



National
Qualifications
2025

2025 Design and Manufacture

National 5

Question Paper Finalised Marking Instructions

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General marking principles for National 5 Design and Manufacture

Always apply these general principles. Use them in conjunction with the detailed marking instructions, which identify the key features required in candidates' responses.

- (a) Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted for errors or omissions.
- (b) If a candidate response does not seem to be covered by either the principles or detailed marking instructions, and you are uncertain how to assess it, you must seek guidance from your team leader.
- (c) To be awarded marks candidates must respond to the command word used in the question. For example, listing a valid point, even if correct, should not be awarded marks if the question asked for an outline, description or explanation.
- (d) Mark consecutive responses to match the marks in 'name/state' questions. For example, if two responses are given to a **1 mark** question, only the first response should be marked.
- (e) Candidates must answer all aspects of the question to gain full marks. For example, if the questions require two reasons candidates must make two valid and substantiated points relating to the question to gain both marks. If the questions require three stages to be described, candidates must provide a structure of characteristics and/or features of each of the three stages to be awarded all **3 marks**.
- (f) For each candidate response, the following provides an overview of the marking principles. Refer to the specific marking instructions for further guidance on how these principles should be applied.
 - (i) Questions that ask candidates to **name/state**
Candidates will normally be required to make the same number of statements as marks available in the question.
 - (ii) Questions that ask candidates to **outline**
Candidates must provide a brief sketch of content. More than naming, but not a detailed description. Candidates will normally be required to make the same number of actual/appropriate points as marks available in the question.
 - (iii) Questions that ask candidates to **describe**
Candidates must provide a statement or structure of characteristics and/or features. This should be more than an outline or a list. Candidates may refer to, for instance, a concept, experiment, situation, or facts in the context of, and appropriate to, the question. Candidates will normally be required to make the same number of factual/appropriate points as marks available in the question.
 - (iv) Questions that ask candidates to **explain**
Candidates must generally relate cause and effect and/or make relationships between things clear. This will be related to the context of the question or a specific area within a question.

Marking instructions for each question

Section 1

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|-------|--|----------|--|
| 1. | (a) | (i) | <p>Name a suitable manufactured board for the base:</p> <ul style="list-style-type: none"> plywood MDF <p>Any other suitable response.</p> | 1 | <p>1 mark for correct response.</p> <p><i>'Chipboard'</i> (1 mark) <i>'Hardboard'</i> (1 mark)</p> <p><i>'Blockboard'</i> (0 marks) as it is too thick (all the other particle boards could be thin).</p> |
| | | (ii) | <p>Suitability of oak for the main body (other than strong and durable):</p> <ul style="list-style-type: none"> suitable for outside use, weather resistant aesthetically pleasing finishes well <p>Any other suitable response.</p> | 1 | <p>1 mark for correct response.</p> <p>Responses referring to strong or durable score 0 marks as they are given in the question.</p> <p>Unqualified <i>'cheap'</i> or <i>'easy'</i> responses score 0 marks.</p> <ul style="list-style-type: none"> easy to work with (cut) scores 0 marks. |
| | | (iii) | <p>Name an alternative hardwood (other than oak):</p> <ul style="list-style-type: none"> mahogany ash beech <p>Any other suitable response.</p> | 1 | <p>1 mark for correct response.</p> <p>Any other suitable hardwood.</p> <p>Balsa scores 0 marks.</p> |

