Non-Exam Assessment (NEA)

NCFE Level 1/2 Technical Award in Engineering (603/7006/3)

Centre version

October 2024 release

v1.0

Contents

Introduction

The non-exam assessment (NEA) is a formal synoptic assessment that requires learners to independently apply an appropriate selection of knowledge, understanding, skills and techniques, developed through the full course of study, in response to a real-world situation, to enable them to demonstrate an integrated connection and coherence between the different elements of the qualification.

The NEA will contribute **60%** towards the overall qualification grade; therefore, it is important that the learner produces work to the highest standard that they can. The learner must not start the NEA until they have been taught the full course, to ensure that they are in the best position to complete the NEA successfully.

What is synoptic assessment?

Synoptic assessment is an important part of a high-quality vocational qualification because it shows that learners have achieved a holistic understanding of the sector. It also shows that they can make effective connections between different aspects of the subject content and across the breadth of the assessment objectives (AOs) in an integrated way. The Department for Education (DfE) has consulted with awarding organisations and agreed the following definition for synoptic assessment:

'A form of assessment which requires a candidate to demonstrate that they can identify and use effectively in an integrated way an appropriate selection of skills, techniques, concepts, theories, and knowledge from across the whole vocational area, which are relevant to a key task.'

Synoptic assessment enables learners to show that they can transfer knowledge and skills learnt in one context to resolve problems raised in another. To support the development of a synoptic approach, the qualification encourages learners to make links between elements of the course and to demonstrate how they have integrated and applied their increasing knowledge and skills.

As learners progress through the course, they will use and build upon knowledge and skills learnt across units. The NEA will test the learners' ability to respond to a real-world situation.

Information for learners

Introduction

The NEA will be assessed holistically using a levels of response marking grid and against five integrated AOs. These AOs and their weightings are shown below.

Assessment objectives (AOs)
AO1: Recall knowledge and show understanding The emphasis here is for learners to recall and communicate the fundamental elements of knowledge and understanding. **20 marks (16.7%)**
AO2: Apply knowledge and understanding The emphasis here is for learners to apply their knowledge and understanding to real-world contexts and novel situations. **16 marks (13.3%)**
AO3: Analyse and evaluate knowledge and understanding The emphasis here is for learners to develop analytical thinking skills to make reasoned judgements and reach conclusions. **16 marks (13.3%)**
AO4: Demonstrate and apply relevant technical skills, techniques and processes The emphasis here is for learners to demonstrate the essential technical skills relevant to the vocational sector by applying the appropriate processes, tools and techniques. **60 marks (50%)**
AO5: Analyse and evaluate the demonstration of relevant technical skills, techniques and processes The emphasis here is for learners to analyse and evaluate the essential technical skills, processes, tools and techniques relevant to the vocational sector. **8 marks (6.7%)**

Mark scheme

The purpose of this mark scheme is to give you:

- examples and criteria of the types of response expected from a learner
- information on how individual marks are to be awarded
- the allocated AOs and total marks for each question.

Marking guidelines

General guidelines

You must apply the following marking guidelines to all marking undertaken. This is to ensure fairness to all learners, who must receive the same treatment. You must mark the first learner in exactly the same way as you mark the last.

- The mark scheme must be referred to throughout the marking period and applied consistently. Do not change your approach to marking once you have been standardised.
- Reward learners positively, giving credit for what they have shown, rather than what they might have omitted.
- Utilise the whole mark range and always award full marks when the response merits them.
- Be prepared to award zero marks if the learner's response has no creditworthy material.
- Do not credit irrelevant material that does not answer the question, no matter how impressive the response might be.
- If you are in any doubt about the application of the mark scheme, you must consult with your internal quality assurer.

Guidelines for using extended-response marking grids

Extended-response marking grids have been designed to assess learners' work holistically. They consist of band-based descriptors and indicative content.

Band-based descriptors

Each band is made up of several descriptors from across the AO range – AO1 to AO5, which when combined provide the quality of response that a learner needs to demonstrate. Each band-based descriptor is worth varying marks.

The grids are broken down into bands, with each band having an associated descriptor indicating the performance at that band. You should determine the band before determining the mark.

Indicative content reflects content-related points that a learner may make but is not an exhaustive list, nor is it a model answer. Learners may make all, some or none of the points included in the indicative content, as its purpose is to guide the relevance and expectation of the responses. Learners must be credited for any other appropriate response.

Application of extended-response marking grids

When determining a band, you should use a bottom-up approach. If the response meets all the descriptors in the lowest band, you should move to the next one, and so on, until the response matches the band descriptor. Remember to look at the overall quality of the response and reward learners positively, rather than focusing on small omissions. If the response covers aspects at different bands, you should use a best-fit approach at this stage and use the available marks within the band to credit the response appropriately.

When determining a mark, your decision should be based on the quality of the response in relation to the descriptors.

Documentation

Declaration of authenticity

The learner and assessor **must** complete the form at the end of the assessment and before any marking takes place. The assessor **must** check the number of tasks submitted by the learner is accurate.

The completed form **must** be retained within the centre and is not to be sent to the moderator or NCFE unless specifically requested.

