CAMBRIDGE
International Education

# Cambridge International AS & A Level

**DESIGN & TECHNOLOGY** **9705/32**

Paper 3 **October/November 2025**

MARK SCHEME

Maximum Mark: 100

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

**PUBLISHED**

## Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

| |
|---|
| GENERIC MARKING PRINCIPLE 5:<br><br>Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen). |
| GENERIC MARKING PRINCIPLE 6:<br><br>Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind. |

## Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

## Annotations

| Annotation | Meaning |
|---|---|
|  | Correct point – mark(s) awarded |
|  | Benefit of doubt given – mark(s) awarded |
| Highlighter | Creditworthy response – highlight key points |
|  | Repetition |
|  | Marking level achieved |
|  | Marking level achieved |
|  | Marking level achieved |
|  | Marking level achieved |
|  | Marking level achieved |
|  | Marking level achieved |
|  | Page or response seen by examiner |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(a) | **State a suitable material for the holder shown in Fig. 1.1.**<br>**Give <u>two</u> reasons to justify your choice.**<br><br>Award up to **one** mark for an appropriate material.<br><br>Award up to **one** mark for **each** appropriate reason up to a maximum of **two** marks.<br><br>The reasons must be relevant to the chosen material.<br><br>Exemplar answers:<br><br>Material: Aluminium<br>Reasons:<br>• It is strong enough not to deform or snap with regular use<br>• It is lightweight for ease of portability<br>• It is easy to bend into the required shape.<br><br>Material: Acrylic<br>Reasons:<br>• It comes in a choice of different colours<br>• It is lightweight for ease of portability<br>• It is easy to bend / mould into the required shape.<br><br>Material: Beech<br>Reasons:<br>• It has aesthetic qualities – beech wood has an attractive grain<br>• It is environmentally friendly – beech wood is a sustainable / renewable resource / can use thin strips of hardwood for lamination, reducing wastage<br>• It has a choice of finishes such as varnish or paint. | **3** | Accept all valid responses.<br><br>Do not accept single word responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(b) | **Use sketches and notes to show how you would make <u>one</u> holder as shown in Fig. 1.1 in a school workshop.**<br><br>**In your response, you should give details of any tools and equipment you would use.**<br><br>This question has a total of 9 marks. Instructions on how to mark this question follow on further pages.<br><br>Knowledge and Understanding = **3** marks<br>Application = **4** marks<br>Communication = **2** marks<br><br>To award full marks, answers must:<br>• include the manufacturing method for all parts of the holder<br>• identify the correct tools and equipment.<br><br>Full details of CAD drawing and set up are required for 3D printing answers.<br><br>Responses may include some of the following ideas, but all valid material must be credited.<br><br>Methods of making the holder could be:<br>• Create net shape for business card holder (add tabs if sides are to be rivetted), mark out onto aluminium sheet<br>• Cut out shape using tins snips or appropriate saws<br>• Clean and finish edges<br>• Use former to carefully fold to shape<br>• Drill and countersink for rivets<br>• Use appropriate sets to rivet sides<br>• Finish and polish. | **9** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(b) | • Create net shape for business card holder<br>• Cut out shape using coping or other fine-toothed saw<br>• Clean and finish edges<br>• Using strip heater, carefully fold each side<br>• If necessary, use Tensol cement at joins<br>• Finish and polish.<br><br>• Prepare length of beech strip, 65 × 5 section<br>• Cut to length for four sides and base<br>• Mark out simple comb joint<br>• Cut joints to fit<br>• Cut recess on front piece<br>• Glue and clamp sides<br>• Fit base, glue into position<br>• Clean up using appropriate abrasives, apply finish.<br><br>**To mark this question:**<br><br>**First**, award up to a maximum of **three** marks using the marking grid for AO1a Knowledge and understanding.<br><br>**Marking grid for AO1a Knowledge and understanding**<br><br>Candidates should be able to:<br>• Demonstrate knowledge and understanding of a range of materials, tools, equipment and components used in design and technological activity. (AO1a) | | |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(b)</td><td>

| Level | Description | Marks |
|---|---|---|
| Level 2 | Clear and detailed knowledge and understanding of an appropriate range of tools and equipment. (AO1a) | 2–3 |
| Level 1 | Partial knowledge and understanding of an appropriate range of tools and equipment. (AO1a) | 1 |
| Level 0 | No creditable response. | 0 |

**Second**, award up to a maximum of **four** marks using the marking grid for AO2a Application of knowledge and understanding.