| Question | | Expected response | Max mark | Additional guidance |
|----------|-----|--|----------|---|
| | (b) | <p>Manufacture of the housing joint:</p> <p>A description and/or sketch that could include some of the following:</p> <p>Marking out stage</p> <ul style="list-style-type: none"> • measure position of joint with rule and mark with pencil • draw lines at 90 degrees with try square • set marking gauge • mark depth with marking gauge <p>Cutting stage</p> <ul style="list-style-type: none"> • use a G-clamp to hold a guide piece of wood next to the line • cut the two lines to the required depth with a tenon saw • remove the waste wood with a chisel (naming a specific chisel is not required) • level the bottom of the joint with a hand router/chisel <p>There is no requirement to refer to the identified stages in the correct sequence.</p> <p>Any other suitable response.</p> | 4 | <p>Candidates must refer to both the marking out and cutting stages to gain full marks.</p> <p>Candidates may use sketches to aid their descriptions.</p> <p>A maximum of 3 marks may be awarded to responses that only refer to one of the stages.</p> <p>Responses that do not refer to appropriate tools score a maximum of 1 mark.</p> <p><i>‘Mark the lines with a try square’ (1 mark)</i></p> <p><i>‘Remove waste material using mallet and chisel’ (1 mark)</i></p> <p><i>‘Find the centre (depth) using a marking gauge’ (1 mark)</i></p> <p>Lists of tools score 0 marks eg <i>‘use a saw and chisel’</i>.</p> <p><i>‘Mark the distance with a ruler’ (0 marks)</i> (a ruler should be used to measure).</p> <p>References to clamping/securing in vice on their own score 0 marks.</p> <p>References to sanding/filing the bottom of the joint score 0 marks.</p> <p>Basic statements such as ‘mark the wood with a pencil’ score 0 marks.</p> <p><i>‘Mark the waste wood with diagonal lines.’ (1 mark)</i></p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|------|---|----------|---|
| | (c) | (i) | Name the drill bit: <ul style="list-style-type: none"> Forstner bit Any other suitable response. | 1 | 1 mark for correct response. Any other suitable response could include: <ul style="list-style-type: none"> spade/flat bit 'Hole saw' (0 marks.) |
| | | (ii) | Outline how to drill to the correct depth: <ul style="list-style-type: none"> set the depth stop Any other suitable response. | 1 | 1 mark for correct response. 'Mark the drill bit with masking tape' (1 mark) 'Mark with pen at the correct depth' (1mark) 'Set the depth stop' (1 mark) 'Put masking tape on the drill.' (1 mark) Reference to depth on its own does not warrant a mark. 'Set the depth.' (0 marks) 'Set the drill.' (0 marks) 'Use a steel ruler.' (0 marks) 'Put a steel rule in the cut hole to check depth' (0 marks) |
| | (d) | (i) | Name two alternative corner joints (other than finger joint): <ul style="list-style-type: none"> lap, halving, rebate rub dowel Any other suitable response. | 2 | 1 mark for correct response up to a maximum of 2 marks. Responses such as <i>'Use a lap joint or rebate joint'</i> score 1 mark only as they refer to the same type of joint. Any other suitable response could include: <ul style="list-style-type: none"> dovetail biscuit mitre butt Screws, pins or glue score 0 marks |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|--|------|---|----------|---|
| | | (ii) | <p>Check for squareness:</p> <ul style="list-style-type: none"> • measure diagonals • using try/engineers square in corners • use a trammel • use a template <p>Any other suitable response.</p> | 2 | <p>1 mark for each correct outline up to a maximum of 2 marks.</p> <p>To be awarded full marks candidates must outline two methods.</p> <p>Sketches may attract marks.</p> <p><i>‘Use an engineer’s square’/ ‘set square’/ ‘combination square’ scores 1 mark.</i></p> <p><i>‘Use a try square.’ (1 mark)</i></p> <p><i>‘Measure the diagonals.’ (1 mark)</i></p> <p><i>‘Check the diagonals using a piece of wood/string/trammel.’ (1 mark)</i></p> <p><i>‘Use a ruler.’ (0 marks)</i></p> <p><i>‘Measure it.’ (0 marks)</i></p> <p><i>‘Corner to corner.’ (0 marks)</i></p> <p><i>‘Draw the diagonals.’ (0 marks)</i></p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|------|---|----------|---|
| | (e) | (i) | <p>Outline two benefits of using varnish:</p> <ul style="list-style-type: none"> • to protect from moisture/stains/weather • to allow the grain to show • to improve the appearance/be aesthetically appealing • to be able to see the contrasting timbers • to make it easier to clean wipe • to be more durable <p>Any other suitable response.</p> | 2 | <p>To be awarded marks candidates must provide an outline when answering this question.</p> <p><i>'More resistant to scratches'</i> (1 mark)</p> <p>1 mark for each valid description up to a maximum of 2 marks.</p> |