Learner name:	
Tasks submitted:	
Learner declaration:	
I certify that the work submitted for this NEA is my own. I have clearly referenced any sources used in the work. I understand that false declaration is a form of malpractice.	
Learner signature:	
Date:	

Assessor name:	
Assessor declaration:	
I certify that the work submitted is the learner's own. The learner has clearly referenced any sources used in the work. I confirm that all work was conducted under conditions designed to assure the authenticity of the learner's work.	
Assessor signature:	
Date:	

Note: once completed, the declaration of authenticity **must** be stored securely within the centre, in line with NCFE Regulations for Conduct of NEA – Non-Exam Assessment. A copy of this declaration form **must** be made available to NCFE upon request.

GDPR consent

Section A: this section must be completed by the learner

- NCFE may select your work for use at teacher training or standardisation events. Your work will be anonymised by removing your name. All materials will be reviewed regularly and will be removed if no longer required.
- NCFE may select your work at some point in the future for use in teaching and learning resources published on the NCFE website. Your work would be anonymised by removing your name. All materials will be reviewed regularly and will be removed if no longer required.
- You understand that this agreement may be terminated at any time through written request.
- For further details about how we process your data, please refer to the legal information section on the NCFE website.

Please tick the option that applies, and sign and date the boxes below:

	Tick one only
I consent to my work being used in the manner detailed in section A	
I **do not** consent to my work being used in the manner detailed in section A	

Learner signature:	
Date:	

Section B: this section must be completed by any participants who feature in the work

Over 13 years old

- I am over 13 and I give my permission for my video and / or photographic image to be used as detailed in section A (above).

Under 13 years old

- I give my permission for my child's video and / or photographic image to be used as detailed in section A (above).

Name of participant (printed)	**Participant / Parent / Carer signature**	**Date**

If any of the participants have declined permission, please tick here: ☐

NCFE Level 1/2 Technical Award in Engineering (603/7006/3)

Non-Exam Assessment (NEA)

October 2024 release

Learner instructions

- Read the project brief carefully before you start the work.
- You **must** clearly identify and label all of the work you produce during the supervised time.
- You **must** hand in all of your work to the supervisor at the end of each timed session.

Learner information

- This NEA will assess your knowledge and understanding from across the qualification.
- The maximum mark for this NEA is **120**.
- The maximum completion time for this NEA is **18 hours** (plus **2 hours** preparation and research time).
- All of the work you submit **must** be your own.

Please complete the details below clearly and in BLOCK CAPITALS.

Learner name			
Centre name			
Centre number		Learner number	
Learner signature			

Preparation and research task

Maximum time: 2 hours

In addition to the allocated assessment time for this NEA, you are permitted to spend a maximum of **2 hours** to undertake research and develop a research pack that you can refer to during the formal NEA assessment time. During this 2-hour period, you may access all learning materials, the internet and other published materials.

You should use this time to create your own research pack, and it is this pack alone that you may use during the allocated time given to the NEA. This is the only support material that is permitted during the completion of NEA tasks (unless otherwise stated within each of the task instructions).

All research and data used in your final NEA **must** be referenced appropriately. As a minimum this **must** include the following:

- the use of quotation marks to clearly identify any passages not of your own words
- date accessed (websites only)
- name of source / author.

Evidence requirements: research pack of no more than four sides of A4, font size 12 (if word processed), to be returned to your assessor at the end of each task / session and submitted with the completed NEA.

Formal non-exam assessment (NEA)

Maximum completion time

You have been provided with a total of **18 hours** to complete this NEA (plus **2 hours** for preparation and research).

You may use some or all of the time provided for each task.

You are allowed to use any remaining time allocated to one task to rework previous tasks up to the maximum time allowed.

You are not allowed to exceed the total number of hours.

You should not start your NEA until you have been taught the full course of study. This will ensure that you are in the best position to complete the NEA successfully.

Project brief

You are an industrial designer who works for a household furniture company. The company supplies office and home accessories.

The company has asked you to design and then produce a working scale model (1:1) of a tablet holder to attach to a desk or table.

The main purpose of the working scale model is for you to demonstrate how an actual tablet holder will work. Some measurements have not been specified. These are for you to determine based on how your tablet holder needs to function.

Your working scale model must show that the actual tablet holder will:

- be universally compatible with devices that have a screen size between 4.5 inches (114 mm) and 12.9 inches (328 mm), not including the bezel or surrounding border
- have pivot points which allow the tablet holder to move as needed to reach the most comfortable viewing position
- be capable of attaching to any horizontal surface, like a desk or table, that is up to 52 mm thick.

The company has supplied you with additional drawings.

Figure 1 and **Figure 2** show examples of the main moving parts of a tablet holder.

Figure 3 is a sketch and is to help in the construction of your working scale model.

Project instructions:

The company have asked you to present a full portfolio of evidence which is to include:

1. Materials research and materials selected
2. Hand-drafted engineering drawings
3. Engineering drawings using computer-aided design (CAD) software
4. Production plan
5. Manufacture of the working scale model
6. Evaluation of your final product.

Please turn over for the Figures.