**Marking grid for AO2a Application of knowledge and understanding**

Candidates should be able to:
- Apply knowledge, understanding and skills in a variety of contexts. (AO2a)

| Level | Description | Marks |
|---|---|---|
| Level 2 | Clear and detailed application of knowledge and understanding of an appropriate range of tools and equipment for the product. (AO2a) | 3–4 |
| Level 1 | Partial application of knowledge and understanding of an appropriate range of tools and equipment for the product. (AO2a) | 1–2 |
| Level 0 | No creditable response. | 0 |

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

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(b)</td><td>Third, award up to a maximum of two marks using the marking grid for AO2b Communication using sketches and notes.<br><br>Marking grid for AO2b Communication using sketches and notes<br><br>Candidates should be able to:<br>• Communicate knowledge and understanding using sketches, notes and a range of graphical techniques, including conventions and specialist vocabulary. (AO2b)<br><br>
<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 2</td><td>Clear and easily understood. (AO2b)</td><td>2</td></tr>
<tr><td>Level 1</td><td>Partial communication. (AO2b)</td><td>1</td></tr>
<tr><td>Level 0</td><td>No creditable response.</td><td>0</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>1(c)</td><td>Use sketches and notes to describe the changes which may be necessary to the design, manufacturing method and the material selected to produce 1000 identical holders.<br><br>This question has a total of 8 marks. Instructions on how to mark this question follow on further pages.<br><br>Materials / design and manufacturing = (2+2) = 4 marks<br>Communication = 4 marks<br><br>To mark this question:<br>Give a total of up to four marks by:<br><br>First, awarding up to a maximum of two marks for the materials and appropriate changes to the design.</td><td>8</td><td>Accept all valid responses</td></tr>
</table>

