T-LEVELS | IfATE Institute for Apprenticeships and Technical Education

T Level Technical Qualification in Design and Development for Engineering and Manufacturing

Employer-Set Project (8730-035)

Marking Grid Autumn 2024

City & Guilds | eal

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Version Control

Version	Updates made
V1.0	Version used for marking.

General marking approach

The following process details at high level the steps that will be undertaken by the external marking teams at City & Guilds following the submission of candidate's submitted evidence (including additional supporting evidence such as videos of presentations etc.);

Process

- Marker scans / reads the candidate's evidence, any notes on the Declaration of Authenticity e.g. regarding level of support recorded and the band descriptors. Evidence contained on Declaration of Authenticity is taken into account along with all other candidate evidence at the point of marking – the external marker makes a judgement on the level of performance the candidate has demonstrated taking all the evidence into consideration and they then judge the appropriate mark following the normal process
- Marker makes an initial assessment of the best fit to band
- Marker reviews the candidate evidence against the initial band descriptor in more detail to decide if the response is securely sitting within the band; i.e. all characteristics described by the band descriptor are seen or it strongly meet the level of performance described by the descriptor holistically
    - Marker will also check the descriptor for the level above
    - If evidence clearly shows some of the characteristics of the higher band, the marker will select a suitable mark at the bottom of that band
    - If not showing characteristics of the higher band, the marker will revert to the original band, selecting a mark at the higher end of that mark range

  If the response is not securely in the band, but is partially showing the characteristics of the band
    - Marker will check the descriptor of the level below/above
    - Maker will decide on a suitable mark either at the bottom of the original band as some characteristics shown, or top of the lower band if it better describes the quality of the characteristics being shown

  If the response is largely meeting the band, with only a few concerns and is not showing characteristics aligning with the higher or lower bands, the appropriate mark is likely to be in the middle range.

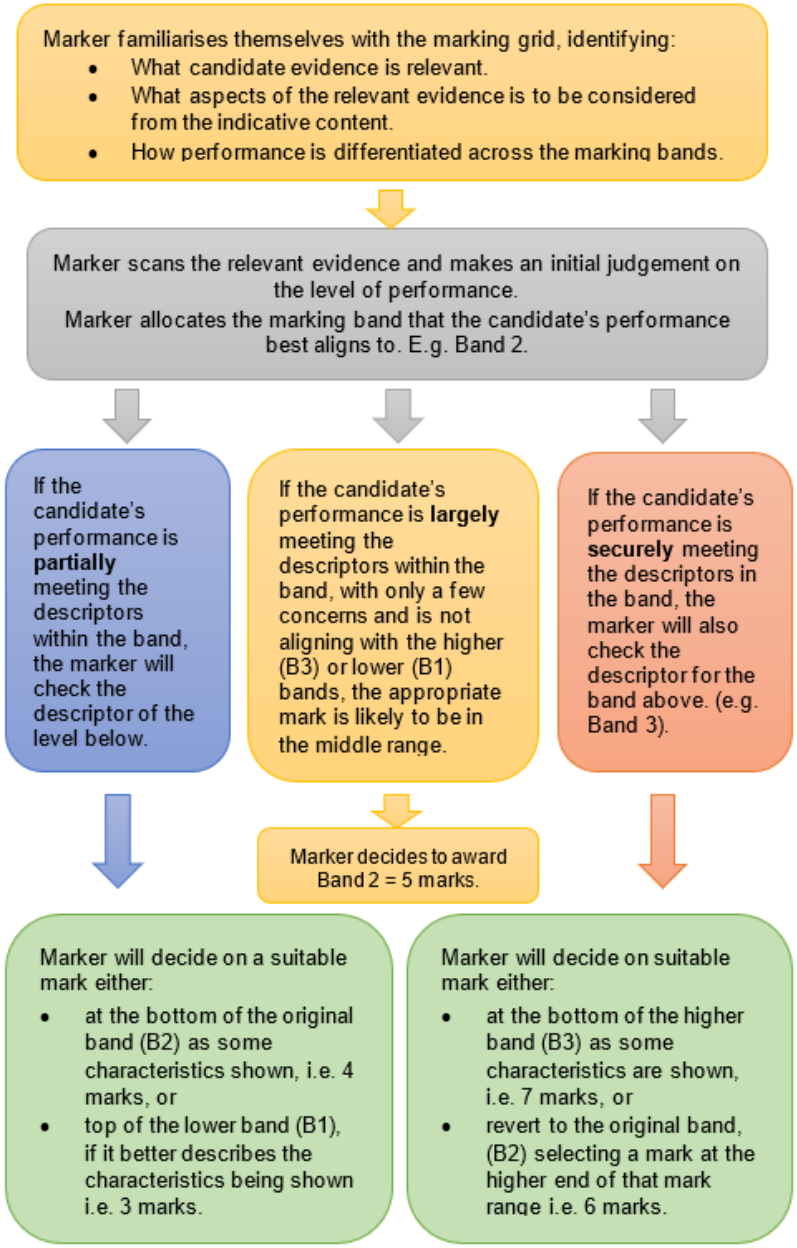
  If there is no alignment with the descriptor, the marker will reassess the starting band, and begin again.
- Based on the level of alignment with the descriptor, the marker will confirm a final mark within the band, bearing in mind the marks available form an evenly distributed scale:
    - If the quality of response fully aligns with the performance described by the descriptor, the marker will assign a high mark within the band
    - If the quality of the response partially aligns with the performance described by the descriptor, the marker will assign a low to medium mark within the band
    - The marker will consider the quality of a range of similar responses (e.g., annotated lead grade exemplification materials, responses reviewed during standardisation, and through experience) and choose a mark that would give an appropriate ranking amongst those responses in relation to the full range of marks available in each band.

- In order to fully assess the evidence, it may be necessary to focus on several distinct aspects. These have been grouped into separate sub-grids (e.g., 1.1, 1.2 etc. to allow the marker to make separate assessment decisions, rather than attempt to bring disparate elements together as a holistic judgement, to support reliability, validity and manageability for the marker.
- Should a candidate make an error or display a weakness in one task that is further compounded through the inter-dependent nature of the tasks and carry through that error, the marker should penalise the candidate only once. Each task should be considered within the constraints of the marking for the task itself, focusing on the knowledge and skills to be demonstrated in that task. For example, if the candidate does not research suitable materials in task 1, when they get to the presentation task 4 where the solution is presented – the marker should focus on looking at how well the candidate presents the solution they are proposing, ie, it is the presentation and communication skills that hold the main relevance in this task, rather than further penalising the candidate for a less than optimal material research and proposal from the initial task 1. Candidates can also use evaluation within later task responses to address issues they have identified.