Figure 1: pivot point and tablet clamp examples

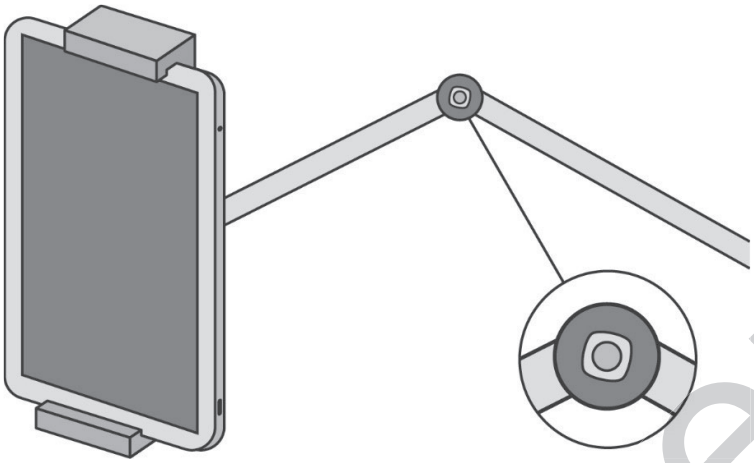


Figure 2: base clip example

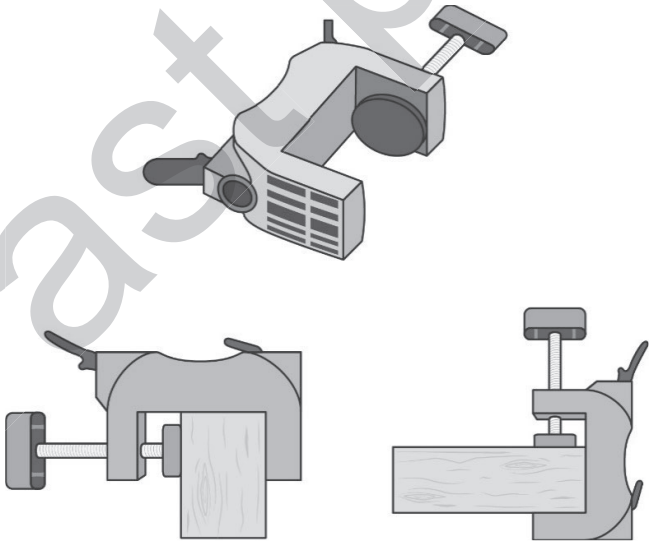
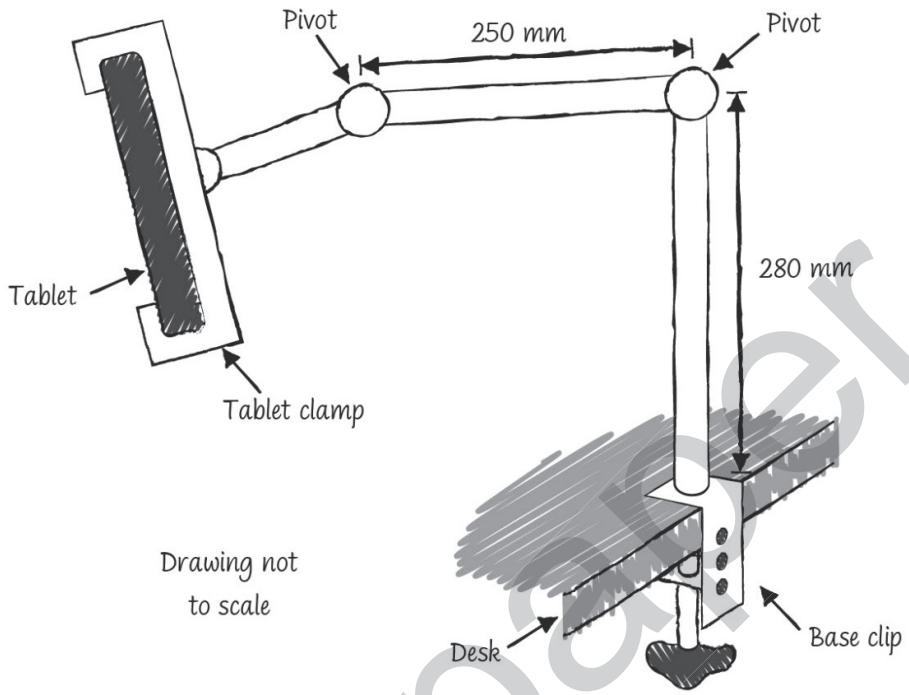


Figure 3: freehand sketch of a tablet holder



Assessment tasks and mark schemes

Task 1

<table>
<tr><td colspan="2">Research and selection of materials and tools / machinery</td></tr>
<tr><td>Maximum time</td><td>1 hour 30 minutes</td></tr>
<tr><td>Content areas assessed</td><td>1. Engineering disciplines
4. Properties, characteristics and selection of engineering materials.
5. Engineering tools, equipment and machines</td></tr>
<tr><td>Assessment objectives (AOs)</td><td>AO1 – 4 marks
AO2 – 4 marks
AO3 – 4 marks</td></tr>
<tr><td colspan="2">You are required to:

Research and select the materials, tools and / or machinery you will use to manufacture your working scale model of a tablet holder.

You must show that you have researched and selected:
• materials required to manufacture the working scale model
• tools and / or machinery required to manufacture the working scale model.

You must show:
• supporting information to justify the selection of materials, tools and / or machinery.

You are permitted to use the internet for this task. You must reference all sources used.

[12 marks]</td></tr>
<tr><td>Evidence</td><td>You could use the following formats to provide evidence for your research:
• written report
• annotated diagrams
• digital presentation.