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(c) | Answers could include:<br><br><u>Materials / design</u><br>• Explanation of no change<br>• Nylon<br>• Aluminium<br>• Mild steel<br>• Polymer resins<br><br>**Second**, awarding up to a maximum of **two** marks for the manufacturing method.<br><br>Answers could include:<br><br><u>Manufacturing method</u><br>• injection moulding<br>• extrusion<br>• Profile formed wood section<br>• Pressing<br>• Automated milling<br><br>**Third**, award up to a maximum of **four** marks using the marking grid for AO2b Communication using sketches and notes.<br><br>**Marking grid for AO2b Communication using sketches and notes**<br><br>Candidates should be able to:<br>• Communicate knowledge and understanding using sketches, notes and a range of graphical techniques, including conventions and specialist vocabulary. (AO2b) | | |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(c)</td><td>
<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 2</td><td>• The sketches are detailed and are successfully communicated with precision and clarity. (AO2b)<br>• The sketches have detailed and correct annotations, including where relevant appropriate conventions and specialist vocabulary. (AO2b)</td><td>3–4</td></tr>
<tr><td>Level 1</td><td>• Partial communication through simple sketches. (AO2b)<br>• The sketches have limited annotations, with limited conventions and specialist vocabulary. (AO2b)</td><td>1–2</td></tr>
<tr><td>Level 0</td><td>• No creditable response.</td><td>0</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(a) | **Describe <u>one</u> of the stages in the product life cycle.**<br><br>Award up to **one** mark for identifying a correct stage.<br><br>Award up to **one** mark for a relevant description of the stage.<br><br>Stages could be:<br>• Research and development [1] to ascertain whether an idea is feasible. It is the phase before a product is introduced to the marketplace. This is when companies bring in investors, develop prototypes, test product effectiveness, and strategize their launch. [1]<br>• Introduction [1] is when the product is launched in the marketplace. Marketing teams create product awareness and target potential customers. Sales can be slow when a product is introduced. [1]<br>• Growth [1] this stage is when the market for the product is growing and expanding. [1]<br>• Maturity [1] this stage of the product life cycle is the most profitable stage, when the costs of production and marketing decline. [1]<br>• Decline [1] is when the product loses sales and market share due to possible market saturation and alternative products. [1] | **2** | Accept all valid responses, including end of life (disposal) and D&T interpretation of product life cycle. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(b) | **Explain <u>two</u> reasons why material testing before production is important to the manufacturer.**<br><br>Award up to **one** mark for each relevant reason.<br>Award up to **one** additional mark for an appropriate explanation of **each** reason.<br><br>Any **two** reasons from:<br>• It can ensure that the material has the properties required [1] to perform as needed in the product. [1]<br>• It can reduce faults [1] which result in loss of production time.<br>• It can reduce waste from faulty products [1] which is better for the environment / reduces the cost. [1]<br>• it can help to guarantee the quality of the product [1] and maintain customer confidence. [1] | **4** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(c) | **Use sketches and notes to describe a jig that you could make in a school workshop, which would enable the cutting of 40 × 20 section hardwood into 200 mm lengths.**<br><br>This question has a total of 4 marks. Instructions on how to mark this question follow below.<br><br>Process = **2** marks<br>Communication = **2** marks<br><br>**To mark this question:**<br><br>**First**, award up to **one** mark for the length limit.<br><br>**Second**, award up to **one** mark for guiding the saw.<br><br>Answers could include:<br>• Length indicator or physical length stop<br>• Holding support or clamp for wood section<br>• Guide for saw blade<br>• Method of securing jig in vice or to bench.<br><br>**Third**, award up to **two** marks for the quality of the communication using the marking grid for AO2b Communication using sketches and notes.<br><br>**Marking grid for AO2b Communication using sketches and notes**<br><br>Candidates should be able to:<br>• Communicate knowledge and understanding using sketches, notes and a range of graphical techniques, including conventions and specialist vocabulary. (AO2b) | **4** | |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2(c)</td><td>
<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 2</td><td>Clear and easily understood, showing force applied and indentation shape. (AO2b)</td><td>2</td></tr>
<tr><td>Level 1</td><td>Partial communication. (AO2b)</td><td>1</td></tr>