Worked Example (1)

Grid 1 AOs: AO1, AO2a, AO3, Relevant Evidence: research notes, list of references/sources

Task 1	Band 1			Band 2			Band 3		
	1	2	3	4	5	6	7	8	9
Research (Planning, core knowledge, selecting techniques and resource)	**Indicative Content – Sample version** **AO1** – The candidate has planned their research. This may be evidenced in the coherence of structure of the research notes, and in the sources/resources listed. The consistency of coverage of research requirements as detailed in the technical brief in relation to required aspects of the task. **AO2a** – Evidence of the candidate researching required elements and refining their approach to the problem and considering the jig requirements meet the specification given. Candidates provided details on research of materials, standard parts and relevant specifications. Research on responses to similar problems, similar solutions or ones that relate the provided brief. Detail of health and safety considerations and risk assessment requirements. **AO3** – The candidate's selected research techniques and resources to meet the brief and their relevance. The matching of resources and information to the various parts of the research requirement – use of specifications, diagrams, downloads etc to match the determinations that must be made.								
	Band 1			**Band 2**			**Band 3**		
	1	2	3	4	5	6	7	8	9
	Some evidence of a planned approach to research. (AO1) Some elements of core knowledge referenced but focus may be imbalanced and more focused on one area than another. (AO2a) Research techniques and resources clear as part of evidence submission. (AO3)			Approach to research and collation of information shows planning and consistency. (AO1) Core knowledge applied in most areas of the brief requirements. (AO2a) Evidence of a range of techniques and resources used and referenced, with different source types considered. (AO3)			Brief requirements are considered consistently throughout the research and information collation – clear evidence of methodical and thorough approach to research and information gathering. (AO1) Core knowledge applied in all areas of the brief requirements. (AO2a) Evidence of comprehensive research techniques, use of resources, and full range of sources. All sources fully detailed and presented fully and consistently. (AO3)		



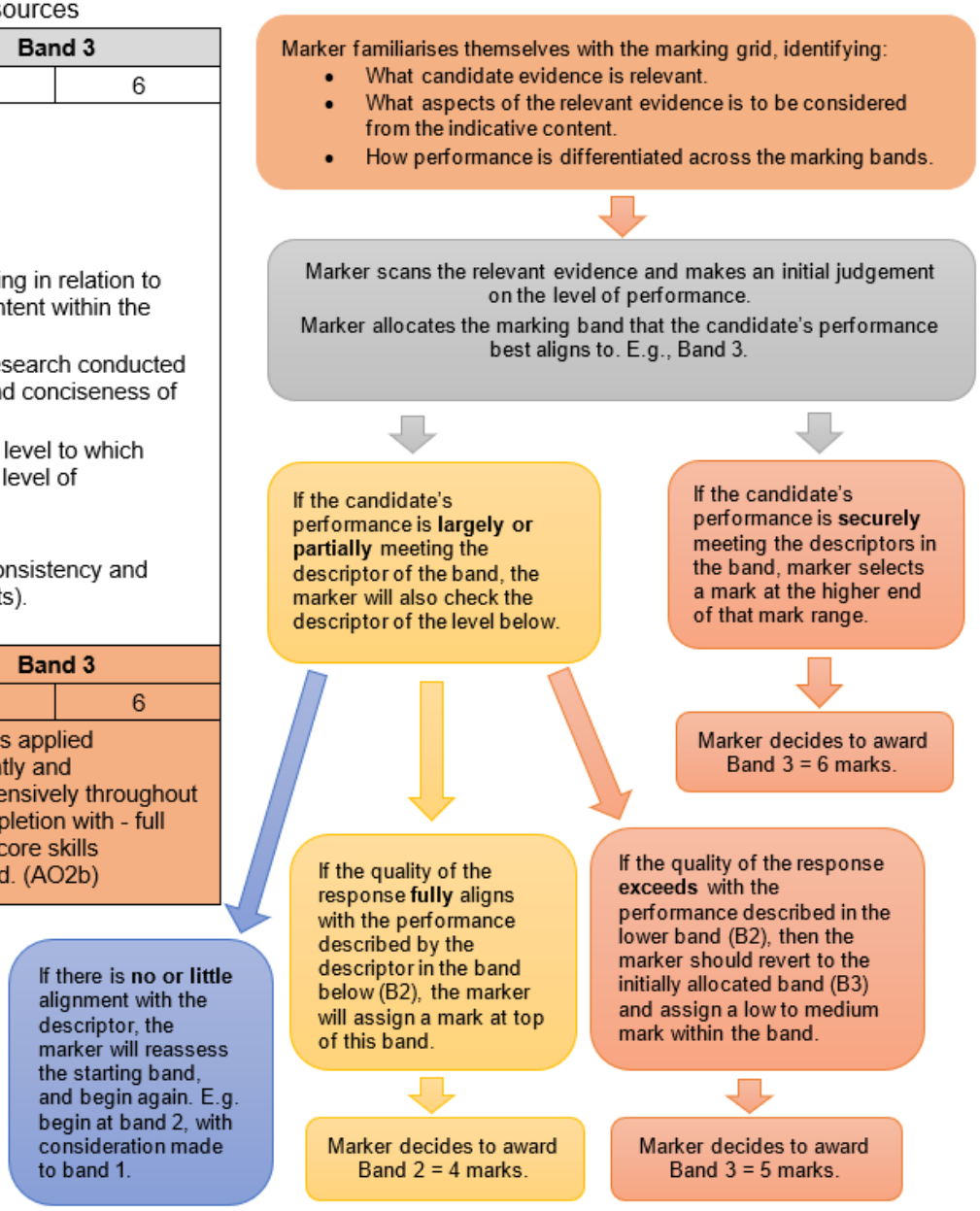
Worked Example (2)

Grid 2 AOs: AO2b, Relevant Evidence: research notes, list of references/sources

Task 1	Band 1		Band 2		Band 3	
	1	2	3	4	5	6

Research
 	
(Core skills)
	Indicative Content – Sample version
	
	AO2b – Application of core skills
	Core skills being assessed:
	• Analysing and interpreting
	  ○ the candidate's demonstration of judgement and reasoning in relation to the review of the requirements from the brief and the content within the report
	  ○ the candidate's effectiveness of communication of the research conducted to meet the requirements outlined in the brief – clarity and conciseness of response
	  ○ expression of ideas in associated research analysis and level to which they are supported e.g. through inclusion of images and level of referencing to sources.
	• Planning and preparation
	  ○ evidence of planning in the research notes in terms of consistency and balance of response (time spent consistently on elements).					