You must also submit your internet browsing history of sites used to support your response to the task.</td></tr>
</table>

Task 1: research and selection of materials and tools / machinery		
Band	**Mark**	**Descriptor**
4	**10 to 12**	**AO3** – **excellent** analysis of the brief, showing **excellent** analytical thinking skills, with **highly reasoned** justifications and decisions in the choice of materials and tools / machinery. Learner has offered **well considered** approaches in order to meet the brief. **AO2** – **excellent** ability to apply knowledge and understanding to the scenario within the brief. **Highly suitable** creative selections, very relevant to the engineering piece. **AO1** – **excellent** ability to research, reflecting a **wide** range of research sources in relation to the brief. **All** elements of the brief will be researched in a **detailed** and **effective** way.
3	**7 to 9**	**AO3** – **good** analysis of the brief, showing **good** analytical thinking skills, with **reasoned** justifications and decisions in the choice of materials and tools / machinery. Learner has offered **considered** approaches in order to meet the brief. **AO2** – **good** ability to apply knowledge and understanding to the scenario within the brief. **Suitable** creative selections, relevant to the engineering piece. **AO1** – **good** ability to research, reflecting a **suitable** range of research sources in relation to the brief. **Most** elements of the brief will be researched in a **detailed** way.
2	**4 to 6**	**AO3** – **reasonable** analysis of the brief, showing a **reasonable** level of analytical thinking, with **some reasoned** justifications and decisions in the choice of materials and tools / machinery. Learner has shown **some consideration** of approaches to meet the brief. **AO2** – **reasonable** ability to apply knowledge and understanding to the scenario within the brief. **Some suitable** creative selections, relevant to the engineering piece. **AO1** – **reasonable** ability to research, reflecting a **reasonable** range of research sources in relation to the brief. **Some** elements of the brief will be researched in a **reasonably detailed** way.
1	**1 to 3**	**AO3** – **limited** analysis of the brief, showing **limited** analytical thinking, justification and decisions in the choice of materials and tools / machinery. Learner has shown **limited consideration** of approaches to meet the brief. **AO2** – **limited** ability to apply knowledge and understanding to the scenario within the brief. **Limited suitable** creative selections, relevant to the engineering piece. **AO1** – **limited** ability to research, reflecting **limited** use of research sources in relation to the brief. **Few** elements of the brief may be researched in a **limited** way.

Band	Mark	Descriptor
	0	No rewardable material

Note: it is not a requirement that the learner formulates a response in their portfolio specifically against each AO as laid out in the indicative content. The evidence provided by the learner for each AO may be embedded throughout the evidence submitted for the task. Whilst it is likely that the responses will be illustrated by the indicative content points below, credit should be given for different approaches, providing they meet the key requirements of the task and mark scheme.

Indicative content

AO1 – learners will recall knowledge and show understanding of materials and tools / machinery and may include the following:

Materials required:

- characteristics and properties of ferrous alloys
- characteristics and properties of non-ferrous alloys
- characteristics and properties of polymers
- characteristics and properties of composites
- characteristics and properties of woods
- characteristics and properties of ceramics.

Tools / machinery:

- correct use of marking-out tools
- correct methods of modifying materials
- correct methods of joining materials
- correct methods of finishing materials.

AO2 – learners will apply knowledge and understanding of materials and tools / machinery and may include the following:

- the working scale model will need to be functional
- in order to successfully develop a working scale model, the appropriate materials would need to be selected
- when developing the working scale model, the correct equipment will be needed to ensure the effective development. This would require accurate marking out of components, modifying the components to comply with drawing dimensions, joining the components correctly and finishing the working scale model to ensure effective operation.

AO3 – learners will analyse and evaluate knowledge and understanding of materials and tools / machinery and may include the following:

- justifications for the choices made when deciding upon the material selected for the development of the working scale model
- justifications for the choices made when deciding upon the tools and / or machinery selected for the development of the working scale model (for example, a drill could be used to create the holes used at the pivot points).

Task 2

Hand-drafted engineering drawings	
Maximum time	**2 hours 30 minutes**
Content areas assessed	2. Applied science and mathematics in engineering 3. Reading engineering drawings 6. Hand-drafted engineering drawings
Assessment objectives (AOs)	AO1 – 8 marks AO4 – 12 marks
You are required to: **Provide** a short description of the requirements of British Standard (BS) 8888, needed to complete this assessment. You can refer to this throughout the project. **Create** hand-drafted engineering drawings of the working scale model of a tablet holder as the brief requires. **[20 marks]**	
Evidence	Your evidence **must** include: • your description of BS 8888 • hand-drafted engineering drawings of the working scale model

