
T-LEVELS
Institute for Apprenticeships & Technical Education
Welcome to the T Level Core Component Support Session for the Theory Exam
Building Service Engineering (BSE) and Onsite Construction
The Webinar will begin shortly
City & Guilds
eal

Webinar Platform

Send any questions in the question area throughout the webinar

All attendees will be in listen only mode

Webinar resources and a CPD certificate will be sent out to all attendees the following day

Agenda

- Overview of the core theory exams
- Assessment objectives-relating to question types
- Use of command verbs in questions
- Question types using sample assessments
- Deconstructing an exam question
- Hints and tips

- Occupational specialism assessments
- ESP
- Delivery and curriculum planning outside of the Technical Qualification

Construction and BSE T Level Team

Paul Brown
Technical Advisor- Construction
M: 07872 463185
Paul.Brown@cityandguilds.com

Mark Jones
EQA Manager – BSE - EAL
M: 07584 230380
Mark.Jones@eal.org.uk

Rob Mallender
Technical Advisor- BSE
M: 07789 926163
Robert.Mallender@cityandguilds.com

Alison Whittle
Technical Advisor- Post 16
M: 07808330385
Alison.Whittle@cityandguilds.com

Overview of the Core Assessments BSE

T-LEVELS | Institute for Apprenticeships & Technical Education

Learners must complete:

- **Two** externally set papers covering knowledge from the building services engineering core (component 350)
- **One** employer-set project covering knowledge and skills from the building services engineering core (component 350)

Technical qualification scheme of assessment overview

Core Component – Learners must complete **all** assessment components

Assessment component (number)	Method	Duration	Marks	Weighting	Marking	Grading
Exam paper 1 (031)	Externally set exam	2.5 hours	110	35%	Externally marked	This component will be awarded on the grade scale A* - E
Exam paper 2 (032)	Externally set exam	2.5 hours	110	35%	Externally marked	
Employer-set project (033)	Externally set project	17 hours	100	30%	Externally marked	

City & Guilds | eal

BSE Core Theory Papers

The two exam papers have each been split into two sections which will be made up of different question types including short answer questions, structured questions, and extended response questions.

Both core exams will follow the same structure but each core exam covers different technical content. In both papers the level of difficulty will increase through the papers with lower demand questions at the beginning of the question paper to higher demand questions at the end of the question paper.

Part A (70%) made up of 77 marks. Made up of a range of low tariff and medium tariff, short answer questions which target recall of knowledge, demonstration of understanding and application of knowledge and understanding.

Part B (30%) made up of 33 marks and includes 3 extended response questions which target application of knowledge and understanding and analysis and evaluation of information and issues.

BSE paper 1 content overview:

- Health and safety in construction
- Construction design principles
- Construction and the built environment industry
- Construction sustainability principles
- Building technology principles
- Tools, equipment and materials

BSE paper 2 content overview:

- Construction science principles
- Construction measurement principles
- Construction information and data principles
- Relationship management in construction
- Digital technology in construction
- Construction commercial/business principles
- Building Services Engineering (BSE) systems
- Maintenance principles

Overview of the Core Assessments Onsite Construction

Learners must complete:

- **Two** externally set exams covering knowledge from the on-site construction core content (component 300)
- **One** employer-set project covering knowledge and skills from the on-site construction core (component 300)

Technical Qualification Scheme of Assessment overview

Core Component – Learners must complete **all** assessment components

Assessment component (number)	Method	Duration	Marks	Weighting	Marking	Grading
Exam paper 1 (031)	Externally set exam	2 hours	90	35%	Externally marked	This component will be awarded on the grade scale A* - E
Exam paper 2 (032)	Externally set exam	2 hours	90	35%	Externally marked	
Employer set project (033)	Externally set project	17 hours	100	30%	Externally marked	

Onsite Core Theory Papers

The two exam papers have each been split into two sections which will be made up of different question types including short answer questions, structured questions, and extended response questions.

Both core exams will follow the same structure but each core exam covers different technical content. In both papers the level of difficulty will increase through the papers with lower demand questions at the beginning of the question paper to higher demand questions at the end of the question paper.

- **Part A** (70%) made up of 60 marks. Made up of a range of low tariff and medium tariff, short answer questions which target recall of knowledge, demonstration of understanding and application of knowledge and understanding.

- **Part B** (30%) made up of 30 marks and includes 3 extended response questions which target application of knowledge and understanding and analysis and evaluation of information and issues.

Onsite paper 1 content overview:

- Health and safety in construction
- Construction design principles
- Construction and the built environment industry
- Construction sustainability principles
- Building technology principles
- Tools, equipment, and materials

Onsite paper 2 content overview:

- Construction science principles
- Construction measurement principles
- Construction information and data principles
- Relationship management in construction
- Digital technology in construction
- Construction commercial/business principles

BSE and OSC paper 1

What went well	Lower mark questions AO1(a) /AO1(B) recall of knowledge
	Overall performance was better in paper 1
	Majority of learners attempted every question
What could be improved	Extended response questions learners gave generic responses and didn't contextualise the response to the question
	Handwriting was poor in some cases
Hints and tips	More understanding of assessment objective AO2
	Use of white space provided on exam paper
	Type of writing implement used
	Look at learners handwriting / **block letters, print script or manuscript**
	45% of questions are weighted against AO2

BSE and OSC paper 2

What went well

Lower mark questions AO1(a) /AO1(b) recall of knowledge

What could be improved

Extended response questions, learners gave generic responses and didn't contextualise their responses to the question

Maths was poor in some cases (particularly in BSE)

Lack of correct terminology when answering questions

Not reading questions properly

Hints and tips

Practice two-part questions and answers

Marks are given for acronyms and industry abbreviations including workings out even if end answer is incorrect

Timings – it seems learners may have run out of time as in some cases papers weren't completed

Delivery, particularly in BSE- consider first exam series to be in Autumn to allow full coverage of the core

45% of questions are weighted against AO2

BSE Grade Boundaries for last summer series

Grade boundaries

The table below shows the grade mark ranges for the Exam, along with the notional boundaries for Paper 1 and Paper 2 – **for the summer 2022 series.**

Grade	Mark range	Notional boundaries	
		Paper 1 (8710-031)	Paper 2 (8710-032)
A*	135 - 220	69 - 110	65 - 110
A	120 - 134	62 - 68	58 - 64
B	105 - 119	54 - 61	50 - 57
C	90 - 104	46 - 53	42 - 49
D	75 - 89	39 - 45	35 - 41
E	60 - 74	32 - 38	28 - 34
Unclassified (U)	0 - 59	0 - 31	0 - 27

Onsite Grade Boundaries for last summer series

Grade boundaries

The table below shows the grade mark ranges for the Exam, along with the notional boundaries for Paper 1 and Paper 2 – **for the summer 2022 series.**

Grade	Mark range	Notional boundaries	
		Paper 1 (8711-031)	Paper 2 (8711-032)
A*	149 - 180	74 - 90	74 - 90
A	128 - 148	64 - 73	64 - 73
B	107 - 127	53 - 63	53 - 63
C	86 - 106	43 - 52	43 - 52
D	66 - 85	33 - 42	33 - 42
E	46 - 65	23 - 32	23 - 32
Unclassified (U)	0 - 45	0 - 22	0 - 22