Band 1		Band 2		Band 3	
1	2	3	4	5	6
Some basic elements of core skills drawn on and evidenced within task response - limited use of skills in relation to brief requirements. (AO2b)		A range of core skills applied and evidenced consistently in task response in relation to different elements of the project brief. (AO2b)		Core skills applied consistently and comprehensively throughout task completion with - full range of core skills evidenced. (AO2b)	



Use of ChatGPT (or any other Artificial Intelligence)

What isn't permitted

AI misuse is where a student uses an AI tool in an assessment or fails to appropriately reference it in an assessment where internet use is permitted. Examples include the following:

- Failing to reference use of AI tools when they have been used as a source of information;
- Incomplete or poor referencing of AI tools;
- Copying sections of AI-generated content so that the work is no longer the student's own;
- Copying whole responses of AI-generated content;
- Submitting work with intentionally incomplete or misleading references or bibliographies.

AI misuse constitutes malpractice as defined in the JCQ Suspected Malpractice: Policies and Procedures (**https://www.jcq.org.uk/exams-office/malpractice/**). We encourage markers to read and reference this guidance if they feel the need to flag potential malpractice related to ChatGPT. The malpractice sanctions available for the offences of 'making a false declaration of authenticity' and 'plagiarism' include disqualification and debarment from taking qualifications for a number of years.

What is permitted

AI may have been used by the candidate as a source within their research task (Task 1 only). Where students use AI, they must acknowledge its use and show clearly how they have used it. However, how candidates have decided to use it will impact on the overall mark they are allocated.

The use of AI as a research technique will impact Grid 1. Below details how they will be impacted and what needs to be considered:

<u>Grid 1</u>

- AO1: Planning (Approach to research and information gathering)
  - Has the candidate validated the information given to them by the AI solution?
- AO2a: Application of Core Knowledge
  - Does the candidate's evidence demonstrate how they have taken the research provided by the AI and used this, alongside their own knowledge in response to the brief?
- AO3: Selecting Techniques and Resources
  - Has the candidate considered other approaches to research, or have they just deferred to AI?
  - Is the use of AI appropriate referenced?

Worked Example

Candidate A has referenced ChatGPT along with one other web-address, which has barely been used or referred to within their evidence. They have considered the majority of the prompt given in the brief but not all.

The way the evidence is presented, it's difficult to determine what information is taken directly from the source and what is the learner's interpretation of this information. On this occasion, the learner is likely to be contained to marks within Band 1 because:

- There is some evidence that they carried out some planning – they've considered the majority of the prompts within the brief.
- It's difficult to determine how the candidate has interpreted the information from the research and applied their own knowledge within the evidence given the way it's presented.
- They have used ChatGPT as a primary source and have only followed up with one other website, and the reference to this is limited, therefore, minimal techniques have been used. To add to this the candidate has not made it clear within their reference what is the output from ChatGPT and what is their own work.

What to do if you believe you've identified potential misuse of AI

Any concerns around AI misuse must be treated as potential malpractice. You must flag this by putting the candidate on HOLD in myMarkis. Further guidance relating to this can be found in Section 12 (Page 6) of the 'myMarkis Checklist for Marking' document.

What to do if you're unsure

Your marking supervisor is there to support you through the process, as are the City & Guilds Assessment team. If you have a specific candidate, you'd like to talk through in more detail please reach out to them.

Assessment objectives

The Employer-Set Project is assessed against five assessment objectives. The assessment objectives are mapped against each task within the marking grids:

AO Ref	Assessment Objective
AO1	Plan their approach to meeting the project brief
AO2	Apply core knowledge and skills as appropriate
• AO2a	• core knowledge
• AO2b	• core skills i) **Planning and preparation** eg interpret and confirm project requirements; plan and scope project (eg timescales, requirements, resources, cost); develop project plans. ii) **Communication** eg interpret, use and produce engineering representations and drawings (including graphical language/conventions), interpret and use relevant technical information in a range of formats and media, communicate appropriately with technical and non-technical audiences (using appropriate technology, as appropriate). iii) **Develop and manufacture** eg design or devise a proposal to meet the brief, develop, model and revise concept/s. iv) **Evaluation** eg carry out appropriate tests, evaluation and analysis (at relevant stages), confirm appropriate model for final realisation, testing for suitability, evaluate how well the final product meets the brief (eg quality, time, resources, cost).
AO3	Select relevant techniques and resources to meet the brief
AO4	Use maths, English and digital skills as appropriate
• AO4a	• maths
• AO4b	• English
• AO4c	• digital
AO5	Realise a project outcome and review how well the outcome meets the brief
• AO5a	• realise a project outcome – was the right outcome achieved
• AO5b	• review how well the outcome meets the brief, how well the brief was met, the quality of the outcome in relation to the brief

Employer-Set Project mark distribution

This table illustrates how the 90 marks for the Employer-Set Project are distributed against the tasks and mapped to each assessment objective. These have been set by subject matter experts and employers and will support the comparability between versions of the Employer-Set Project over time.

Tasks	AO1	AO2a	AO2b	AO3	AO5a	AO5b	Total	AO4a	AO4b	AO4c
1. Research	3	3	6	3	0	0	15	3	3	3
2. Design	3	6	6	3	3	3	24			
3. Plan	3	6	6	3	0	0	18			
4. Present	3	6	6	3	3	3	24			
Total	**12**	**21**	**24**	**12**	**6**	**6**	**81**	**9**		**90**
AO marks	12	45		12	12		-	9		90
AO %	13.3%	50%		13.3%	13.3%		-	10%		100%

NB - AO2 collectively must be at least 50% (ie 45 marks)

1. Research

<table>
<tr><th colspan="4">Grid 1: AO1, AO2a, AO3 Research (Planning, core knowledge, selecting techniques and resource)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
• Technical brief including an evaluation of potential opening/ closing mechanism and locking system, key requirements for a suitable storage unit, overall aesthetics of the design of the storage unit to be visually appealing, they should be visible both during the day and night and extra visibility should be added when they are open to warn other vehicles to be extra cautious.
• Any supporting documentation such as research notes.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td>AO1 – Plan their approach to meeting the project brief
The candidate’s:
• approach to investigating potential solutions.
• structure of the research notes and analysis.
• exploration of the requirements and the issues outlined in the task, and how consistent/balanced the consideration of each of these are in comparison to each other.
• appropriate indication of references to sources of guidance and industry standards.