Task 2: hand-drafted engineering drawings		
Band	**Mark**	**Descriptor**
4	**10 to 12**	**AO4** – **excellent** consideration of all aspects of the brief. The needs of the household furniture company are **fully** met in a **sophisticated** and **effective** manner through the creation of **highly appropriate** drawings. **AO4** – **excellent** ability to construct drawings. **Sophisticated** and **effective** technical skills are demonstrated along with the provision of **clear** and **detailed** drawings. **AO4** – **excellent** demonstration of drawing skills using a **highly appropriate** structure. Technical terms and layout are used **correctly** and **effectively** throughout. The drawings are **accurate** and **sophisticated**.
3	**7 to 9**	**AO4** – **good** consideration of all aspects of the brief. The needs of the household furniture company are met in an **effective** manner through the creation of **appropriate** drawings. **AO4** – **good** ability to construct drawings. **Effective** technical skills are demonstrated along with the provision of **clear** drawings. **AO4** – **good** demonstration of drawing skills using an **appropriate** structure. Technical terms and layout are used **correctly** throughout. The drawings are **accurate**.
2	**4 to 6**	**AO4** – **reasonable** consideration of all aspects of the brief. The needs of the household furniture company are met in a **mostly appropriate** manner through the creation of **mostly appropriate** drawings. **AO4** – **reasonable** ability to construct drawings. **Reasonable** technical skills are demonstrated along with the provision of **some** evidence of **clear** drawings. **AO4** – **reasonable** demonstration of drawing skills using a **mostly appropriate** structure. Technical terms and layout are **reasonably** used. The drawings are **moderately appropriate**.
1	**1 to 3**	**AO4** – **limited** consideration of all aspects of the brief. The needs of the household furniture company **may not be fully met** through the creation of drawings. **AO4** – **limited** ability to construct drawings. **Limited** technical skills are demonstrated along with the provision of **limited** evidence of **clear** drawings. **AO4** – **limited** demonstration of drawing skills using a **somewhat appropriate** structure. Technical terms and layout are used in a **limited** way. The drawings are **limited**.
	0	No rewardable material

Task 2: hand-drafted engineering drawings		
Band	**Mark**	**Descriptor**
4	**7 to 8**	**AO1** – **excellent** and **comprehensive** recall of knowledge and understanding of relevant British Standards. **AO1** – **excellent** and **comprehensive** recall of knowledge and understanding of how to construct hand-drafted engineering drawings.
3	**5 to 6**	**AO1** – **good** and **mostly detailed** recall of knowledge and understanding of relevant British Standards. **AO1** – **good** and **mostly detailed** recall of knowledge and understanding of how to construct hand-drafted engineering drawings.
2	**3 to 4**	**AO1** – **reasonable** recall of knowledge and understanding of relevant British Standards that has **some detail**. **AO1** – **reasonable** recall of knowledge and understanding of how to construct hand-drafted engineering drawings that has **some detail**.
1	**1 to 2**	**AO1** – **limited** recall of knowledge and understanding of relevant British Standards that has **minimal detail**. **AO1** – **limited** recall of knowledge and understanding of how to construct hand-drafted engineering drawings that has **minimal detail**.
	0	No rewardable material

Note: it is not a requirement that the learner formulates a response in their portfolio specifically against each AO as laid out in the indicative content. The evidence provided by the learner for each AO may be embedded throughout the evidence submitted for the task. Whilst it is likely that the responses will be illustrated by the indicative content points below, credit should be given for different approaches, providing they meet the key requirements of the task and mark scheme.

Indicative content

AO1 – learners will recall knowledge and show understanding of the requirements of BS 8888 and may include the following:

- use of consistent language when graphically representing items
- all information relevant to creating the working scale model of a tablet holder
- particular requirements needed to meet BS 8888.

AO4 – learners will demonstrate the application of technical skills with the creation and completion of hand-drafted engineering drawings. The drawings may include the following:

- a consideration of the needs of the engineering company and its requirements
- hand-drafted drawing or drawings that may include the following:
  - 3 dimensions
  - scale
  - dimension: angles, lengths and diameters
  - unit of measurement (metric)
  - lines: visible, hidden, centre and construction
  - tolerance (+ or –)
  - title block.
- clear understanding of relevant BS:
  - this should include an understanding of and compliance with how BS 8888 is applied to engineering drawings.

Task 3

CAD-produced engineering drawings	
Maximum time	**2 hours 30 minutes**
Content areas assessed	2. Applied science and mathematics in engineering 3. Reading engineering drawings 7. CAD engineering drawings
Assessment objectives (AOs)	AO1 – 8 marks AO4 – 12 marks
You are required to: **Use** CAD software to **create** engineering drawings of the hand-drafted engineering drawings that you created in **Task 2**. Your drawings **must** apply a layout that is recognised within the engineering industry, following British Standard 8888. **[20 marks]**	
Evidence	Your evidence **must** include: • CAD software engineering drawings of the working scale model of a tablet holder.

Task 3: CAD-produced engineering drawings		
Band	**Mark**	**Descriptor**
4	**10 to 12**	**AO4** – **excellent** consideration of all aspects of the brief. The needs of the household furniture company are **fully** met in a **sophisticated** and **effective** manner through the creation of **highly appropriate** drawings. **AO4** – **excellent** ability to construct drawings. **Sophisticated** and **effective** technical skills are demonstrated along with the provision of **clear** and **detailed** drawings. **AO4** – **excellent** demonstration of drawing skills using a **highly appropriate** structure. Technical terms and layout are used **correctly** and **effectively** throughout. The drawings are **accurate** and **sophisticated**.
3	**7 to 9**	**AO4** – **good** consideration of all aspects of the brief. The needs of the household furniture company are met in an **effective** manner through the creation of **appropriate** drawings. **AO4** – **good** ability to construct drawings. **Effective** technical skills are demonstrated along with the provision of **clear** drawings. **AO4** – **good** demonstration of drawing skills using an **appropriate** structure. Technical terms and layout are used **correctly** throughout. The drawings are **accurate**.
2	**4 to 6**	**AO4** – **reasonable** consideration of all aspects of the brief. The needs of the household furniture company are met in a **mostly appropriate** manner through the creation of **mostly appropriate** drawings. **AO4** – **reasonable** ability to construct drawings. **Reasonable** technical skills are demonstrated along with the provision of **some** evidence of **clear** drawings. **AO4** – **reasonable** demonstration of drawing skills using a **mostly appropriate** structure. Technical terms and layout are **reasonably** used. The drawings are **moderately appropriate**.
1	**1 to 3**	**AO4** – **limited** consideration of all aspects of the brief. The needs of the household furniture company **may not be fully met** through the creation of drawings. **AO4** – **limited** ability to construct drawings. **Limited** technical skills are demonstrated along with the provision of **limited** evidence of **clear** drawings. **AO4** – **limited** demonstration of drawing skills using a **somewhat appropriate** structure. Technical terms and layout are used in a **limited** way. The drawings are **limited**.
	0	No rewardable material