<tr><td>Level 0</td><td>No creditable response.</td><td>0</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 3(a) | **Identify a product that has been manufactured as one-off and describe <u>one</u> quality control check that could be carried out on the product.**<br><br>Award up to **one** mark for valid one-off product.<br><br>Award up to a maximum of **two** additional marks for an appropriate quality control check.<br><br>Exemplar answers:<br><br>Product could be:<br>• Bespoke item of furniture<br>• Item of jewellery<br><br>Quality control check could be:<br>• Visual check [1] using illuminated magnifying glass if appropriate to identify faults or problems. [1]<br>• Dimensional check [1] using appropriate equipment tools to check important product dimension. [1]<br>• Specific product feature functional test. | **3** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 3(b) | **Explain <u>one</u> external quality standard used in manufacturing industries.**<br><br>Award up to **one** mark for the identification of an appropriate external quality standard, e.g. ISO.<br><br>Award up to a maximum of **two** additional marks for an appropriate and specific explanation, e.g. ISO 9013.<br><br>External quality standard could be:<br>• ISO 9013 (thermal cutting) details geometrical product specifications and quality tolerances for the classification of thermal cuts in materials suitable for oxyfuel flame cutting, plasma cutting and laser cutting.<br>• ISO 34257 (wood adhesives).<br>• CE marking refers to how a product complies with EU safety, health and environmental requirements, and how to place a CE marking on your product.<br>• BSI Kitemark certification confirms that a product or service's claim has been independently and repeatedly tested by experts, meaning that users can have trust and confidence in products and services that are BSI Kitemark certified.<br>• NZS 5831.1:1989 Walking aids for the disabled - Specification for the walking stick.<br>• ZWS X4:1968 Anthropometric recommendations for dimensions of non-adjustable office chairs, desks and tables. | **3** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 3(c) | **Explain <u>two</u> reasons why repair and maintenance is an important service sector in design and manufacturing industries.**<br><br>Award up to **one** mark for each relevant reason.<br>Award up to **one** additional mark for an appropriate explanation of **each** reason.<br><br>Any **two** reasons from:<br>• Design and manufacturing industry needs to make best use of capital expenditure [1] effective repair and maintenance of machinery ensures long usage. [1]<br>• Some machines are very expensive [1] repair is a more cost effective than having to purchase new one when failure occurs. [1]<br>• Effective maintenance and repair by a company [1] maintains availability, reliability and quality of product and enhances and cements its reputation. [1]<br>• Maintenance and repair is critical to a company's profitability [1] by ensuring limited downtime through machine failure. [1] | **4** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 4(a) | **Explain <u>one</u> issue of concern relating to the extraction of raw materials.**<br><br>Award up to **one** mark for the identification of an appropriate issue.<br><br>Award up to **one** additional mark for an appropriate explanation of the issue.<br><br>Exemplar answers:<br>• Extraction of some raw materials involves large scale interventions in ecosystems [1] such as timber removal from unauthorized forestry effecting animal habitat and global warming exacerbation. [1]<br>• Mining and deforestation to extract raw materials [1] can destabilize soils, increase erosion, and reduce the nutrient levels in ecosystems. It can increase erosion and also decrease water quality by increasing sediment and pollutants in rivers and streams. [1]<br>• The extraction of fossil fuels [1] is a primary cause of current climate change, which is affecting ecosystems and causing global human and environmental health problems. [1] | **2** | Accept all valid responses. |
| 4(b) | **Give <u>one</u> example of how a designer would use photo manipulation software.**<br><br>Award up to **two** marks for the explanation of how a designer made use of photo manipulation software.<br><br>Exemplar answers:<br>• Photo manipulation software such as Photoshop [1] can be used by a designer to use filters to create subtle colour changes for the desired image. [1]<br>• Layers can be built by graphic designers [1] to generate complex and sophisticated images. [1]<br>• Photographic images can be retouched and distorted by designers [1] to produce images that fit in with the required design genre or theme. [1] | **2** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 4(c) | **Discuss the effectiveness of using customer observation to obtain market research information.**<br><br>Use the marking grid for AO4d Analysis of the wider issues in design and technology to mark candidates' responses to this question.<br><br>Responses may include some of the following ideas, but all valid material must be credited.<br><br>• Observing customers can provide a deeper understanding of customer behaviour and needs, leading to more effective marketing and product development strategies. E.g. Observing customers carrying out tasks such as washing up dishes at a sink can inform designers who have the task of designing items or products to be used when washing dishes.<br>• Target markets may be identified for observation; as wide a range of customers as possible, depending upon budget, can be very helpful to identify the common features and behaviours of tasks involving the use of available products that are due for a redesign as sales may be dropping against competitors.<br>• Observation is not widely used but gives intuitive feedback. Research companies organise customer observation sessions to gather information and capture insights on how they engage with the product or service or that of a similar competitor product or service.<br>• It is often used as an alternative to focus groups. It is a relatively inexpensive research tool but gives the opportunity to witness potential customers interacting with and using a product in a natural environment.<br>• Researchers may also observe customer behaviour in retail stores, look at what areas are they are drawn to in a window or in-store display. | **6** | Accept all valid responses. |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4(c)</td><td>