AO2a – Apply core knowledge
The candidate’s:
• confidence and appropriateness of use of terminology.
• accuracy of the technical brief contents in relation to sources.
• selection and definition of key aspects of the task in relation to:
○ limitations of current cycle storage units
○ the opening/closing mechanism for the recumbent cycle storage unit along with warning signs when in operation for oncoming traffic
○ how it will operate for less able users
○ the locking systems that can be used by authorised users
○ materials that could be used for all elements of the storage unit based on the product design specification, including their cost and consideration of future maintenance
○ how to make the storage unit visible at all times</td><td>AOs

AO1

AO2a

AO3</td><td>Total marks available

9</td></tr>
</table>

Grid 1: AO1, AO2a, AO3 Research (Planning, core knowledge, selecting techniques and resource)			
	○ review any appropriate cycle parking standards that exists ○ overall aesthetics of the design of the storage unit to be visually appealing ○ they should be visible both during the day and night ○ extra visibility should be added when they are open to warn other vehicles to be extra cautious. • evaluation of different options and reasoning for refining/selecting solutions, how this links back to the specifics of the product design specification and brief from client. **AO3 – Select relevant techniques and resources to meet the brief** The candidate's: • range of techniques and resources used to carry out research (such as the number of websites, and types of websites). • consideration of the relevance and reliability of the sources used during the research. • ability to apply the findings from the research into their initial proposal. • clarity of references to sources of guidance and industry standards. • Use of pictures, drawings, schematics, specifications and sketches alongside prose to communicate their initial design concepts.		

Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given

Band 1 descriptor			Band 2 descriptor			Band 3 descriptor		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Some evidence of a planned approach to research. (AO1)			Approach to research and collation of information shows planning and consistency. (AO1)			Brief requirements are considered consistently throughout the research and information collation – clear evidence of methodical and thorough approach to research and information gathering. (AO1)		

Grid 1: AO1, AO2a, AO3 Research (Planning, core knowledge, selecting techniques and resource)		
Some elements of core knowledge referenced but focus may be imbalanced and more focused on one area than another. (AO2a) Research techniques and resources detailed as part of evidence submission. (AO3)	The application of core knowledge is referenced consistently for example in relation to technology, selection of materials and development of initial ideas. (AO2a) Evidence of a range of techniques and resources used and referenced, with different source types considered. (AO3)	Core knowledge applied in all areas of the brief requirements including - technology, construction materials, and idea summation. (AO2a) Evidence of comprehensive research techniques, use of resources, and full range of sources. All sources fully detailed and presented fully and consistently. (AO3)

<table>
<tr><th colspan="7">Grid 2: AO2b Research (Core Skills)</th></tr>
<tr><td>Guidance for markers</td><td colspan="6">Only the following evidence must be used to assess performance against this marking grid:
• Technical brief including an evaluation of potential opening/ closing mechanism and locking system, key requirements for a suitable storage unit, overall aesthetics of the design of the storage unit to be visually appealing, they should be visible both during the day and night and extra visibility should be added when they are open to warn other vehicles to be extra cautious.
• Any supporting documentation such as research notes.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td colspan="4">AO2b – Application of core skills
Core skills being assessed:
Planning and preparation:
• interpretation of the project brief and product design specification
• judgement and reasoning for initial concept ideas

Communication:
• effectiveness of communication of refined technical requirements for the recumbent cycle storage unit
• clarity and conciseness of delivery.
• use of industry conventions and technical language
• use of methods to communicate ideas (drawings, sketches, diagrams, schematics, written format).
• clarity and conciseness of expressions of ideas.</td><td>AOs</td><td>Total marks available</td></tr>
<tr><td>AO2b</td><td>6</td></tr>
<tr><td colspan="7">Marking descriptors – All versions
Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><td colspan="2">Band 1 descriptor</td><td colspan="2">Band 2 descriptor</td><td colspan="2">Band 3 descriptor</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td colspan="2">Some basic elements of core skills drawn on and evidenced within task response - limited use of skills in relation to brief requirements. (AO2b)</td><td colspan="2">A range of core skills applied and evidenced consistently in task response in relation to different elements of project brief. (AO2b)</td><td colspan="2">Core skills applied consistently and comprehensively throughout task completion with - full range of core skills evidenced. (AO2b)</td></tr>
</table>

2. Design

<table>
<tr><th colspan="4">Grid 3: AO1, AO3 Design (Planned approach, selecting techniques)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Annotated sketches of at least two potential designs which illustrate the recumbent cycle storage unit opening/closing mechanism for the storage unit that is suitable for less able users, materials from which all parts will be made to last at least 15 years in external environmental conditions, that the storage unit is enclosed and waterproof, the extra visibility added when they storage unit is open to warn other vehicles to be extra cautious the locking system, an aesthetically pleasing design, full dimensions and how many cycles it will hold.
Cost of recumbent cycle storage unit calculations
Notes on how the potential designs meet the brief requirements.
Dimensioned and scaled CAD drawing(s) of preferred chosen design.</td></tr>
<tr><td>Indicative Content</td><td>AO1 – Plan their approach to meeting the project brief
The candidate’s
layout of sketches and CAD drawings for the design, into plans, elevations, sections and details.
coverage of the requested elements of the task:
fully-annotated sketches
with supporting notes
working calculations
a final fully dimensioned CAD drawing
coherence of structure and clarity of task 2
AO3 – Select relevant techniques and resources to meet the brief
The candidate’s
presentation of sketches and CAD
drawings, adherence to convention and annotations, clarity, quality and accuracy.
use of a drawing frame for drawings, and inclusion of title block.
consideration of industry practices and use of adopted scale when creating the sketches and drawings.</td><td>AOs

AO1

AO3</td><td>Total marks available

6</td></tr>
</table>

<table>
<tr><th colspan="6">Grid 3: AO1, AO3 Design (Planned approach, selecting techniques)</th></tr>
<tr><td></td><td colspan="3">• presentation and format of calculations prepared by the candidate to determine the maximum that can be produced for the available budget(s).</td><td></td><td></td></tr>
<tr><td colspan="6">Marking descriptors – All versions
Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><th colspan="2">Band 1 descriptor</th><th colspan="2">Band 2 descriptor</th><th colspan="2">Band 3 descriptor</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr>
<tr><td colspan="2">Some evidence of a planned approach to design task, response may lack detail and calculation information. (AO1)

Some relevant techniques used in the preparation and presentation of drawings/sketches and associated calculations. (AO3)</td><td colspan="2">Approach to design and calculations information is planned, organised and complete. (AO1)

Relevant techniques and industry drawing conventions used throughout the preparation and presentation of drawings/sketches and associated calculations. (AO3)</td><td colspan="2">Approach to design and calculations fully comprehensive and in line with standard industry practices / best practice (AO1)

Preparation and presentation of drawings/sketches and associated calculations is fully in line with industry drawing conventions showing the use of all correct techniques. (AO3)</td></tr>
</table>