Task 3: CAD-produced engineering drawings		
Band	**Mark**	**Descriptor**
4	**7 to 8**	**AO1** – **excellent** recall of knowledge and understanding of relevant British Standards that is **comprehensive**. **AO1** – **excellent** recall of knowledge and understanding of how CAD-produced engineering drawings are constructed that is **comprehensive**.
3	**5 to 6**	**AO1** – **good** recall of knowledge and understanding of relevant British Standards that is **mostly detailed**. **AO1** – **good** recall of knowledge and understanding of how CAD-produced engineering drawings are constructed that is **mostly detailed**.
2	**3 to 4**	**AO1** – **reasonable** recall of knowledge and understanding of relevant British Standards that has **some detail**. **AO1** – **reasonable** recall of knowledge and understanding of how CAD-produced engineering drawings are constructed that has **some detail**.
1	**1 to 2**	**AO1** – **limited** recall of knowledge and understanding of relevant British Standards that has **minimal detail**. **AO1** – **limited** recall of knowledge and understanding of how CAD-produced engineering drawings are constructed that has **minimal detail**.
	0	No rewardable material

Note: it is not a requirement that the learner formulates a response in their portfolio specifically against each AO as laid out in the indicative content. The evidence provided by the learner for each AO may be embedded throughout the evidence submitted for the task. Whilst it is likely that the responses will be illustrated by the indicative content points below, credit should be given for different approaches, providing they meet the key requirements of the task and mark scheme.

Indicative content

AO1 – learners will recall knowledge and show understanding of the use of BS 8888 when creating CAD-produced engineering drawings, that may include the following:

- CAD-produced drawing or drawings that may include the following:
  - 3 dimensions
  - scale
  - dimension: angles, lengths and diameters
  - unit of measurement (metric)
  - lines: visible, hidden, centre and construction
  - tolerance (+ or –)
  - title block.

AO4 – learners will demonstrate the application of technical skills with the creation and completion of CAD-produced engineering drawings. The drawings may include the following:

- a consideration of the needs of the engineering company and its requirements
- CAD-produced drawing or drawings that may include the following:
  - 3 dimensions
  - scale
  - dimension: angles, lengths and diameters
  - unit of measurement (metric)
  - lines: visible, hidden, centre and construction
  - tolerance (+ or –)
  - title block
- clear understanding of relevant BS:
  - this should include an understanding of and compliance with how BS 8888 is applied to engineering drawings.

Task 4

<table>
<tr><td colspan="2">Production plan</td></tr>
<tr><td>Maximum time</td><td>4 hours</td></tr>
<tr><td>Content areas assessed</td><td>5. Engineering tools, equipment and machines
8. Production planning techniques</td></tr>
<tr><td>Assessment objectives (AOs)</td><td>AO2 – 12 marks
AO3 – 12 marks</td></tr>
<tr><td colspan="2">You are required to:

Create a production plan for your working scale model of a tablet holder, based on the drawings you developed in Tasks 2 and 3.

Your plan must evidence each of the following areas:
• tools and equipment requirements
• health and safety measures
• quality control measures
• time plan (including timescales and deadlines for completion of tasks).

You must also justify each of the planning decisions made.

You are permitted to use the internet for this task. You must reference all sources used.

[24 marks]</td></tr>
<tr><td>Evidence</td><td>Your evidence must include:
• the production plan of your working scale model.

You could use a range of the following to provide evidence for your plan:
• written report
• annotated diagrams
• digital presentation
• screenshots.

You must also submit your internet browsing history of sites used to support your response to the task.</td></tr>
</table>

Task 4: production plan		
Band	**Mark**	**Descriptor**
4	**10 to 12**	**AO3** – planning will contain **excellent** justification of decisions made. Conclusions will be **very clear** and **detailed** with **excellent** reasoning. **AO3** – engineering features will be very **well justified** and **relevant** to the brief, as well as in line with their own proposal. **AO3** – the analysis of the requirements, measures and techniques that are to be used is of **excellent** detail, with **excellent** reasoning and judgement made.
3	**7 to 9**	**AO3** – planning will contain **good** justification of decisions made. Conclusions will be **clear** and **detailed** with **good** reasoning. **AO3** – engineering features will be **justified** and **mostly relevant** to the brief, as well as in line with their own proposal. **AO3** – the analysis of the requirements, measures and techniques that are to be used is of **good** detail, with **clear** reasoning and judgement made.
2	**4 to 6**	**AO3** – planning will contain **reasonable** justification of decisions made. Conclusions **may not be clear** and are **reasonable** in reasoning. **AO3** – **some** engineering features may be **justified or relevant** to the brief. Planning may not be in line with their own proposal. **AO3** – the analysis of the requirements, measures and techniques that are to be used is of **reasonable** detail, with **partially clear** reasoning and judgement made.
1	**1 to 3**	**AO3** – planning will contain very **limited** justification of decisions made. Conclusions are **not clear** and are **limited** in reasoning. **AO3** – **very few** engineering features are **justified** or **relevant** to the brief. Planning may not be in line with their own proposal. **AO3** – the analysis of the requirements, measures and techniques that are to be used is of very **limited** detail, with **unclear** reasoning and judgement made.
	0	No rewardable material