T-LEVELS | Institute for Apprenticeships & Technical Education

Assessment Objectives and Command Verbs in Relation to Question Types

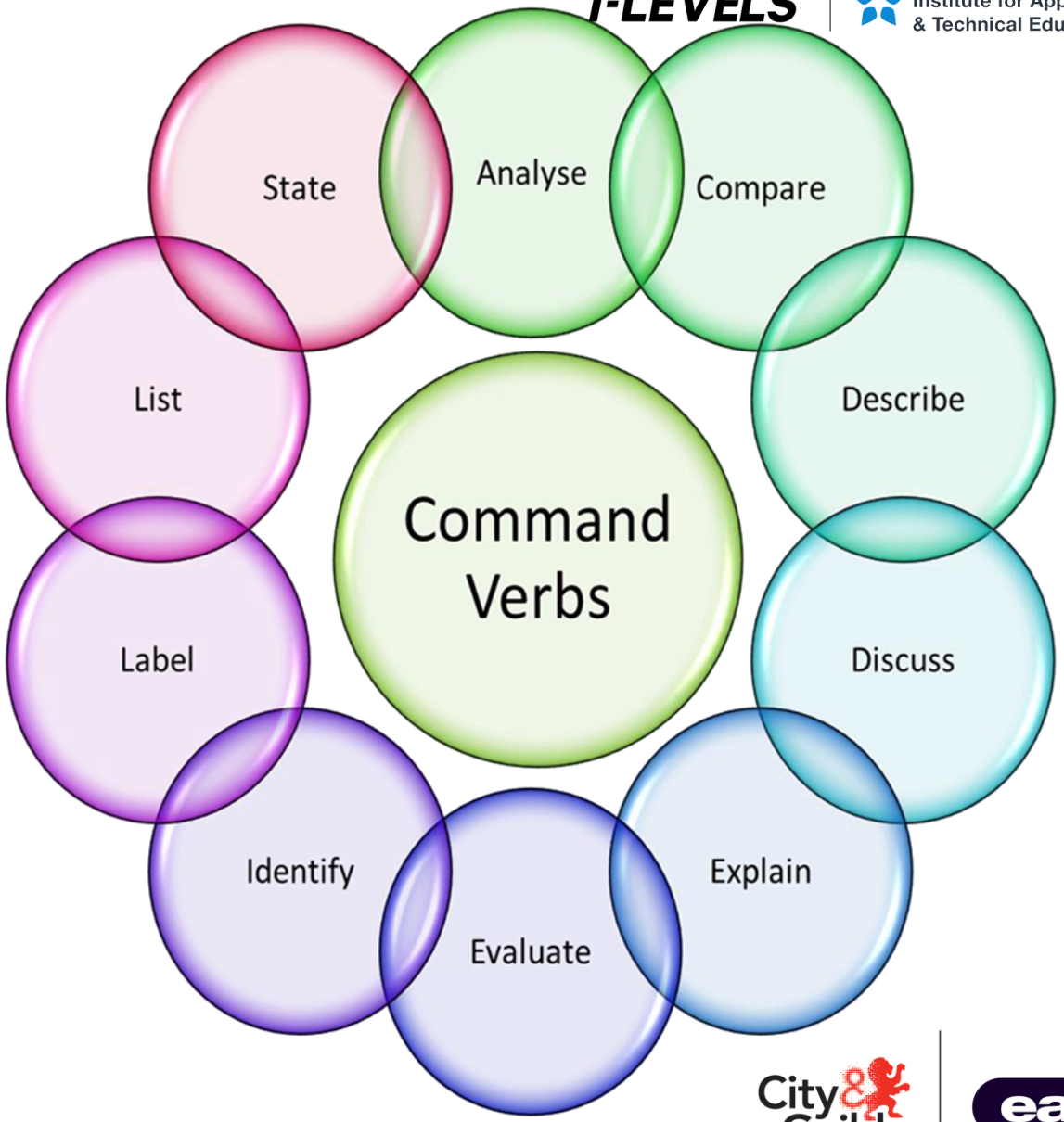
BSE/Onsite

City & Guilds | eal

Exam Preparation

In examinations, certain words, often called command words, are used as prompts to give an indication to learners of the type of response that is expected by the question. These words include ‘state’, ‘describe’, ‘explain’ and ‘discuss’.

Command verbs in exam papers are the words your learners need to understand. They tell you what level of /depth of response the examiner is looking for.



Assessment Weightings (more detailed explanations available in QHB)

Assessment Objective (AO)	Description The learner is required to..	Weightings (for OSC and BSE)	Typical Tariffs (marks)	Questions/ examination tasks that might prompt this sort of evidence	Typical command words used
Note: All AOs require the ability to recall knowledge.					
AO1 a Demonstrate knowledge	demonstrate basic recall	10%	Short, lower-tariff (marks) question types, typically require a separate point per mark	Simple questions that require knowledge that could be learned by rote (facts) with no requirement to go beyond recall & statement of fact: Labelling a diagram with names/locations definitions, facts, recall of purpose of something description of physical appearance of something.	• List • Label • Identify • State • Name • Select • Define • Describe a • Describe the process
AO1 b Demonstrate understanding	explain principles and concepts beyond recall	25%	Low to Medium- tariff (marks), may require a point or limited explanation for 1 mark with a further mark available for more depth or explanation	Straightforward questions requiring demonstration, beyond recall, of understanding about something. Response is in general terms, why is what does … mean? explain the use of… explanation of how something works explanation of the benefits/weaknesses of..	• Compare (and contrast) • Differentiate between • Give examples • Summarise • Explain

Assessment Weightings (more detailed explanations available in QHB)

Assessment Objective (AO)	Description The learner is required to..	OSC Weightings (for OSC and BSE)	Typical Tariffs (marks)	Questions/ examination tasks that might prompt this sort of evidence	Typical command words used
AO2 Apply knowledge and understanding to different situations and contexts	take the understanding of generalities (AO1b) and apply them to specific novel situations.	45%	Medium to high tariff (marks), will require the candidate to take their knowledge and understanding and apply it to the context/scenario given within the question	Given a clear, straightforward/narrow situation, the question requires selection and application of relevant principles and procedures in a way that is specific to the situation (rather than in general terms): what is the best approach to… in this situation? explain the process/ procedure to take when… what are the implications of …(specific rather than general situation).	Given information/ a narrow situation: • What is the best… • Explain the process when… • Use • Apply • Calculate • Work out • Estimate

Assessment Weightings (more detailed explanations available in QHB)

Assessment Objective (AO)	Description The learner is required to..	Weightings (for OSC and BSE)	Typical Tariffs (marks)	Questions/ examination tasks that might prompt this sort of evidence	Typical command words used
AO3 Analyse and evaluate information and issues	Use information they have been provided with e.g. in the form of a detailed scenario requiring them to analyse the interrelated issues arising and evaluate, e.g., the strengths and weaknesses or advantages and disadvantages of approaches they may take to achieve a good outcome	20%	Higher tariff (9-12 mark question types, 'discuss'-type questions expect a higher quality of response for higher marks, and these are usually marked using level of response marking (bands).	**Analyse** Given a relatively complex, realistic occupationally relevant scenario, analyse the situation recommending an approach to be taken to… analyse how the situation can be managed in order to… analyse the consequences of… **Evaluate information and issues related to the content** justify your decisions/approach evaluate how well … meets …standards evaluate how effective/ /efficient…	• Determine • Analyse • Discuss • Evaluate • Justify