| | | (ii) | <p>Describe high quality brushed finish:</p> <ul style="list-style-type: none"> • apply a thin coat • apply an even coat • cover all surfaces • remove any bristles that come off the brush • remove excess varnish off brush before applying to wood so the amount of varnish applied is easily controlled • brush with the grain • multiple layers applied • sand between layers <p>Any other suitable response.</p> | 3 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p>1 mark for each correct response up to a maximum of 3 marks.</p> <p>0 marks to be awarded to 'apply with brush' as this is in the question.</p> <p><i>'Remove dust after sanding between layers'</i> (2 marks)</p> <p><i>'Use steel wool'</i> (1 mark)</p> <p><i>'Remove dust'</i> (1 mark)</p> <p><i>'Sand between coats.'</i> (1 mark)</p> <p><i>'Sand it.'</i> (0 marks)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|------|--|----------|---|
| | (f) | (i) | Name a suitable silver non-ferrous metal: <ul style="list-style-type: none"> aluminium Any other suitable response | 1 | 1 mark for correct response. <i>'Zinc' (1 mark)</i> <i>'Tin' (0 marks)</i> <i>'Silver' (0 marks)</i> |
| | | (ii) | Outline of safety checks carried out on centre lathe before turning: <ul style="list-style-type: none"> work secured in chuck chuck key is removed material running true centre cutting tool centred guard down. check speed of lathe Any other suitable response. | 2 | 1 mark for each correct response up to a maximum of 2 marks . Marks can only be awarded for checks on the centre lathe. No marks should be awarded for reference to personal safety or protective equipment. <i>'Put the guard down and make sure the work piece is secure.' (2 marks)</i> <i>'Put the guard down.' (1 mark)</i> <i>'Turn on to check speed of lathe.' (1 mark)</i> <i>'You must wear goggles.' (0 marks)</i> <i>'The guard.' (0 marks)</i> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|-------|---|----------|---|
| | | (iii) | Name the centre lathe processes: Step 1: • parallel/step turning Step 2: • taper turning Step 3: • knurling | 3 | 1 mark for each correct response up to a maximum of 3 marks . <i>'Chamfering' (0 marks)</i> |
| | (g) | (i) | Name a hand tool for cutting curve: • coping saw | 1 | 1 mark for correct response. <i>'Abrafile.'</i> (1 mark) Mention of machine tools scores (0 marks) |
| | | (ii) | Explain why countersunk holes were used: • the flush surface prevents napkins getting caught on the screw heads | 1 | 1 mark for correct response. <i>'To ensure the screws don't stick out.'</i> (1 mark) |
| | | (iii) | Finishing plastic edges. A description that includes: • cross file • draw file • scrape • rub with wet and dry paper • polish • steel wool and soap Any other suitable response. | 2 | 1 mark for each valid stage up to a maximum of 2 marks . Sketches may attract marks. If the graphic indicates the right process but has been annotated incorrectly marks should be awarded. <i>'Cross file the edges and draw file the edges.'</i> (2 marks) <i>'Cross file the edges.'</i> (1 mark) <i>'File it.'</i> (1 mark) <i>'Rub the edges with steel wool and soap.'</i> (1 mark) References to <i>'sand/glass paper'</i> on their own score (0 marks). |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|--|------|---|----------|--|
| | | (iv) | <p>Description of how to form the line bends.</p> <ul style="list-style-type: none"> • heat the fold line using a strip heater/line bender • bend around a former to create the right-angled bend • secure in place until it sets • leaving until cool <p>Any other suitable response.</p> | 2 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p>1 mark for each valid point leading to a clear description, up to a maximum of 2 marks.</p> <p><i>‘Bend it around a piece of wood.’</i> (1 mark) (implies use of a former)</p> <p><i>‘Heat it on a strip heater.’</i> (1 mark)</p> <p><i>‘Put it on a strip heater’</i> (1 mark)</p> <p><i>‘Leave it to cool.’</i> (1 mark)</p> <p><i>‘Heat it.’</i> (0 marks).</p> <p><i>‘Heat it in the oven’</i> (0 marks)</p> <p><i>‘Bend it.’</i> (0 marks)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|--|--|----------|---|