<table>
<tr><th colspan="4">Grid 4: AO2a Design (Core Knowledge)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Annotated sketches of at least two potential designs which illustrate the recumbent cycle storage unit opening/closing mechanism for the storage unit that is suitable for less able users, materials from which all parts will be made to last at least 15 years in external environmental conditions, that the storage unit is enclosed and waterproof, the extra visibility added when they storage unit is open to warn other vehicles to be extra cautious the locking system, an aesthetically pleasing design, full dimensions and how many cycles it will hold.
Cost of recumbent cycle storage unit calculations
Notes on how the potential designs meet the brief requirements.
Dimensioned and scaled CAD drawing(s) of preferred chosen design.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td>AO2a – Apply core knowledge
The candidate’s
choice of language used in any text on the sketches and CAD drawings, its technical levels and consistency with the intended audience.
proposed solutions for the design of the recumbent cycle storage unit how well they meet industry guidance, have the potential to be implemented and their technical sense.
opening/closing mechanism for the storage unit that is suitable for less able users
materials from which all parts will be made to last at least 15 years in external environmental conditions
that the storage unit is enclosed and waterproof
the extra visibility added when they storage unit is open to warn other vehicles to be extra cautious the locking system
an aesthetically pleasing design
full dimensions and how many cycles it will hold
accuracy of technical principles applied throughout the design.
ability to make links between general knowledge and understanding of engineering principles and apply this to the given scenario.
approach to perform calculations, selected method used to determine this and level of consideration of safety factors.</td><td>AOs</td><td>Total marks available</td></tr>
<tr><td>AO2a</td><td>6</td></tr>
<tr><td colspan="4">Marking descriptors – All versions</td></tr>
</table>

Grid 4: AO2a Design (Core Knowledge)					
Note: where there is insufficient evidence to award a mark, a zero mark may be given					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Some elements of core knowledge drawn on and evidenced - limited comprehension of knowledge in relation to brief requirements e.g., brief requirements omitted indicating lack of knowledge of that area. (AO2a) Some links to the application of core knowledge to support judgements, but connections are not always clear and accurate. (AO2a)		Knowledge from across the core applied and evident in relation to different elements of project brief. (AO2a) Links to the application of core knowledge to justify and support judgements, but with some gaps or inaccuracies. Concepts explained/ referenced clearly and correctly. (AO2a)		Core knowledge applied consistently throughout response with minimal technical inaccuracies. (AO2a) Connections between elements of core knowledge exploited to strengthen arguments and demonstrate understanding. (AO2a)	

<table>
<tr><th colspan="4">Grid 5: AO2b Design (Core skills)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Annotated sketches of at least two potential designs which illustrate the recumbent cycle storage unit opening/closing mechanism for the storage unit that is suitable for less able users, materials from which all parts will be made to last at least 15 years in external environmental conditions, that the storage unit is enclosed and waterproof, the extra visibility added when they storage unit is open to warn other vehicles to be extra cautious the locking system, an aesthetically pleasing design, full dimensions and how many cycles it will hold.
Cost of recumbent cycle storage unit calculations
Notes on how the potential designs meet the brief requirements.
Dimensioned and scaled CAD drawing(s) of preferred chosen design.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td>AO2b – Application of core skills

Core skills being assessed:
Planning and preparation
interpretation of the project brief and product design specification
judgement and reasoning for initial designs and preferred choice
Developing proposals and concepts
demonstration of judgement and reasoning in relation to the preparation of the solution, considering the original product design specification.
justification of their choices in relation to the development of their design ideas.
Communication
effectiveness in communicating idea/information through sketches, CAD drawings and associated annotations so the key features of the design can be interpreted e.g. the materials from which the unit is to be constructed and technology that is to be used. The opening/ closing and locking system.
use of proportion within sketches for the design, use of dimension and annotations on sketches and/or drawings.</td><td>AOs

AO2b</td><td>Total marks available

6</td></tr>
</table>

Grid 5: AO2b Design (Core skills)					
Marking descriptors – All versions Note: where there is insufficient evidence to award a mark, a zero mark may be given					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Some elements of core skills drawn on and evidenced within task response - limited use of skills in relation to brief requirements. (AO2b) Design has limited logic and shows superficial coherence between different aspects of the brief. Representations lack proportionally, dimension, and annotation. (AO2b)		A range of core skills applied and evident in task response in relation to different elements of project brief. (AO2b) Design is logical and shows some coherence between different aspects of the brief. Representations are mostly proportional and correctly dimensioned with significant annotation. (AO2b)		Core skills applied consistently throughout task completion with - full range of core skills evidenced. (AO2b) Design is logical and demonstrates detailed coherence between different aspects of the design brief. Representations are proportional, have detailed dimensions and annotation. (AO2b)	

<table>
<tr><th colspan="4">Grid 6: AO5a, AO5b Design (Realise outcome, review outcome)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Annotated sketches of at least two potential designs which illustrate the recumbent cycle storage unit opening/closing mechanism for the storage unit that is suitable for less able users, materials from which all parts will be made to last at least 15 years in external environmental conditions, that the storage unit is enclosed and waterproof, the extra visibility added when they storage unit is open to warn other vehicles to be extra cautious the locking system, an aesthetically pleasing design, full dimensions and how many cycles it will hold.
Cost of recumbent cycle storage unit calculations
Notes on how the potential designs meet the brief requirements.
Dimensioned and scaled CAD drawing(s) of preferred chosen design.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td>AO5a - realise a project outcome – was the right outcome achieved
Considering the candidate’s preferred chosen design and:
the effectiveness of the design (fit for purpose) in relation to the context given in the project brief.
the extent the solution meets the requirements of the product design specification.
AO5b – review how well the outcome meets the brief, how well the brief was met, the quality of the outcome in relation to the brief
The candidate’s:
evaluation and review of requirements of the product design specification and recognition of how these have been met with proposed design.
development of ideas from two potential designs to one final design, rationale for the selection of the design option from the prepared sketches, clarity on which has been taken forward and drawn up as a fully annotated and dimensioned CAD drawing.
evaluation of how the final design has met the client requirements given in the product design specification.
development of ideas throughout the task, refining, improving and building upon potential solutions as they progress.</td><td>AOs

AO5a

AO5b</td><td>Total marks available

6</td></tr>
<tr><td colspan="3">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
</table>

Grid 6: AO5a, AO5b Design (Realise outcome, review outcome)					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Task response partially addresses some of the task requirements. (AO5a) Evaluation and review do not clearly address how well the task outcome met the brief and lacks clarity and reasoning in places. (AO5b)		Task response addresses all aspects of the task requirements. (AO5a) Evaluation and review address how well the task outcome was achieved. (AO5b)		Task response fully addresses all aspects of all elements of the task requirements. (AO5a) Evaluation and review are comprehensive and specifically addresses how well the task outcome was achieved. (AO5b)	