Command word	Definition	Likely AO(s)
Identify	recognise something, usually from an image, and state what it is	AO1a
Label	add names or descriptions, indicating their positions, on e.g. an image/ drawing	AO1a
List	give as many answers/ examples as the question indicates	AO1a
State	give the answer, clearly and carefully	AO1a
Name	give the (technical) name of something	AO1a
Select	choose (e.g. the correct material/tool for the job) by making careful decisions	AO1a
Define	give the meaning of something, usually of a technical term	AO1a
Describe a…	write what something is like – usually what it looks, tastes, feels, sounds like etc,	AO1a
Describe the process for…	give the steps in a process	AO1a
Compare (…and contrast) (or ***describe*** the similarities/differences)	look for and describe the similarities (and differences) between two or more things/ circumstances	AO1b
Differentiate between	show or find the characteristic differences between two or more similar things/ concepts	AO1b
Distinguish between	describe the characteristic differences between two things, or make one thing seem different from another	AO1b
Annotate	add explanatory notes and comments	AO1b
Give example(s) **Illustrate/**	use examples or images to support, clarify or demonstrate e.g. an explanation	AO1b
Calculate	work out the answer to a problem using mathematical operators and concepts	AO1b
Summarise	give the main/ key points, which give a broad overview of something	AO1b
Explain the…	make clear or easy to understand by giving details and linked reasoning	AO1b

Command word	Definition	Likely AO(s)
Explain why /consequences of/ reasons for…	give the causes of/ rational for something	AO1b, AO2
Explain how…	Give the steps in e.g. a process, clarifying causal relationships	AO2/AO3
Discuss	talk/write about a topic in detail, considering the different issues, ideas, opinions related to it	AO3
Analyse	study or examine usually a complex issue in detail to identify essential elements, causes, characteristics etc	AO3
Give a rationale	Explain why you have taken particular actions/ decisions	AO3
Justify your decisions	Make a case for the decisions/ actions taken explaining why they particularly meet the particular circumstances/ context	AO3
Describe the effect of (e.g. an event)…. **Describe** the effect on ……	write about what has changed/happened because of the e.g. event	AO2/AO3
Evaluate	Make an analysis about the success/ quality of e.g. end product/outcome – usually systematic, proposing improvements	AO3

BSE

Core exam

Paper 1

Paper 2

Extended response questions

Section A

1. State **one** statutory document that specifically regulates **each** of the following activities.

a) The use of power tools on a construction site.

[1 mark]

.....

.....

b) The hazards of working on live electrical systems during maintenance procedures.

[1 mark]

.....

.....

T-LEVELS | Institute for Apprenticeship & Technical Education

Command verb is State:

State-give the relevant points briefly

Key words learners need to understand are **statutory** and **regulates**

Q1	State **one** statutory document that specifically regulates **each** of the following activities. a) The use of power tools on a construction site. b) The hazards of working on live electrical systems during maintenance procedures.			
	Acceptable answer(s)	**Guidance**	**Max marks**	**Test Spec ref & AO**
	a) The Provision and Use of Work Equipment Regulations - PUWER b) The Electricity at Work Regulations - EWR	Award **1 mark** for each Accept answers in full or acronyms	**2**	**1.3** **AO1a**
KO	KO1 Health and safety			

City & Guilds | eal

4. List **two** professional bodies in Building Services Engineering, including the specialism they are affiliated with.

[2 marks]

.....

.....

.....

.....

Q4	List **two** professional bodies in Building Services Engineering, including the specialism they are affiliated with.			
	Acceptable answer(s)	**Guidance**	**Max marks**	**Test Spec ref & AO**
	• IET- Institution of Engineering and Technology-electrical • CIBSE- Chartered Institution of Building Services Engineers-general building services • CIPHE- Chartered Institute of Plumbing and Heating Engineering – plumbing heating • Institute of Refrigeration (IoR) – Refrigeration	Both the professional body and the specialism is required for **1 mark.** Accept any other answer that identifies a professional body relevant to BSE	**2**	**7.5 AO1a**
KO	KO7 Building technology principles			

Question is in two parts.

The command verb is **List** with a further instruction to **include.**

List- Provide an itemised series of parts.

Key word learners need to understand is **affiliated (**associated or linked to something)

14. A contractor has won the contract to design and build a high-rise block of flats. The building will be constructed using a structural steel frame.

Give **four** advantages of steel that makes it suitable for the structural frame of the high-rise building.

[4 marks]

.....

.....

Picking out the relevant parts of a question that requires understanding;

Q14	A contractor has won the contract to design and build a high-rise block of flats. The building will be constructed using a structural steel frame. Give **four** advantages of steel that makes it suitable for the structural frame of the high-rise building.			
	Acceptable answer(s)	**Guidance**	**Max marks**	**Test Spec ref & AO**
	Award **1 mark** for each of the following points up to a maximum of **4 marks:** • High strength • Relatively low weight • Ease of installation • Availability of a wide range of ready-made structural sections • Ability to resist dynamic forces such as wind and earthquakes	Do not accept properties of steel that are not relevant to the context	**4**	**7.7 AO2**

Common errors learners make is to answer a question in part only.

Part B type questions-extended response

What is the key Information

A client wants a two-storey extension constructed on the back of an office. The site has very easy access for materials and machinery.

The main constraint is that the time allowed for the construction work on site, from commencement to handover, is extremely limited.

Evaluate the different types of construction methods and processes and suggest the most suitable for this project.

(12 marks)

These type of questions are designed for stretch and challenge and provide opportunity for differentiation of learners.

Part B type questions-extended response

What is the key Information

A client wants a two-storey extension constructed on the back of an office. The site has very **easy access for materials and machinery.**

The **main constraint is that the time** allowed for the construction work on site, from commencement to handover, is extremely limited.

Evaluate the different types of construction methods and processes and **suggest** the **most suitable** for this project.

Command verbs are **evaluate** (Consider several options, ideas) and **suggest** (Give possible reasons) **(12 marks)**

For less able learners you may need to break these types of questions down during formative assessments to support learners in accessing marks

These type of questions are designed for stretch and challenge and provide opportunity for differentiation of learners.

Band 1
1-3 marks
Demonstrates a basic use of analysis of the different types of construction methods. Demonstrates basic application of knowledge and understanding of the use of different construction methods relevant to the time constraints. Demonstrates basic evaluative skills with limited reasoning to which method would be most suitable

Band 2
4-6 marks
Demonstrates a good use of analysis of the different types of construction methods. Demonstrates good application of knowledge and understanding of the use of different construction methods relevant to the time constraints. Demonstrates good evaluative skills with clear reasoning to which method would be most suitable.

Band 3
7-9 marks
Demonstrates a thorough use of analysis of the different types of construction methods. Demonstrates thorough application of knowledge and understanding the use of different construction methods relevant to the time constraints. Demonstrates thorough evaluative skills with thorough reasoning and justifications to which method would be most suitable.

Band 4
10-12 marks

Demonstrates comprehensive use of analysis of the different types of construction methods. Demonstrates comprehensive application of knowledge and understanding the use of different construction methods relevant to the time constraints. Demonstrates comprehensive evaluative skills comprehensive reasoning and justifications to which method would be most suitable.

Section B-extended response type questions

The top two floors of a large office building have their water supplied by a set of two pumps. Following a temporary interruption to the water supply, it has been discovered that one of these pumps had failed, leaving only one in service.

As a contractor who offers building services maintenance, you have been asked to investigate the failed pump. You discover blocked filters have caused the pump to seize. There are no isolation points on the supply pipework, meaning the cold-water service to the entire building will need to be isolated to enable the exchange of the pump.

Discuss the best course of action to replace the pump whilst minimizing disruption to the building, **giving recommendations** for what could be put in place to prevent this type of failure in the future.

(9 Marks)

It may be useful to practice these types of questions with learners.

Get them to list the key points of the question- what is the question asking them to do?
Highlight the key information and command verbs.