Task 4: production plan		
Band	**Mark**	**Descriptor**
4	**10 to 12**	**AO2** – **excellent** application of knowledge and understanding of the planning process in a **highly appropriate** format. **AO2** – **highly appropriate** planning tools will be selected and used **effectively**. **AO2** – working scale model manufacturing features are **highly relevant** and described with **strong detail**. Requirements, measures and techniques are described with **excellent detail** and understanding of their use within the production of the product.
3	**7 to 9**	**AO2** – **good** application of knowledge and understanding of the planning process in a **completely appropriate** format. **AO2** – **appropriate** planning tools will be selected and **mostly** used **effectively**. **AO2** – working scale model manufacturing features are **relevant** and described with **detail**. Requirements, measures and techniques are described with **good detail** and understanding of their use within the production of the product.
2	**4 to 6**	**AO2** – **reasonable** application of knowledge and understanding of the planning process in a **somewhat appropriate** format. **AO2** – **some** planning tools will be selected and used with **some success**. **AO2** – working scale model manufacturing features **may not** be **relevant** or described with **clear** understanding. Requirements, measures, and techniques are described with **detail** and understanding of their use within the production of the product.
1	**1 to 3**	**AO2** – **limited** application of knowledge and understanding of the planning and the format **may not be appropriate**. **AO2** – **few** planning tools are selected and used, with **limited success**. **AO2** – working scale model manufacturing features **may not** be **relevant** or described **sufficiently** and **lack clear** understanding. Requirements, measures, and techniques are described with **limited detail** and understanding of their use within the production of the product.
	0	No rewardable material

Note: it is not a requirement that the learner formulates a response in their portfolio specifically against each AO as laid out in the indicative content. The evidence provided by the learner for each AO may be embedded throughout the evidence submitted for the task. Whilst it is likely that the responses will be illustrated by the indicative content points below, credit should be given for different approaches, providing they meet the key requirements of the task and mark scheme.

Indicative content

AO2 – learners will apply knowledge and understanding of the planning process and may include the following:

- consideration of health and safety measures that are required to complete the working scale model safely – this could include the wearing of safety goggles and the use of a safety guard to protect drill users from broken bits
- a production plan that focuses on the development of the working scale model and could include:
  - flow chart
  - Gantt chart
  - spreadsheet
- information on quality control measures that should be implemented during and after the production of the working scale model to ensure that it is produced to the highest possible standard.

AO3 – learners will analyse and evaluate knowledge and understanding of the planning process and may include the following:

- information on the tools and equipment required and justification as to why these are necessary
- information on quality control measures that should be implemented and justification on why these are important
- a time plan that shows how time will be allocated and a justification as to why this has been planned.

Task 5

Manufacture of the working scale model	
Maximum time	**6 hours**
Content areas assessed	9. Applied processing skills and techniques
Assessment objectives (AOs)	AO4 – 36 marks

You are required to:

Create a working scale model (1:1) of the tablet holder, using the drawings **and** production plan you developed in **Tasks 2 to 4**. You **must** use suitable processing skills and techniques.

Test the functionality of the working scale model.

Your working scale model **must**:

- meet the needs of the brief
- follow your hand-drafted and CAD-produced drawings
- be fully functional.

You **must** provide:

- your working scale model
- evidence of production processes, skills, and techniques
- evidence of testing the working scale model.

[36 marks]

Evidence	You could use a range of the following formats to provide evidence of your production process: • digital presentation • written report • annotated screenshots • annotated images.

Task 5: manufacture of the working scale model – meeting the needs of the brief		
Band	**Mark**	**Descriptor**
4	**10 to 12**	**AO4** – **excellent** consideration of all aspects of the brief. **AO4** – the needs of the engineering company are **fully** met in a **sophisticated** and **effective** manner. **AO4** – production / manufacturing choices are **appropriate** and **effective**.
3	**7 to 9**	**AO4** – **good** consideration of all aspects of the brief. **AO4** – the needs of the engineering company are **mostly** met in an **effective** manner. **AO4** – production / manufacturing choices are **appropriate**.
2	**4 to 6**	**AO4** – **reasonable** consideration of some aspects of the brief. **AO4** – **some** of the needs of the engineering company are met in a **sound** manner. **AO4** – production / manufacturing choices are **somewhat appropriate**.
1	**1 to 3**	**AO4** – **limited** consideration of some aspects of the brief. **AO4** – **limited** needs of the engineering company are met. **AO4** – production / manufacturing choices are of **limited appropriateness**.
	0	No rewardable material

Task 5: manufacture of the working scale model – technical skills		
Band	**Mark**	**Descriptor**
4	**10 to 12**	**AO4** – **excellent** ability to construct a working scale model. **AO4** – **sophisticated** and **effective** technical skills are demonstrated along with the provision of **clear** and **detailed** evidence of processing skills and techniques. **AO4** – **excellent** translation of drawings to the working scale model.
3	**7 to 9**	**AO4** – **good** ability to construct a fully functioning working scale model. **AO4** – **effective** technical skills are demonstrated, along with the provision of **clear** evidence of processing skills and techniques. **AO4** – **good** translation of drawings to the working scale model.

