintel
Floors	
<ul style="list-style-type: none"> Explain two advantages of using a solid ground floor instead of a suspended timber ground floor in a house. 	<ol style="list-style-type: none"> Not prone to fungal attack therefore does not require ventilation/is more durable/has a longer life span More flexibility in the positioning of lightweight internal partitions because concrete has high compressive strength and bears loads directly on the ground
<ul style="list-style-type: none"> Sketch a diagram of a cross section through a solid ground floor 	
<ul style="list-style-type: none"> State two main functions of a floor 	<ol style="list-style-type: none"> Transfer loads to walls Provide a level surface for the occupants and contents

<ul style="list-style-type: none"> • Sketch and label a block and beam flooring system 	
<ul style="list-style-type: none"> • Describe what is meant by an engineered timber joist. 	<p>An engineered timber joist combines softwoods with a composite panel (such as plywood)</p> 
<ul style="list-style-type: none"> • State three different types of floor finishes 	<ol style="list-style-type: none"> 1. Screed 2. Chipboard 3. Carpet
<ul style="list-style-type: none"> • Sketch a cross section of a block and beam floor 	
<p>Roofs</p>	
<p>Diagram 1 shows a section through a pitched roof at eaves level. Label the parts of the pitched roof shown in Diagram 1.</p>  <p style="text-align: center;">Diagram 1</p>	<p>(i) batten (ii) rafter / roof spar (iii) fascia / fascia board (iv) soffit / soffit board (v) wall plate</p>
<ul style="list-style-type: none"> • Explain two advantages of a flat roof compared to a pitched roof for a house extension. 	<ol style="list-style-type: none"> 1. There is less impact on the neighbours' view as the roof line is lower. 2. Quicker to erect so labour costs are reduced.

<p>(a) Label the components of the roof structure shown in Diagram 1. (4)</p>  <p style="text-align: center;">Diagram 1</p>	<ul style="list-style-type: none"> i. Valley / valley rafter ii. Ridge / ridgeboard iii. Jack / jack rafter iv. Hip / hip rafter
<ul style="list-style-type: none"> • State two functions of a roof 	<ol style="list-style-type: none"> 1. Method of discharging rainfall 2. Withstand loads such as snow
<ul style="list-style-type: none"> • Explain why roof trusses are commonly made from softwoods. 	<ol style="list-style-type: none"> 1. Softwoods are relatively lightweight when compared to most hardwoods and this makes them easier to lift in to place. 2. Softwoods are a sustainable material which can easily be regrown and this helps to reduce to the carbon footprint of the building
<ul style="list-style-type: none"> • State two different types of roof finish 	<ol style="list-style-type: none"> 1. Slate 2. Felt