*Command verb is **discuss**--Talk/write about a topic in detail, considering the different issues, ideas, opinions related to it*
***Give recommendations-** a suggestion that something is good or suitable for a particular purpose or job*

The top two floors of a **large office building** have their **water supplied by a set of two pumps**. Following a temporary interruption to the water supply, it has been discovered that **one of these pumps had failed, leaving only one in service.**

As a contractor who offers building services maintenance, you have been asked to **investigate the failed pump.** You discover **blocked filters have caused the pump to seize**. There are **no isolation points on the supply pipework, meaning the cold-water service to the entire building will need to be isolated to enable the exchange of the pump.**

Discuss the best course of action to replace the pump whilst **minimizing disruption** to the building, **giving recommendations** for what could be put in place to **prevent this type of failure in the future**.

Answer guide

The intention of this question is to allow the candidate to demonstrate their understanding of the scenario in terms of the task at hand (changing the pump) but also a more holistic view of the overall scenario and how future issues could be resolved or prevented. The candidate should be able to identify that the pump must be replaced, but that it's not an emergency as the water supply is still working, albeit without a backup. It should be identified this form of maintenance is purely reactive. The water supply being switched off will cause major disruption to the rest of the building and its users and should consider when the works take place, such as outside of working hours, giving advance notification, informing all users of the building. The candidate should introduce the principle of planned/preventative maintenance and what this entails. Recommendations: It's been identified that there is a lack of isolation, rectifying this should be considered, such as fitting isolation points for future maintenance tasks.

27

Bands

Band 1 1- 3 marks

Demonstrates basic analysis of the information provided. Demonstrates basic application of knowledge and understanding of the type of maintenance activity and action required to repair. Demonstrates basic use of evaluative skills providing only brief recommendations of how to prevent this from occurring in the future.

Band 2 3-6 marks

Demonstrates good analysis of the information provided. Demonstrates good application of knowledge and understanding of the type of maintenance activity and action required to repair. Demonstrates good use of evaluative skills providing some good considerations and recommendations of how to prevent this from occurring in the future.

Band 3 6-9 marks

Demonstrates thorough analysis of the information provided. Demonstrates thorough application of knowledge and understanding of the type of maintenance activity and action required to repair. Demonstrates thorough use of evaluative skills providing detailed considerations and recommendations of how to prevent this from occurring in the future

Construction Onsite Section

Core exam

Paper1

Paper 2

Extended response questions

6. You are contracted to assist in the refurbishment of a grade II listed building.

State the **two** main cost factors that would need to be consider during the planning and design stage of the refurbishment.

[2 marks]

.....

.....

.....

Q6	You are contracted to assist in the refurbishment of a grade II listed building. State the **two** main cost factors that would need to be consider during the planning and design stage of the refurbishment of the Grade 2			
	Acceptable answer(s)	**Guidance**	**Max marks**	**Test Spec ref & AO**
	Award marks for a suitable answer that covers the following points: • Listed buildings require specialist materials which cost more • Use of specialist labour skills which cost more • Paying for professional fees	Award **1 mark** for each up to a maximum of 2	**2**	**3.1** **AO1b**
KO	KO3 Construction design principles			

Command verb is **State-**give the relevant points briefly

Q. A new build office is to be illuminated. The client is considering the installation of light tunnels in the roof space to allow for natural lighting and has asked for your opinion.

Describe **four** benefits of utilising natural lighting in a building with regards to a person's **health**.

(4 Marks)

Acceptable answer(s)	Guidance	Max marks	Test Spec ref & AO
The utilisation of natural light in a building can provide health benefits such as creating a more comfortable environment (1), preventing seasonal affective disorder (1) help to regulate a person's body clock (1) and improve concentration (1). Natural light will also help reduce any mould or mildew developing (1).	Award **1 mark** for each benefit up to a maximum of 4 marks Accept any other suitable answer that is relevant to the context	**4**	**2.6** **A02**
KO2 Construction science and principles			

Q. A building has suspected asbestos in the walls, ceilings, and pipe insulation. The structure of the building needs to be partially demolished as part of the installation work of building services equipment, which includes the removal of the pipe insulation.

Explain what must be considered to deal with the hazard before work proceeds.

[4 marks]

Command verb is explain-make clear

Acceptable answer(s)	Guidance	Max marks	Test Spec ref & AO
Award marks for answers that demonstrate understanding of the considerations of dealing with asbestos relative to the context, to include • Management of demolition (1) • Extends beyond unlicensed work (1) • Pipe lagging is licenced (1) • Specialist contractors must be used to remove and dispose of these items (1)	Award marks for any other suitable explanations that is relevant to the context	4	1.3 AO2

Section B-extended response type question

A client wants a two-story extension constructed on the back of an office. The site has very easy access for materials and machinery. The main constraint is that the time allowed for the construction work on site, from commencement to handover, is extremely limited.

Discuss the construction method most suitable for this time constraint. **(9 Marks)**

These type of questions are designed for stretch and challenge and allow for differentiation of learners.

For less able learners you may need to break these types of questions down during formative assessments to support learners in accessing marks.

Section B-extended response type question

Picking out the key information

A client wants a two-story extension constructed on the back of an office. The site has very **easy access for materials and machinery.** The main **constraint is that the time** allowed for the construction work on site, from commencement to handover, is extremely limited.

Discuss the **construction method most suitable** for this **time constraint.**

(9 Marks)

Command verb is **discuss-**Talk/**write** about a topic in detail, considering the different issues, ideas, opinions related to it

Indicative content

As the **amount of time allowed on site is extremely limited**, a modular or premanufactured superstructure is the best option. This is where the main structure of the building is constructed elsewhere or off-site and then broken down into sections, moved to site then assembled or put together in a much shorter time.

As the site has **easy access**, the items can easily be delivered and lifting equipment can place it in correct position for quick assembly This system requires long planning times for construction. Co-ordination between superstructure size and sub-structure installation and dimensions is very important to minimise problems

Discussion can also be negative such as reasons for not using traditional methods of construction due to the time taken on site to set-out, build and cure.

It is important for the discussion to note the risks such as the super structure and sub-structure being built in different places, so communication is key to ensure correct dimensions

Band 1
1-3 marks
Demonstrates a basic use of analysis of the different types of construction methods. Demonstrates basic application of knowledge and understanding of the use of different construction methods relevant to the time constraints. Demonstrates basic evaluative skills with limited reasoning to which method would be most suitable

Band 2
4-6 marks
Demonstrates a good use of analysis of the different types of construction methods. Demonstrates good application of knowledge and understanding of the use of different construction methods relevant to the time constraints. Demonstrates good evaluative skills with clear reasoning to which method would be most suitable.

Band 3
7-9 marks
Demonstrates a thorough use of analysis of the different types of construction methods. Demonstrates thorough application of knowledge and understanding the use of different construction methods relevant to the time constraints. Demonstrates thorough evaluative skills with thorough reasoning and justifications to which method would be most suitable.

Section B-extended response type question

A client wants to plan and develop sustainable offices for small business enterprises on a brownfield site surrounded by a mixture of residential and commercial properties.

Discuss the environmental performance measures that need to be considered during the design stage of this project to support the planning application to the local authority

Intention: To allow learners to evaluate a retail/commercial development in terms of the environmental factors that are faced in order to develop a sustainable project.