3. Plan

<table>
<tr><th colspan="4">Grid 7: AO1, AO3 Plan (Planned approach, selecting techniques)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Programme of work detailing key stages of the project, resources and equipment required to manufacture the design, duration and sequence of activities and identification of the critical path.
A supporting statement which considers health and safety requirements including risk assessment, any relevant standards, quality control, key stages for manufacturing the design, waste management and environmental factors and all assumptions relating to in-house manufacturing capabilities and resources.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td>AO1 – Plan their approach to meeting the project brief
The candidate’s
planning of activities to complete the design, development and manufacture, including the sequence, and cost for each stage.
adherence to the constraints set within the brief and the achievability and realism of their plan - production of 600 storage units within 36 weeks in the first instance if your storage solution costs up to £1,500 (maximum total budget £900,000) or up to 3000 units within 52 weeks if each unit cost was no more than £1,000 (maximum total budget £3,000,000).
inclusions of relevant information to facilitate delivery of the plan.
consideration of dependences between the different activities, clarity and accuracy of task connections shown on the critical path analysis.
AO3 – Select relevant techniques and resources to meet the brief
The candidate’s
choice of manufacturing methods to construct the chosen design, and level of reasoning provided.
judgements and justification in the selection of resources and equipment that will be required to design and develop the unit.
consideration of environmental factors during planning.
waste management during the use of selected resources.</td><td>AOs

AO1

AO3</td><td>Total marks available

6</td></tr>
<tr><td colspan="3">Marking descriptors – All versions</td></tr>
</table>

Grid 7: AO1, AO3 Plan (Planned approach, selecting techniques)					
Note: where there is insufficient evidence to award a mark, a zero mark may be given					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Limited approach to planning, response contains evidence of some of the required elements. (AO1) There is limited justification for the selection of techniques, resources (e.g., equipment, contractors), methods, and materials (including disposal) to be used. The choices made are not always the most effective or appropriate for the prescribed project brief. (AO3)		Response contains required elements in logical order with consideration of deadline and layout. (AO1) Techniques and/or resources (e.g., equipment, contractors), methods, and materials (including disposal) selected from those available to respond to the brief requirements. The choices made are mostly accurate and appropriate for the prescribed project brief. (AO3)		Logical and clear approach used with evidence of a detailed plan and methodology in line with standard engineering industry practices / best practice and effective prioritisation. (AO1) There is a detailed and justified approach to the selection of resources (e.g., equipment, contractors), methods and materials (including disposal). The choices made are accurate and appropriate for the prescribed project brief. (AO3)	

<table>
<tr><th colspan="6">Grid 8: AO2a Plan (Core Knowledge)</th></tr>
<tr><td>Guidance for markers</td><td colspan="5">Only the following evidence must be used to assess performance against this marking grid:
• Programme of work detailing key stages of the project, resources and equipment required to manufacture the design, duration and sequence of activities and identification of the critical path.
• A supporting statement which considers health and safety requirements including risk assessment, any relevant standards, quality control, key stages for manufacturing the design, waste management and environmental factors and all assumptions relating to in-house manufacturing capabilities and resources.</td></tr>
<tr><td>Indicative Content</td><td colspan="3">AO2a – Apply core knowledge

The candidate’s
• use of technical terminology with supporting statement, its consistency and appropriateness for the intended audience.
• level of detail of current health and safety requirements including risk assessment.
• justification of the key stages for manufacturing the chosen design, this can include evidence of collation of appropriate activities and the logic in the sequence in which they are presented.
• consideration and level of knowledge relating to waste management and environmental factors.
• assumptions made relating to the in-house manufacture of the chosen design, the fullness of their explanation in the supporting statement, their validity and alignment to accepted best practice in industry.
• breadth and depth of assumptions made in relation to the development from across the core content.</td><td>AOs

AO2a</td><td>Total marks available

6</td></tr>
<tr><td colspan="6">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><td colspan="2">Band 1 descriptor</td><td colspan="2">Band 2 descriptor</td><td colspan="2">Band 3 descriptor</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
</table>

Grid 8: AO2a Plan (Core Knowledge)		
Some elements of core knowledge referenced within plan - limited comprehension of knowledge in relation to brief requirements. (AO2a) Supporting information details some links to the application of core knowledge to support judgements, but connections are not always clear and accurate. (AO2a)	Elements of core knowledge directly highlighted in brief referenced within plan – knowledge evidenced may have gaps or show some misunderstanding. (AO2a) Supporting information details links to the application of core knowledge to justify and support judgements, but with some gaps or inaccuracies. (AO2a)	Knowledge from across the core applied and evident in plan in relation to different elements of project brief. (AO2a) Connections between elements of core knowledge fully explained within the supporting information to strengthen arguments and demonstrate understanding. (AO2a)

<table>
<tr><th colspan="4">Grid 9: AO2b Plan (Core skills)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
• Programme of work detailing key stages of the project, resources and equipment required to manufacture the design, duration and sequence of activities and identification of the critical path.
• A supporting statement which considers health and safety requirements including risk assessment, any relevant standards, quality control, key stages for manufacturing the design, waste management and environmental factors and all assumptions relating to in-house manufacturing capabilities and resources.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td>AO2b – Application of core skills
Core skills being assessed:
• Planning and preparation:
○ professionalism of the presentation of the programme of works and to what extent it is conveyed using industry standard notation and features.
○ use of recognised methods of presentation for the programme (e.g., Gantt Chart) and comprehensiveness of completion (e.g., tasks, milestones, resources, and critical path analysis).
○ coverage of the activities required to complete the design and development of the chosen design and how comprehensive this is.
• Developing proposals and concepts:
• clear focus on the required outcomes, justifying approaches to:
○ health and safety including risks assessment requirements.
○ quality control.
○ key stages for manufacturing the chosen design.
○ waste management and environmental considerations.
○ all assumptions relating to in house manufacturing capabilities and resources.
• Communication:
○ structure, logic and coherence of the supporting statement and coverage of the required considerations.</td><td>AOs
AO2b</td><td>Total marks available
6</td></tr>
<tr><td colspan="3">Marking descriptors – All versions</td></tr>
</table>

Grid 9: AO2b Plan (Core skills)					
Note: where there is insufficient evidence to award a mark, a zero mark may be given					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Some elements of each core skill applied - limited application of skills in practice in relation to brief requirements. (AO2b)		Elements of most core skills directly highlighted in brief used efficiently and consistency throughout. (AO2b)		All aspects of all core skills applied effectively throughout plan creation with clear focus on to required outcomes and linking of skills to task elements is fully considered. (AO2b)	

4. Present

<table>
<tr><th colspan="6">Grid 10: AO1, AO3 Present (Planned approach, selecting techniques)</th></tr>
<tr><td>Guidance for markers</td><td colspan="5">Only the following evidence must be used to assess performance against this marking grid:
• Video recording of presentation
• Presentation materials (slides, handouts, notes etc)
• Presentation Q&A Record (if this cannot be heard on the video)

Audience: The client has a technical background.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td colspan="3">AO1 – Plan their approach to meeting the project brief
The candidate’s
• logic, order and coherence, of the presentation (e.g., containing an introduction to themselves, an introduction to what will be covered within the presentation, a conclusion, and an invitation to ask questions from the audience).