**Marking grid for AO4d Analysis of wider issues in design and technology**

Candidates should be able to:
- Analyse wider issues in design and technology (including cultural, economic, environmental and social factors). (AO4d)

<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 3</td><td>Analysis of more than two wider issues with relevant and detailed information<br><br>• Detailed discussion of more than two wider issues in design and technology. (AO4d)<br>• The analysis is well supported with relevant and detailed information. (AO4d)</td><td>5–6</td></tr>
<tr><td>Level 2</td><td>Analysis of at least two wider issues with relevant information<br><br>• Discussion of at least two wider issues in design and technology. (AO4d)<br>• The analysis is supported with relevant information. (AO4d)</td><td>3–4</td></tr>
<tr><td>Level 1</td><td>Description of at least one wider issue with limited relevant information<br><br>• Description of at least one wider issue in design and technology. (AO4d)<br>• The description is supported with limited relevant information. (AO4d)</td><td>1–2</td></tr>
<tr><td>Level 0</td><td>• No creditable response.</td><td>0</td></tr>
</table>

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

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 5(a) | **Describe <u>one</u> way in which a filler can be used to enhance the properties of a polymer.**<br><br>Award up to **two** marks for an appropriate description of one way in which a filler can be used to enhance the properties of a polymer.<br><br>Exemplar answers:<br>• Calcium carbonate (chalk) [1] is used in many applications including PVCs and unsaturated polyesters. It can improve moulding productivity by decreasing the cooling rate of the polymer. It can also increase the operating temperatures of polymers. [1]<br>• Silica, clay and kaolin [1] are added as fillers to polymers to add bulk and lower cost. They also make them easier to mould and shape while ensuring the stability of the compounds.<br>• For polymers that require heat-resistance, mineral fillers [1] can increase heat-deflection and reduce thermal expansion.<br>• Carbon fibres [1] are added to polymers to increase tensile strength without adding weight, improve heat deflection, and improve electrical conductivity. [1] | **2** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 5(b) | **Explain what is meant by CYMK with reference to printing.**<br><br>Award up to **two** marks for an appropriate explanation of what is meant by CYMK with reference to printing.<br><br>Exemplar answers:<br>• CMYK is a type of colour model where colours are created by absorbing certain wavelengths of light [1] and is used for printing mostly in commercial printing processes. [1]<br>• The abbreviation CMYK refers to the four ink plates used: cyan, magenta, yellow, and key (black) [1] and uses subtractive colours, where the background starts of white (like a sheet of paper in a printer) and as more colour is added it gets darker until it turns black. [1]<br>• CMYK is used for printing [1] rather than RGB (red, green, blue) as it is easier to standardise, due to the spectrum of colours available. That means print colours are kept looking perfectly consistent throughout the print run. [1]<br>• CMYK is a colour model [1] all colour models stem from a small set of primary colours, and they each create a larger, specific range of colours. A good knowledge CMYK is required to print high-quality art and design prints. [1] | **2** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 5(c) | **Discuss the benefits, to teams of designers, of collaborative working that uses digital technology.**<br><br>Use the marking grid for AO4d Analysis of the wider issues in design and technology to mark candidates' responses to this question.<br><br>Responses may include some of the following ideas, but all valid material must be credited.<br><br>• Collaborative working can be carried out using a range of digital tools, including:<br>– Project and task management software to provide a framework for collaboration<br>– Video conferencing software, such as Teams or Skype, for online meetings<br>– Team messaging platforms such as email and messenger.<br>• Security may be an issue, secure log ins and frequent password changes may be required.<br><br>Benefits of collaborative working would include:<br>• More innovation from bringing a range of people from across the company together to brainstorm on issues.<br>• Speed of progress, program does not have to follow a linear plan from department to department, members from several teams can work at the same time, the impact of any proposals / changes made can be discussed immediately by all relevant parties.<br>• Design companies may be able to attract a wider range of designers, possibly globally, not only the ones who live locally, as they can collaborate with them through the use of collaboration software packages.<br>• Collaborative working using Video conferencing would allow designers or other members of the team to work from home. | **6** | |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>5(c)</td><td>

**Marking grid for AO4d Analysis of wider issues in design and technology**

Candidates should be able to:
- Analyse wider issues in design and technology (including cultural, economic, environmental, and social factors). (AO4d)

<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 3</td><td>Analysis of more than two wider issues with relevant and detailed information<br><br>• Detailed discussion of more than two wider issues in design and technology. (AO4d)<br>• The analysis is well supported with relevant and detailed information. (AO4d)</td><td>5–6</td></tr>
<tr><td>Level 2</td><td>Analysis of at least two wider issues with relevant information<br><br>• Discussion of at least two wider issues in design and technology. (AO4d)<br>• The analysis is supported with relevant information. (AO4d)</td><td>3–4</td></tr>
<tr><td>Level 1</td><td>Description of at least one wider issue with limited relevant information<br><br>• Description of at least one wider issue in design and technology. (AO4d)<br>• The description is supported with limited relevant information. (AO4d)</td><td>1–2</td></tr>
<tr><td>Level 0</td><td>• No creditable response.</td><td>0</td></tr>
</table>