[12 marks]

Section B extended response question

A client wants to plan and develop sustainable offices for small business enterprises on a brownfield site surrounded by a mixture of residential and commercial properties.
Discuss the environmental performance measures that need to be considered during the design stage of this project to support the planning application to the local authority

Intention: *To allow learners to evaluate a retail/commercial development in terms of the environmental factors that are faced in order to develop a sustainable project.*

Key words:

Command verb-**discuss**-talk/write about a topic in detail, considering the different issues, ideas, opinions related to it

Consider-think carefully about (something), typically before making a decision

Key facts

- Sustainable
- brownfield site
- environmental performance measures to be considered in the design
- support a planning application to local authority

[12 marks]

Knowledge Outcomes:
KO3 Construction design principles
KO5 Sustainability principles

Indicative content:

Performance measures include, as examples

● **Materials**: these should be sympathetic with other buildings in the surrounding location and preferably locally sourced

● **Energy Sources and consumption**: measures should be taken to reduce energy consumption with careful selection of fuel sources so the development will not have a negative impact on the supplies to surrounding properties

● **Water sources/consumption**: Consideration should be given to water recycling and conservation such as rainwater harvesting or greywater recycling to reduce mains water consumption

● **Transport**: Links to public transport to reduce parking conflicts and vehicle use. Provision of electric charging points to promote electric vehicles, provision of secure cycle storage to promote cycling

● **Ecology**: landscape and planting to soften development and promote eco systems

● **Pollution**: restrictions on the type of businesses allowed to use development to reduce pollution such as noise, smell. Designs to reduce light pollution and as well as visual impact.

● Other environmental considerations acceptable with justification including emissions, product use etc.

Looking at the detail papers 1&2 BSE/OSC

1. There was a clear differentiation of performance within the cohort when candidates were asked to demonstrate **understanding, application, analysis**, or **evaluation.**

2. Overall, it was evident that candidates would benefit from support in developing their **extended response answering techniques**, as candidates underperformed in **Section B** of these exams

3. Candidates also found it challenging when having to respond to and follow question **command verbs**.

4. In the ERQ questions, candidates were asked to explain how a proposed new development can create a flood risk, including evaluating flood risk reduction methods that could be implemented, to combat flooding issues. The question response needs to be twofold, as the question is asking for two explanation/discussion points. Candidate's responses overall did not address the question fully, as responses never encompassed all question elements to access the higher marks available.

5. The type of response required by an '**Explain'** question requires a higher level of response than a **'Describe**' question

Assessment Weightings (more detailed explanations available in QHB)

Assessment Objective (AO)	Description The learner is required to..	OSC Weightings (for OSC and BSE)	Typical Tariffs (marks)	Questions/ examination tasks that might prompt this sort of evidence	Typical command words used
AO2 Apply knowledge and understanding to different situations and contexts	take the understanding of generalities (AO1b) and apply them to specific novel situations.	45%	Medium to high tariff (marks), will require the candidate to take their knowledge and understanding and apply it to the context/scenario given within the question	Given a clear, straightforward/narrow situation, the question requires selection and application of relevant principles and procedures in a way that is specific to the situation (rather than in general terms): what is the best approach to… in this situation? explain the process/ procedure to take when… what are the implications of …(specific rather than general situation).	Given information/ a narrow situation: • What is the best… • Explain the process when… • Use • Apply • Calculate • Work out • Estimate

Assessment Weightings (more detailed explanations available in QHB)

Assessment Objective (AO)	Description The learner is required to..	Weightings (for OSC and BSE)	Typical Tariffs (marks)	Questions/ examination tasks that might prompt this sort of evidence	Typical command words used
AO3 Analyse and evaluate information and issues	Use information they have been provided with e.g. in the form of a detailed scenario requiring them to analyse the interrelated issues arising and evaluate, e.g., the strengths and weaknesses or advantages and disadvantages of approaches they may take to achieve a good outcome	20%	Higher tariff (9-12 mark question types, 'discuss'-type questions expect a higher quality of response for higher marks, and these are usually marked using level of response marking (bands).	**Analyse** Given a relatively complex, realistic occupationally relevant scenario, analyse the situation recommending an approach to be taken to… analyse how the situation can be managed in order to… analyse the consequences of… **Evaluate information and issues related to the content** justify your decisions/approach evaluate how well … meets …standards evaluate how effective/ /efficient…	• Determine • Analyse • Discuss • Evaluate • Justify

Question Layout Paper 2 BSE

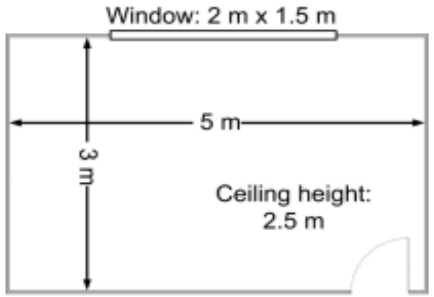


Figure 3

Figure 3 shows a garden room / summer house to be used as a home office, that requires heating. The room's U values are shown in Table 2 below. The desired internal temperature is 22 °C and the outside temperature is assumed to be 5 °C and there are two air changes per hour. All walls are external.

External blockwork & insulated walls U value	0.35
Wooden Floor U value	0.20
Flat roof with insulation U value	0.25
Windows U value	2.9
Door U value	2.9
Air change factor	0.33

Table 2

Analyse the total heat loss based on the information provided and recommend an efficient method of space heating. Show your workings.

Many questions cover various:-
Assessment objectives

learning outcomes

Maths, English and digital skills.

This is cross referenced to the course handbook.

In this example many learners didn't attempt the last part of the question.

Tip.This style could be used in sample questions

Indicative content	Guidance	Max marks	Test Spec ref & AO
Room volume 5×3×2.5=37.5 m2 **Air change loss** 37.5×(22−5)×2×0.33=420.75 Watts Wall area (3 m walls) 3×2.5=7.5×2=15 m2 (5 m walls) 5×2.5=12.5×2=25 m2 Less door 1×1.9=1.9 m2 Less window 2×1.5=3 m2 Total 25−3−1.9=20.1 m2 **Total wall** 20.1+15=35.1 m2 **Wall loss** 35.1×(22−5)×0.35=208.85 Watts	***For no awardable content, award 0 marks.*** **Band 1 1-3 marks** Demonstrates a basic understanding of heat principles. Some basic calculations and some basic explanation of heating systems **Band 2 4-6 marks** Demonstrates a good understanding of heat principles. Most calculations achieved and good explanation of heating systems **Band 2 7-9 marks** Demonstrates a thorough understanding with minor detail missing **Band 4 10-12 marks** Demonstrates comprehensive understanding with detailed calculations and a full understanding of heating principles and suitable systems	12	AO2 (3) AO3a (6) AO3b (3) 2.2 2.6 2.7 MC2 MC4

Deconstructing the question.

Question with key words highlighted.

Analyse the total heat loss based on the information provided and recommend an efficient method of space heating.

Deconstruction.

- **Analyse the total heat loss based on the information provided**

Study the results of the heat loss calculation and building characteristics in detail to suggest potential heat sources for the building.

- **recommend an efficient method of space heating.**

Suggest a suitable method of space heating and include detail as to why this will be effective and capable of heating the room

Question Layout Paper 2 BSE

An old house is to have a new heating system installed and pre-work inspections reveal that none of the BSE systems have been updated or maintained since their installation in the late 1960s. Before any new installation work can commence, all existing systems and services need to be inspected and checked to determine any likely issues and dangers. The house is currently occupied so removal or loss of services must be minimised.

The electrical supply to the house is a 230 V TN-C-S (PME) supply and other services include gas, water and telephone systems.

Discuss the likely condition of the services within the building including what approaches need to be taken to minimise disruption and maintain safety.