Task 5: manufacture of the working scale model – technical skills		
Band	**Mark**	**Descriptor**
2	**4 to 6**	**AO4** – **reasonable** ability to construct a working scale model. **AO4** – **reasonable** technical skills are demonstrated along with the provision of **some** evidence of processing skills and techniques. **AO4** – **reasonable** translation of drawings to the working scale model.
1	**1 to 3**	**AO4** – **limited** ability to construct a working scale model. **AO4** – **limited** technical skills are demonstrated along with the provision of **limited** evidence of processing skills and techniques. **AO4** – **limited** translation of drawings to the working scale model.
	0	No rewardable material

Task 5: manufacture of the working scale model – functionality of the product		
Band	**Mark**	**Descriptor**
4	**10 to 12**	**AO4** – working scale model with **excellent** functionality. **AO4** – the working scale model will **fully meet** the requirements of such a device. **AO4** – product testing is **appropriate, detailed** and **comprehensive**.
3	**7 to 9**	**AO4** – working scale model with **good** functionality. **AO4** – the working scale model will **mostly meet** the requirements of such a device. **AO4** – product testing is **appropriate** and **detailed**.
2	**4 to 6**	**AO4** – working scale model with **reasonable** functionality. **AO4** – the working scale model will **somewhat meet** the requirements of such a device. **AO4** – product testing is **appropriate** and in **some detail**.
1	**1 to 3**	**AO4** – working scale model with **limited** functionality. **AO4** – the working scale model may be **unfinished** or **missing elements**. **AO4** – product testing is **limited**.
	0	No rewardable material

Note: it is not a requirement that the learner formulates a response in their portfolio specifically against each AO as laid out in the indicative content. The evidence provided by the learner for each AO may be embedded throughout the evidence submitted for the task. Whilst it is likely that the responses will be illustrated by the indicative content points below, credit should be given for different approaches, providing they meet the key requirements of the task and mark scheme.

Indicative content

AO4 – learners will demonstrate the application of technical skills with the creation and completion of a working scale model of the tablet holder which may include the following:

- working scale models may show evidence that learners have considered:
  - dimension in accordance with drawings
  - materials used in accordance with production plan and / or drawings
  - tolerance (+ or –) within acceptable values
  - functionality of working scale model conforms to requirements of the brief
  - pivot points and rotational base according to requirements.

Task 6

Summative evaluation	
Maximum time	**1 hour 30 minutes**
Content areas assessed	8. Production planning techniques
Assessment objectives (AOs)	AO5 – 8 marks

You are required to:

Evaluate your final product.

Your evaluation **must** consider:

- the success and functionality of the final working scale model
- how your final working scale model met the brief
- how suitable your final working scale model is for use in the specified industry
- how you could improve your final working scale model in relation to the brief.

[8 marks]

Evidence	You could use the following formats to provide evidence of your evaluation: • annotated screenshots • written report.

Task 6: summative evaluation		
Band	**Mark**	**Descriptor**
4	**7 to 8**	**AO5** – **excellent** analysis and evaluation of the success of the final working scale model, its functionality, how well it met the brief and suitability to the specified industry that is comprehensive and **highly detailed**. **AO5** – supported by thoughtful, imaginative and **highly relevant** examples of ways to improve the working scale model.
3	**5 to 6**	**AO5** – **good** analysis and evaluation of the success of the final working scale model, its functionality, how well it met the brief and suitability to the specified industry that is **mostly detailed** and considered. **AO5** – supported by thoughtful, useful and **mostly relevant** examples of ways to improve the working scale model.
2	**3 to 4**	**AO5** – **reasonable** analysis and evaluation of the success of the final working scale model, its functionality, how well it met the brief and suitability to the specified industry that is in **some detail**. **AO5** – supported by at least one example of a way to improve the working scale model that has **some relevance**.
1	**1 to 2**	**AO5** – **limited** analysis and evaluation of the success of the final working scale model, its functionality, how well it met the brief and suitability to the specified industry that has **minimal detail**. **AO5** – supported by at least one example of a way to improve the working scale model that has **minimal or no relevance**.
	0	No rewardable material

Note: it is not a requirement that the learner formulates a response in their portfolio specifically against each AO as laid out in the indicative content. The evidence provided by the learner for each AO may be embedded throughout the evidence submitted for the task. Whilst it is likely that the responses will be illustrated by the indicative content points below, credit should be given for different approaches, providing they meet the key requirements of the task and mark scheme.

Indicative content

AO5 – learners will analyse and evaluate the whole process of developing the working scale model of a tablet holder and may include the following:

- an evaluation of the drawings, planning and production of the working scale model that could address the following:
  - were the materials, tools and / or machinery selected ultimately the correct ones?
  - how effective, accurate and / or useful were the hand-drafted engineering drawings?
  - how effective, accurate and / or useful were the CAD-produced engineering drawings?
  - how useful and accurate was the production plan, and how closely was this followed?
  - was the production of the final working scale model successful?
  - did the functionality of the working scale model perform as desired?
  - how suitable to the industry was the final product?
  - how could the process be improved?