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

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 6(a) | **A design company is to produce a holder for a digital drawing tablet, USB connector and pen.**<br><br>**The design specification states that the holder must be:**<br>• **easy to carry**<br>• **adjustable to allow the tablet to be supported at three different angles when in use**<br>• **manufactured as a batch of 250.**<br><br>**Use sketches and notes to produce <u>two</u> different innovative ideas for the holder for a digital drawing tablet, USB connector and pen.**<br><br>This question has a total of 12 marks. Instructions on how to mark this question follow on further pages.<br><br>Communication = **2** marks<br>Generate = **4** marks<br><br>**(i)** Idea 1 = 2 + 4 marks (**6** marks in total)<br>**(ii)** Idea 2 = 2 + 4 marks (**6** marks in total)<br><br>**To mark this question:**<br><br>For **each** innovative idea, part (i) and part (ii)<br>• **First**, award up to **two** marks using the marking grid for AO2b Communication using sketches and notes.<br>• **Second**, award up to **four** marks using the marking grid for AO3c Generate conceptual ideas.<br>– The two ideas must be **different** from each other.<br><br>The design ideas may include some of the following ideas, but all valid material must be credited.<br><br>• Range of material and construction possibilities<br>• Handle, straps carrying methods<br>• Securing methods<br>• Additional; features, e.g. paper storage. | **12** | |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6(a)</td><td>

**Marking grid for AO2b Communication using sketches and notes**

Candidates should be able to:
- Communicate knowledge and understanding using sketches, notes and a range of graphical techniques, including conventions and specialist vocabulary. (AO2b)

<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 2</td><td>Clear and easily understood. (AO2b)</td><td>2</td></tr>
<tr><td>Level 1</td><td>Partial communication. (AO2b)</td><td>1</td></tr>
<tr><td>Level 0</td><td>No creditable response.</td><td>0</td></tr>
</table>

**Marking grid for AO3c Generate conceptual ideas**

Candidates should be able to:
- Generate conceptual ideas and evaluate them, leading to the creation of a design proposal. (AO3c)