Again we need to break down the key parts of the question

See in the mark scheme how the examiners use bands to award marks

Indicative content	Guidance	Max marks	Test Spec ref & AO
Discussion to include likely issues, such as: Electrical system • VIR cables which may damage on movement. Care needed when removing switch covers as insulation failure is likely • Rewireable fuses may contain asbestos. Do not disturb or disrupt as particles may become present in the atmosphere causing harm • Consumer unit may not have suitable basic protection and inspection may lead to risks of shock through contact with live terminals as IP2X protection not present • PME system and bonding connection if removed may create a shock risk due to open PEN in supply. Disconnecting	***For no awardable content, award 0 marks.*** **Band 1 1-3 marks** Demonstrates a basic understanding of older systems but no understanding of the risks involved and no recommendations or evaluated risk **Band 2 4-6 marks** Demonstrates a good understanding of older systems and offers partial understanding of the risks involved with limited	12	AO2 (3) AO3a (4) AO3b (5) 12.7 12.6 12.1

bonding may create the risk of circulating current path being broken leading to potential differences where extraneous parts are used as return path
- metalwork may be used as an earth return path under fault conditions within the installation. Undetected faults may create potential difference between metalwork and earth

Other services

- presence of asbestos in lagging around pipes or in boxing which becomes a danger if disrupted and in these quantities will require specialist removal when work begins
- inspection may cause debris to block boiler flue and if boiler is open flue then there is a risk of carbon monoxide poisoning for residents after inspection work
- As the future planned work is very likely to create a problems with disturbance of the electrical system, recommend a full electrical rewire is carried out before or during the works as the heating installation is certain to disrupt the system creating a risk to installers and disruption to client

recommendations or evaluated risk

Band 3 7-9 marks

Demonstrates a thorough understanding with minor detail missing

Band 4 10-12 marks

Demonstrates comprehensive understanding with detailed understanding of risks and recommendations

Deconstructing the question.

Question with key words highlighted.

Discuss the likely condition of the services within the building including what approaches need to be taken to minimise disruption and maintain safety.

Deconstructing a two part question.

- **Discuss the likely condition of the services within the building.**

(talk/write about the condition of the services of the property in the question brief in detail, considering the different issues, ideas, opinions related to it).

- **What approaches need to be taken to minimise disruption and maintain safety.**

Approach means a way of dealing with someone or something; a way of doing or thinking about something such as a problem or a task.

Minimise disruption means lessen any problems

maintain means to keep in an existing state (as of repair, efficiency, or validity) :

The response needs to ensure the approaches which both minimise (lessen) disruption and maintain (keep) safety are considered to achieve a good mark.

Continued

If the question is broken down so learners can have a clear understanding of all of the instructions within an ERQ it may help them to focus their answers in more detail.

Key point: ERQ questions are worded in a certain way to differentiate between learners.

Discuss the likely condition of the services within the building including what approaches need to be taken to minimise disruption and maintain safety.

Example

P1-Write about the condition of the services of the property in detail, think about the different issues, related to it .

P2-Then write about the different ways you would deal with any problems whilst making sure that there is little risk of disruption to the people living there and you have thought about your safety and the safety of the people there whilst the work is being carried out.

ERQ question

A company involved with ministry of defence work is taking on a cohort of trainees, and as part of the training induction, ERR (Employment Rights and Responsibilities) is to be delivered. Discuss **three** subjects that would be included in the training for the trainees, and why they are important to the construction industry. (12 marks)			
Max marks	12	**Test Spec ref & AO**	9.11 , AO2 (4), AO3a (4), AO3b (4)

Indicative content	Guidance
Intention: *To allow learners to evaluate various topics and if they are covered by ERR* **Indicative content:** A discussion around the following topics **Employment rights:** Minimum wage, pensions Holidays/sickness/maternity leave Equality H&S Welfare arrangements Grievance procedures **Employee responsibilities:** Working to contract H&S compliance Confidentiality Compliance with employers' requirements	***For no awardable content, award 0 marks.*** It is expected that the candidate's response will cover both employers and employees' responsibilities Answers must include explanations of why the subjects are important to the sector.

ERQ bands for marking and markers guidance

Band 1 1-3 marks	Demonstrates a basic use of analysis of topics covered under ERR Demonstrates basic application of knowledge and understanding in relation to ERR Demonstrates basic evaluative skills with limited reasoning to which content would be included in the training
Band 2 4-6 marks	Demonstrates a good use of analysis of topics under ERR Demonstrate good application of knowledge and understanding in relation of ERR Demonstrates good evaluative skills with clear reasoning to which content would be included in the training
Band 3 7-9 marks	Demonstrates a thorough use of analysis of topics under ERR Demonstrate thorough application of knowledge and understanding of ERR Demonstrates through evaluative skills with thorough reasoning and justifications to which content would be included in the training
Band 4 10-12 marks	Demonstrates comprehensive use of analysis Demonstrate comprehensive application of knowledge and understanding of ERR Demonstrates comprehensive evaluative skills comprehensive reasoning and justifications to which content would be included with the training References to confidentiality

	AO2 Application	**AO3a** Analysis	**AO3b** Evaluation
Basic	Limited understanding that is relevant to the context or question. Limited accuracy in interpretation through lack of application of relevant knowledge and understanding.	Limited accuracy in analysis through lack of application of relevant knowledge and understanding.	Un-supported evaluation through lack of application of knowledge and understanding. Un-supported judgement through lack of application of knowledge and understanding.
Good	Some understanding that is relevant to the context or question. Some accuracy in interpretation through the application of some relevant knowledge and understanding.	Some accuracy in analysis through the application of some relevant knowledge and understanding.	Partially supported evaluation through the application of some relevant knowledge and understanding. Partially supported judgement through the application of some relevant knowledge and understanding.
Thorough	A range of accurate understanding that is relevant to the context or question. Accurate interpretation through the application of relevant knowledge and understanding.	Accurate analysis through the application of relevant knowledge and understanding.	Supported evaluation through the application of relevant knowledge and understanding. Supported judgement through the application of relevant knowledge and understanding.
Comprehensive	A range of detailed and accurate understanding that is fully relevant to the context or question. Detailed and accurate interpretation through the application of relevant knowledge and understanding.	Detailed and accurate analysis through the application of relevant knowledge and understanding.	Detailed and substantiated evaluation through the application of relevant knowledge and understanding. Detailed and substantiated judgement through the application of relevant knowledge and understanding

Learners responses

Candidate Response (Band 1)

Top of band 1 response - 3 marks

A subject I would expect to be covered is an employee's right of holiday. This is greatly important because it keeps the employees happy. As well as this, it will improve the quality of work as they will be happy to work for you as they are treated fairly.

I would also expect the responsibility of employees to be covered. This is a good topic to cover as it will tell the trainees what is expected of them by you the employer.

Examiner Commentary on application of mark scheme

The candidate has provided a basic analysis of the topics which fall under EER. They have been asked to identify three subjects, and this candidate has only identified two given some analysis around one of these subjects. The subjects identified are correct, however, in response to the context given they are of less important that other subjects which haven't been considered. Their response also focuses only on the employee and does not consider the employer.

There is basic application of knowledge, the candidate has failed to use any of the context given in the question in order to form their response, they comment on general considerations of ERR, rather than those applied to the situation given.

The candidate makes limited reasoning and makes judgements which are un-supported.

Candidate Response (Band 4)

Bottom of Band 4 - 10 marks

The employment rights and responsibilities induction will contain all of the information about the trainees jobs. The three subjects will include: their pay, their sick pay/allowed time off, as well as their entitlement to breaks during work.