AO3 – Select relevant techniques and resources to meet the brief
The candidate’s
• selection and application of techniques for delivering the presentation, how appropriate and effective they are (e.g., use of slide deck, reference to notes, provision of handouts, use of other reference material).
• use of positive non-verbal communication during delivery (e.g., maintaining eye contact with the audience) and the clarity of speaking/delivery, and the level of which distraction behaviour is displayed (e.g. rocking, tapping, pausing).</td><td>AOs

AO1

AO3</td><td>Total marks available

6</td></tr>
<tr><td colspan="6">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><td colspan="2">Band 1 descriptor</td><td colspan="2">Band 2 descriptor</td><td colspan="2">Band 3 descriptor</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
</table>

Grid 10: AO1, AO3 Present (Planned approach, selecting techniques)		
The presentation lack's structure and does not always follow a logical approach due of ineffective planning. (AO1) Technique used to deliver the presentation is sometimes effective. However technical information is not always complete and accurate. (AO3)	The presentation is structured and follows a logical approach in response to the task with evidence of planning. (AO1) Techniques used to deliver the presentation are mostly effective. The technical information provided is accurate most of the time with valid reasoning. (AO3)	The presentation is organised, structured and logical in its approach. It is clear that the presentation content has been considered in terms of its audience. (AO1) Techniques used to deliver the presentation are effective with well justified reasoning behind the information provided. (AO3)

<table>
<tr><th colspan="4">Grid 11: AO2a Present (Core Knowledge)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
• Video recording of presentation
• Presentation materials (slides, handouts, notes etc)
• Presentation Q&A Record (if this cannot be heard on the video)

Audience: The client has a technical background.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td>AO2a – Apply core knowledge

The candidate’s
• judgements in the preparation of the presentation, how well they are reasoned and cover the key features of the chosen design and the proposed approach to manufacture.
• interpretation of the challenges within the client’s design brief and explanations as to how these have been overcome in the chosen design.
• understanding of engineering principles which has influenced the solutions and with reasoning of why these suitably meet the product design specification from the client for the following features:
o opening/closing mechanism for the storage unit that is suitable for less able users
o materials from which all parts will be made to last at least 15 years in external environmental conditions
o that the storage unit is enclosed and waterproof
o the extra visibility added when they storage unit is open to warn other vehicles to be extra cautious the locking system
o an aesthetically pleasing design
o full dimensions and how many cycles it will hold.
• confidence and accuracy when responding to question from the client.
• use of technical language (with consideration of the target audience)</td><td>AOs

AO2a</td><td>Total marks available

6</td></tr>
<tr><td colspan="3">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
</table>

Grid 11: AO2a Present (Core Knowledge)					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Engineering concepts relating to the core knowledge conveyed through the presentation - these may not always be accurate or be directly linked to the brief requirements. (AO2a) Terminology used may have inaccuracies and content provided may include inconsistencies and not clear to the targeted audience. (AO2a)		Engineering concepts relating to the core knowledge are coherent throughout the presentation to meet the requirements of the brief set. (AO2a) Terminology used is mostly accurate with minor errors. The content provided is in the most correct but does not always consider target audience / may be imbalanced or biased (e.g., to either technical or non-technical focus). (AO2a)		Engineering concepts relating to the core knowledge are coherent with clear justifications on how these are applied in response to the brief requirement. (AO2a) Terminology used is accurate and error free. The content provided is clear and easily understood by the target audience, with no bias in tone / imbalance across audience type (where appropriate). (AO2a)	

<table>
<tr><th colspan="6">Grid 12: AO2b Present (Core skills)</th></tr>
<tr><td>Guidance for markers</td><td colspan="5">Only the following evidence must be used to assess performance against this marking grid:
• Video recording of presentation
• Presentation materials (slides, handouts, notes etc)
• Presentation Q&A Record (if this cannot be heard on the video)

Audience: The client has a technical background.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td colspan="3">AO2b – Application of core skills
Core skills being assessed:

Communication:
• effectiveness in communicating the key features of the chosen design – including fluency, clarity and conciseness.
• clarity and size of images and figures, inclusion of labels, font size.

Evaluation:
• effectiveness in presenting the evaluation of the design and how well it met the product design specification.</td><td>AOs</td><td>Total marks available</td></tr>
<tr><td>AO2b</td><td>6</td></tr>
<tr><td colspan="6">Marking descriptors – All versions
Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><td colspan="2">Band 1 descriptor</td><td colspan="2">Band 2 descriptor</td><td colspan="2">Band 3 descriptor</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td colspan="2">Communication of engineering concepts is sometimes effective. The delivery of technical information may lack accuracy and clarity for the audience. (AO2b)</td><td colspan="2">Engineering concepts are communicated effectively most of the time in an appropriate manner for the target audience. There are minor inaccuracies in the delivery of information which causes a lack of clarity in some instances. (AO2b)</td><td colspan="2">Highly effective communication of engineering concepts is appropriate for the target audience. Technical information is presented accurately and delivered with clarity. (AO2b)</td></tr>
</table>

<table>
<tr><th colspan="6">Grid 13: AO5a, AO5b Present (Realise outcome, review outcome)</th></tr>
<tr><td>Guidance for markers</td><td colspan="5">Only the following evidence must be used to assess performance against this marking grid:
• Video recording of presentation
• Presentation materials (slides, handouts, notes etc)
• Presentation Q&A Record (if this cannot be heard on the video)

Audience: The client has a technical background.</td></tr>
<tr><td rowspan="2">Indicative Content</td><td colspan="3">AO5a - realise a project outcome – was the right outcome achieved
The candidate’s
• effectiveness in evaluating the challenges presented by the brief and how these have been overcome.
• identification of which areas of the brief were/were not satisfied.
• reflections on additional aspects of research/design process they could have done, any rework of that would improve/enhance a future project outcome.