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

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6(a)</td><td>
<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 3</td><td>• Generates one complete valid conceptual idea. The conceptual idea is fully supported. (AO3c)<br>• Clear reference to design specification. (AO3c)</td><td>4</td></tr>
<tr><td>Level 2</td><td>• Generates one complete conceptual idea. The conceptual idea has some supporting information. (AO3c)<br>• Some reference to design specification. (AO3c)</td><td>2–3</td></tr>
<tr><td>Level 1</td><td>• Generates one partially complete conceptual idea. The conceptual idea has limited supporting information. (AO3c)<br>• Limited or no reference to design specification. (AO3c)</td><td>1</td></tr>
<tr><td>Level 0</td><td>• No creditable response.</td><td>0</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 6(b) | **Evaluate your <u>two</u> ideas for the holder to select a final proposal for development. Justify your selection.**<br><br>Award up to **one** mark for the decision with justification.<br><br>Award up to **one** mark for the comparison of the two design ideas.<br><br>Award up to **one** mark for the evaluation.<br><br>Accept an answer which includes sketches and annotations as necessary.<br><br>• A clear justification of the choice with an explanation.<br>• Clear comparisons should be made.<br>• Evaluations should consider the specification points given in the question.<br>• Sketches and notes may be used to support evaluations.<br><br>Candidates can answer this question in a variety of ways. | **3** | Accept all valid responses. |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 6(c) | **Use sketches and notes to develop your chosen idea to show details of functions, materials, construction and finishes.**<br><br>This question has a total of 10 marks. Instructions on how to mark this question follow on further pages.<br><br>Functions, materials, construction and finishes = **8** marks<br>Communication = **2** marks<br><br>**To mark this question:**<br><br>**First**, give a total of up to **eight** marks by using the following:<br><br><u>Functions</u><br>Award up to a maximum of **three** marks:<br>• Award **one** mark for one key function described.<br>• Award **two** marks for two key functions described.<br>• Award **three** marks for more than two functions described.<br><br><u>Materials</u><br>Award up to a maximum of **two** marks:<br>• Award **one** mark for naming one or more relevant material.<br>• Award **one** mark for the justification of use of the material.<br><br><u>Construction</u><br>Award up to a maximum of **two** marks:<br>• Award **one** mark for some detail of construction / assembly.<br>• Award **two** marks for clear detail of construction / assembly.<br><br><u>Finishes</u><br>Award **one** mark for an appropriate finish.<br><br>**Second**, award up to **two** marks using the marking grid for AO2b Communication using sketches and notes. | **10** | |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6(c)</td><td>
Marking grid for AO2b Communication using sketches and notes<br><br>
Candidates should be able to:<br>
• Communicate knowledge and understanding using sketches, notes and a range of graphical techniques, including conventions and specialist vocabulary. (AO2b)<br><br>
<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 2</td><td>Clear and detailed sketches and notes. (AO2b)</td><td>2</td></tr>
<tr><td>Level 1</td><td>Simple sketches with some notes included. (AO2b)</td><td>1</td></tr>
<tr><td>Level 0</td><td>No creditable response.</td><td>0</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 6(d) | **Use a method of your own choice to draw the complete design solution. Include key details and dimensions.**<br><br>This question has a total of 8 marks. Instructions on how to mark this question follow on further pages.<br><br>Communication = **4** marks<br>Finalise = **4** marks<br><br>Candidates may use component drawings with an assembled product sketch.<br><br>Pictorial / perspective sketches should include all details and dimensions. Annotation may be used to describe key features.<br><br>Appropriate drawings could be dimensioned orthographically or isometrically.<br><br>**To mark this question:**<br><br>**First**, award up to a maximum of **four** marks using the marking grid for AO2b Communication using sketches and notes.<br><br>**Marking grid for AO2b Communication using sketches and notes**<br><br>Candidates should be able to:<br>• Communicate knowledge and understanding using sketches, notes and a range of graphical techniques, including conventions and specialist vocabulary. (AO2b) | **8** | |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6(d)</td><td>
<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 2</td><td>Clear and detailed sketches with most key dimensions included. (AO2b)</td><td>3–4</td></tr>
<tr><td>Level 1</td><td>Simple sketches with some dimensions included. (AO2b)</td><td>1–2</td></tr>
<tr><td>Level 0</td><td>No creditable response.</td><td>0</td></tr>
</table>
<br>Second, award up to a maximum of four marks using the marking grid for AO3d Finalise a design proposal.<br><br>Marking grid for AO3d Finalise a design proposal<br><br>Candidates should be able to:<br>• Refine and develop procedures to finalise a design proposal, recognising the constraints of time, cost and resources, and plan for making. (AO3d)<br><br>
<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>Level 2</td><td>The design proposal is realistic and includes most design/product details. (AO3d)</td><td>3–4</td></tr>
<tr><td>Level 1</td><td>The design proposal includes some design/product details. (AO3d)</td><td>1–2</td></tr>
<tr><td>Level 0</td><td>No creditable response.</td><td>0</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6(e)</td><td>
Write a detailed <u>manufacturing</u> specification for your chosen idea. Your answer should include at least <u>four</u> different manufacturing specification points.<br><br>
Award marks based on the following criteria.<br><br>
<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>5</td><td>Four or more detailed manufacturing specification points covered and clearly described.</td><td>5</td></tr>
<tr><td>4</td><td>Three points covered and clearly described. Four or more detailed manufacturing specification points covered and not clearly described.</td><td>4</td></tr>
<tr><td>3</td><td>Two points covered and clearly described. Three points covered and not clearly described.</td><td>3</td></tr>
<tr><td>2</td><td>One point covered and clearly described. Two points covered not clearly described.</td><td>2</td></tr>
<tr><td>1</td><td>One point covered but not clearly described.</td><td>1</td></tr>
<tr><td>0</td><td>No creditable response.</td><td>0</td></tr>
</table>
<br>
The manufacturing specification could include the following, but all valid material must be credited:<br><br>
<u>Specific materials used:</u><br>
• Appropriate for a holder for an A4 digital drawing tablet, charger and pen.<br><br>
<u>Bought in components / parts:</u><br>
• Appropriate for a holder for an A4 digital drawing tablet, charger and pen.
</td><td>5</td><td></td></tr>
</table>

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 6(e) | Construction / assembly details:<br>• Appropriate for a holder for an A4 digital drawing tablet, charger and pen.<br><br>Finish to be applied:<br>• Appropriate for a holder for an A4 digital drawing tablet, charger and pen.<br><br>Allowable tolerance:<br>Appropriate for a holder for an A4 digital drawing tablet, charger and pen. | | |
| 6(f) | **Describe one disadvantage of using Computer-aided-design (CAD) when designing.**<br><br>Award up to **one** mark for the appropriate disadvantage.<br>Award up to **one** mark for a relevant description.<br><br>Any **one** disadvantage from:<br>• Cost [1], software and hardware required [1]<br>• Time [1] freehand sketching quicker for generating initial ideas<br>• Personal preference [1] designer choice [1]. | **2** | Accept all valid responses. |