Firstly, the employees pay. This is vital as it is used to incentivise the employee and make them want to work, this is especially important in the construction industry as some companies keep retention of their employees as well as pension contributions.

Secondly, sick pay or time off in general is a subject heavily discussed to the trainee, this is required in the construction industry as everyone is entitled to time off if needed whether it is maternity leave or holiday pay, it is a human right. This is also very important in the construction industry as injuries can be easy to come by and employees must know what to do if they are injured and who to report it to, as well as how long they're allowed off.

Finally, the employees entitlement to breaks during work must be discussed, as it is also a human right if working for a long period of time. This is vital in the construction industry as prolonged periods of work without rest can lead to exhaustion or greatly increase the risk of injury. These are also used as incentives for workers as free time helps employees to relax, refuel.

All of these subjects are discussed under ERR as they are all human rights for employees and must legally be discussed.

Examiner Commentary on application of mark scheme

The candidate has met the requirements of the questions and considered at least three EER subjects which need to be covered as part of the induction which are all relevant to EER. For each point made the candidate evaluates the importance of the subject and reflects on why it is needed in a construction context showing detailed and substantiated evaluation and judgements.

The candidate remains towards the bottom of the band as the subjects they have chosen are still generic and their response is not tailored to the context of working for the Ministry of Defence and the contextualisation this requires in their response.

Q. Calculate the volume of concrete required to pour a pile foundation measuring 600 mm in diameter with a depth of 8 m. Show all workings and provide the answer to 2 decimal places.

Acceptable answer(s)	Guidance	Max marks	Test Spec ref & AO
Concrete pile foundations are cylindrical therefore requiring the formula height x pi x radius^2 (1 mark) 0.6 diameter/2 to obtain radius 0.3 (1 mark) 0.3 x 0.3 is 0.09 (1 mark) 0.09 x pi 3.14 is 0.2826 (1 mark) 0.2826 x 8 is 2.26 Answer: 2.26 m^3 to 2 decimal places (1 mark)	If only answer given with no workings shown, a maximum of 3 marks can be awarded. Award max. 4 marks if answer is NOT given in unit/ m^3 Some candidates will have been taught 3.142 or 3.14 so accept either for pi.	5	7.2 (MC2) AO2
KQ ref: Building technology principles			

7.2 **Forms** of construction

Range:
Forms - substructure, superstructure, infrastructure, internal/external walls, external work.

What do learners need to learn?	Skills
Current forms of construction and their use and suitability for both built environment and civil engineering structures.	EC1 EC2 EC4 EC6
Substructures: types of foundations, basements, retainer wall	
Superstructure: roofs, walls, floors, windows, doors and frames	
Infrastructure: roads, sewage systems, railways, bridges	
Internal/external walls: cavity, solid, infill, stud, openings vertical and horizontal damp proof, weather tight, preventing water ingress and allowing for egress (weep holes)	
External work: paving, boundaries, drainage, parking, (finished surfaces, sub-base materials)	

Example Candidate Response (worth 5 marks)

$600 \div 2 = 300$

$300^2 \times \pi = 282743.3388$

$282743.3388 \times 8000 = 2261946711\ mm^3$

$2261946711\ mm^3 = 2.261946711\ m^3$

$= 2.26\ m^3\ of\ concrete$

Examiner Commentary on application of mark scheme

Mark 1: The candidate demonstrated they were able to apply their understanding of the shape of a pile foundation being cylindrical by identifying the appropriate formula. Despite not using the method in the order outlined in the mark scheme, the candidate was still able to recall and use the appropriate formula of $h \times \pi \times r^2$.

Mark 2: The candidate had the knowledge that the radius was half of the diameter and therefore halved 600.

Mark 3: Candidate was able to correctly calculate the area of the circle $\pi \times r^2$

Mark 4: Candidate was able to correct multiple the area of the circle by the height of the foundation.

Mark 5: The candidate was able to present their answer in the correct SI unit (m^3) to 2 dp.

Examiner hints and tips

- Encourage candidates to always show their working out, they may be able to pick up marks for following the correct method, even when calculations have gone wrong.
- If candidates only present an answer and do not show the method they used for the calculation they may not achieve full marks.
- Where candidates make errors in their calculations or the method used, they should cross through their working.
- Candidates should note the SI unit/unit of measure that their answer needs to be presented using.
- Candidate should note the number of decimal places or significant figures they are asked to give their answer too.


T-LEVELS
Institute for Apprenticeships & Technical Education
Support materials
City & Guilds
eal

Paid for resources: supporting delivery with Hodder Education

Building Services Engineering and Construction T Level: Core

- **Complete coverage of T Level's core component**
- **Prepares students for core exams and ESP**
- **Available in print and digital formats**
- **E-mail Ruth Murphy if you would like to review the full book proofs or request sample chapter**
- ruth.murphy@hoddereducation.co.uk

- **Link to Hodder Website**

Link to Hodder Website also has the link to the mapping grids (bottom of the webpage) which can show how other books can deliver the Occupational Specialism

Paid for resources: supporting delivery with Hodder Education Building Services Engineering and Construction T Level: Core

Key term

Superstructure: the part of a building above ground level, built on the basement or foundation

▲ Figure 3.1 Superstructure and substructure of a building

Test yourself

What part of a building is the superstructure?

Industry tip

Never deviate from approved working drawings during the construction phase without written consent from either Local Authority Building Control or a government-approved private building inspector. Changes to the design without permission can be expensive to put right if the work fails to meet building regulations approval.

Improve your English

'Luminaire' is a word used to describe a source of artificial light. Write a paragraph to explain the use of different types of luminaire in a building, and explain why natural light is always a better source of energy.

Improve your maths

Research the average wages for five different trades in your area, then determine the annual median wage.

Research

Search online for 'PAS 2030:2019 Specification for the installation of energy efficiency measures in existing dwellings and insulation in residential park homes'.

Identify the standards of PAS 2030:2019 for retrofit installers and explain how they benefit the construction industry.

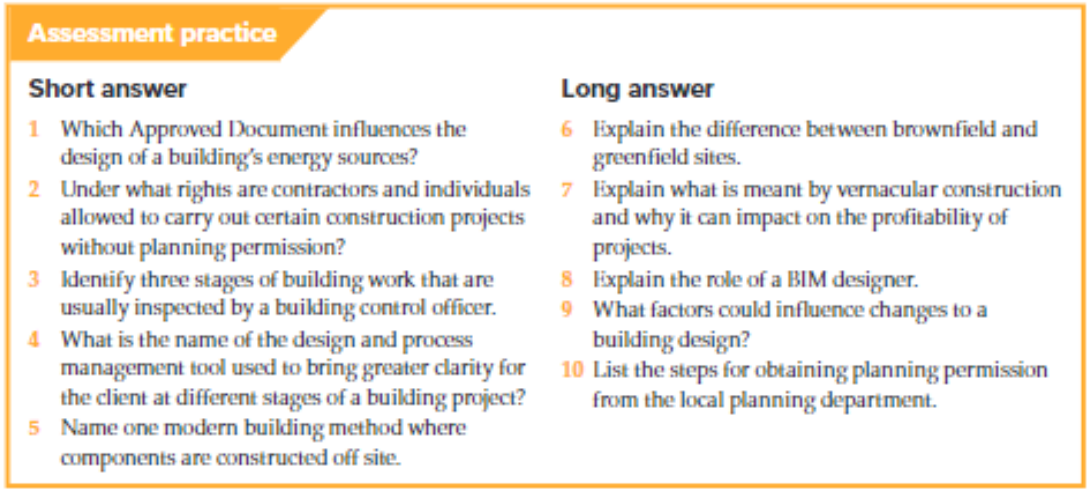
▲ Figure 3.17 Retrofit installer fitting an energy-efficient boiler

Paid for resources: supporting delivery with Hodder Education Building Services Engineering and Construction T Level: Core

The Hodder text books have some great ideas of how to develop learners' skills and the use of the relevant verbs in assessment questions.