AO5b – review how well the outcome meets the brief, how well the brief was met, the quality of the outcome in relation to the brief
The candidate’s
• clarity within their evaluation and review of the challenges of the product design specification, and indications within the presentation on how these have been overcome.
• clarity of explanation of how the final design addresses the requirements of the product design specification brief, including any featured considered by the candidate to be improved.</td><td>AOs</td><td>Total marks available</td></tr>
<tr><td>AO5a

AO5b</td><td>6</td></tr>
<tr><td colspan="6">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><td colspan="2">Band 1 descriptor</td><td colspan="2">Band 2 descriptor</td><td colspan="2">Band 3 descriptor</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
</table>

Grid 13: AO5a, AO5b Present (Realise outcome, review outcome)		
Project outcome as a whole partially addresses some of the brief requirements. Articulates some challenges encountered. (AO5a)	Project outcome as a whole address all aspects of the brief requirements. Articulates all challenges encountered and the attempts to overcome them. (AO5a)	Project outcome as a whole fully addresses all aspects of the brief requirements and considers alternative options where appropriate. Articulates fully challenges encountered and comprehensively covers how they were overcome. (AO5a)
No or minimal reasons and justification in how effectively the brief was met across project tasks. (AO5b)	There is reason and justification in how effectively some areas of the brief were met across project tasks. (AO5b)	Detailed reasoning behind how successfully the project brief was met across project tasks. (AO5b)

Maths, English and Digital skills

<table>
<tr><th colspan="4">Grid 14: AO4a (Maths)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
• Annotations on sketches (Task 2)
• Dimensioning and scaling CAD drawing (Task 2)
• Calculation of design and manufacturing cost, timescales and critical path within the Programme of work (Task 3)</td></tr>
<tr><td rowspan="2">Indicative Content</td><td rowspan="2">The candidate’s:
• use of numeracy to provide dimensioned sketches and scaled CAD drawing(s).
• selection and use of mathematical methods to determine the costings of the product and which one they can supply
• clarity and accuracy in the calculations.
• accuracy in calculation of the duration of activities on the programme of work plan and accuracy of completion of the critical path analysis.</td><td>AOs</td><td>Total marks available</td></tr>
<tr><td>AO4a</td><td>3</td></tr>
<tr><td colspan="4">Marking descriptors – All versions
Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><th>Band 1 descriptor</th><th>Band 2 descriptor</th><th colspan="2">Band 3 descriptor</th></tr>
<tr><td>1</td><td>2</td><td colspan="2">3</td></tr>
<tr><td>Some mathematical concepts and calculations applied appropriately. (AO4a)

Workings or techniques omitted as part of calculations, assumptions lack detail and full definition. Workings shown but calculation errors made / inaccurate execution. (AO4a)</td><td>A range of mathematical concepts and calculations applied. (AO4a)

Working contains inaccuracies or could be more efficient (i.e., expressed in shorthand). Workings inconsistently shown. (AO4a)</td><td colspan="2">Mathematical approaches and concepts applied fully and consistently. (AO4a)

workings shown and evidence of checking to ensure correct results (e.g., estimation workings, reverse calculation checks) (AO4a)</td></tr>
</table>

Grid 15: AO4b (English)			
Guidance for markers	**Only** the following evidence must be used to assess performance against this marking grid: • Technical brief (Task 1) • Notes detailing how the designs meet the brief requirement (Task 2) • Supporting statement for the programme of work (Task 3) • Presentation delivery (orally) and materials to support presentation (e.g. slides etc) (Task 4)		
Indicative Content	The candidate's: • use of appropriate and accurate English • clarity and articulateness of use of English to present information and ideas • accuracy of grammar, spelling and punctuation • use of terminology, which is technical and consistent with the intended audience • confidence in the use of language during verbal presentations, level of articulation and clarity in the delivery of information to summarise information/ideas.	**AOs** **AO4b**	**Total marks available** **3**

Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given

Band 1 descriptor	Band 2 descriptor	Band 3 descriptor
1	**2**	**3**
Evidence within task responses lacks structure where outcome is partially understandable. Communication style is generally appropriate to the outcome but has some inconsistencies across tasks. (AO4b) Meaning is clear, but the language is not always fluent. Grammar and/or spelling contain errors or inconsistencies. Audibility of oral presentation is inconsistent. (AO4b)	Evidence within task responses uses conventional structure which is understandable. Communication style is appropriate to the outcome across most tasks. (AO4b) Meaning is clear, language is fluent, although the response may contain colloquialisms or jargon etc. Grammar and spelling are mainly accurate. Audibility of oral presentation is good. (AO4b)	Evidence within task responses uses a structure which makes it easy to fully understand. Communication style is appropriate to the outcome across all tasks. (AO4b) Meaning is clear, language is fluent and consistent across tasks. Grammar and spelling are consistently accurate across tasks. Deploys a range of grammatical constructions. Audibility of oral presentation is excellent. (AO4b)

Grid 16: AO4c (Digital)			
Guidance for markers	**Only** the following evidence must be used to assess performance against this marking grid: • Types of sources used for Research (Task 1) • CAD Drawing (Task 2) • Presentation of the programme of work (Task 3) • Presentation materials (slides, handouts, notes etc) (Task 4)		
Indicative Content	The candidate's: • selection of digital resources and the effective of the resource in meeting task requirements • application of features available within digital resources (e.g. formatting, layout, presentation modes, animations / transitions in presentation, application of CAD package features). • selection and use of software to support delivery of the presentation. • use of a range of digital options used across tasks, the extent to which they have been used to add value and their effectiveness of use. • use of current digital techniques, resources, and sources in adherence with industry practice, convention, and trends. • use of a digital presentation package such as PowerPoint (selecting appropriate images, videos and figures)	**AOs** **AO4c**	**Total marks available** **3**

Marking descriptors – All versions Note: where there is insufficient evidence to award a mark, a zero mark may be given		
Band 1 descriptor	**Band 2 descriptor**	**Band 3 descriptor**
1	**2**	**3**
Digital technology attempted as part of task responses. (AO4c)	Consideration and use of basic digital options / features to strengthen task responses throughout project across tasks. (AO4c)	Digital options applied effectively in line with industry practices / best practice, demonstrating use of range of technology features. Digital techniques used effectively to add value to task responses. (AO4c)

Get in touch

City & Guilds Technicals Quality Team

We are here to answer any queries you may have regarding your T Level Technical Qualification delivery.

Should you require assistance, please contact us using the details below:

T: 0300 303 53 52 (Monday - Friday | 08:30 - 17:00 GMT)

E: **technicals.quality@cityandguilds.com**

W: cityandguilds.com/tlevels

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