This can also help with setting sample questions in the classroom at various intervals in delivery.

Tip. Also set sample questions across multiple learning outcomes and units.



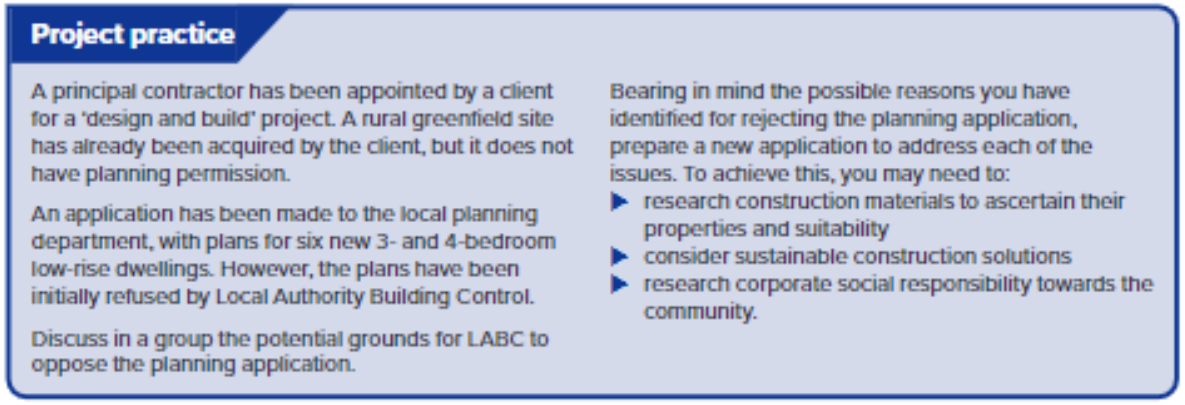
Assessment practice

Short answer

1 Which Approved Document influences the design of a building's energy sources?
2 Under what rights are contractors and individuals allowed to carry out certain construction projects without planning permission?
3 Identify three stages of building work that are usually inspected by a building control officer.
4 What is the name of the design and process management tool used to bring greater clarity for the client at different stages of a building project?
5 Name one modern building method where components are constructed off site.

Long answer

6 Explain the difference between brownfield and greenfield sites.
7 Explain what is meant by vernacular construction and why it can impact on the profitability of projects.
8 Explain the role of a BIM designer.
9 What factors could influence changes to a building design?
10 List the steps for obtaining planning permission from the local planning department.



Project practice

A principal contractor has been appointed by a client for a 'design and build' project. A rural greenfield site has already been acquired by the client, but it does not have planning permission.

An application has been made to the local planning department, with plans for six new 3- and 4-bedroom low-rise dwellings. However, the plans have been initially refused by Local Authority Building Control.

Discuss in a group the potential grounds for LABC to oppose the planning application.

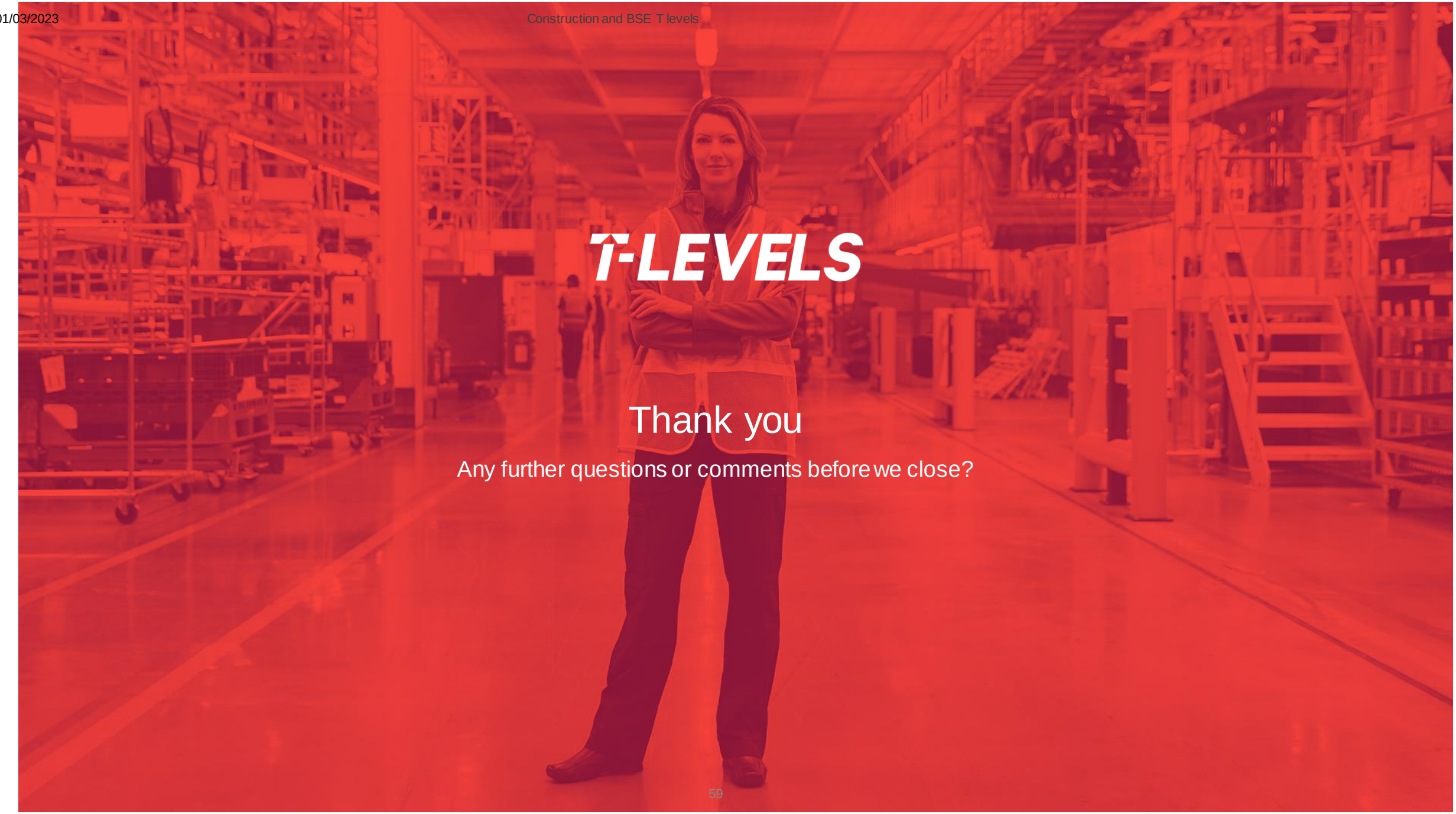
Bearing in mind the possible reasons you have identified for rejecting the planning application, prepare a new application to address each of the issues. To achieve this, you may need to:

- research construction materials to ascertain their properties and suitability
- consider sustainable construction solutions
- research corporate social responsibility towards the community.

Future Networks how can we help

Please complete our short survey and tell us what you need for the future.

https://forms.office.com/r/qkzfv6pML0



Thank you

Any further questions or comments before we close?