| 2. | (a) | | <p>Describe the key stage of a questionnaire:</p> <ul style="list-style-type: none"> • decide on the questions to be used • Identify the target audience • test/check the questionnaire for example length/clarity • ask questions/distribute the questionnaire • collect results • analyse results <p>Any other suitable response.</p> | 3 | <p>1 mark for each valid description up to a maximum of 3 marks.</p> <p>A list of single word responses doesn't attract marks.</p> <p>Some interpretation may be required from the marker with reference to the bullet points on the left.</p> <p><i>'Hand out questionnaire to target audience.'</i> (2 marks)</p> <p><i>'Hand out questionnaire.'</i> (1 mark)</p> <p><i>'Don't make it too long as people may get bored.'</i> (1 mark)</p> |
| | (b) | | <p>Name an alternative research technique:</p> <ul style="list-style-type: none"> • user trip <p>Any other suitable response.</p> | 1 | <p>1 mark for the correct response.</p> <p>Candidates may also refer to:</p> <ul style="list-style-type: none"> • user trials • testing/test rigs • comparisons • reviews. <p><i>'Use the internet'</i> unqualified so scores (0 marks).</p> <p><i>'Survey'</i> is considered too similar to questionnaire so scores (0 marks).</p> <p><i>'Market research.'</i> (0 marks)</p> |
| | (c) | | <p>Explanation why a specification is used:</p> <ul style="list-style-type: none"> • gives a clear idea of what the product should be • to help explore and refine ideas • the designer is less likely to forget to incorporate important features • it can be used to evaluate the suitability of a product <p>Any other suitable response.</p> | 1 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p><i>'As a checklist for your design.'</i> (1 mark)</p> <p><i>'As a starting point.'</i> (0 marks)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|--|--|---|----------|--|
| 3. | | | <p>Description of the key stages of brainstorming that includes any three of the following:</p> <p>Typical responses for brainstorming could include reference to:</p> <ul style="list-style-type: none"> • communicate the purpose of the activity • group activity • coming up with lots of ideas within a designated time • record all ideas • no ideas too silly • spark ideas off each other • select the most promising idea(s) for future development <p>Any other suitable response.</p> | 3 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p>A list of single word responses doesn't attract marks</p> <p>1 mark for each valid point leading to a clear description, up to a maximum of 3 marks.</p> <p>Candidates do not need to refer to all stages to gain full marks.</p> <p><i>'People shout out lots of ideas and someone writes them down.'</i> (2 marks)</p> <p>Reference to <i>'a topic being shared'</i> could gain 1 mark (refers to communicating the purpose).</p> <p><i>'People think of lots of ideas.'</i> (1 mark) (refers to a group).</p> <p><i>'Think of lots of ideas.'</i> (0 marks)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|-----|--|----------|--|
| 4. | (a) | (i) | <p>A description of the benefits of sketch models:</p> <ul style="list-style-type: none"> • sketches models can be produced quickly which allows lots of ideas to be produced in a short time • the designer gets to see their ideas in a 3D form • as part of an idea generation technique • the materials used are easy to source, for example, card or paper • the modelling materials are low cost • the designer may be able to create forms that are difficult to sketch • sketch modelling does not require a high level of skill • can be shown to others for initial feedback • can be altered and refined <p>Any other suitable response.</p> | 2 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p>Responses cannot be repeated across (i) and (ii)</p> <p>1 mark for each valid point leading to a clear description, up to a maximum of 2 marks.</p> <p>In the context of this question an unqualified ‘quick’ is accepted.</p> <p>Unqualified <i>‘cheap’</i> or <i>‘easy’</i> responses score (0 marks).</p> <p>References to correct stages in the design process can gain marks.</p> <p><i>‘Quick to make.’ (1 mark)</i></p> <p><i>‘Quicker to make than scale models.’ (1 mark)</i></p> <p><i>‘A rough idea of what it looks like.’ (1 mark)</i></p> <p><i>‘Creates rough ideas’ (1 mark)</i></p> <p><i>‘Sketch models can be annotated to add detail’ (1 mark)</i></p> <p><i>‘The size of the controls can be checked to ensure they fit the size of fingers.’ (0 mark)</i></p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|--|------|--|----------|--|
| | | (ii) | <p>A description of the benefits of block models:</p> <ul style="list-style-type: none"> • provides better understanding of 3D form • made from one solid block material • if it would present any maintenance/cleaning issues • if the design is sturdy and stable • to evaluate aesthetics • physical interaction gives feedback on ergonomics • can be used for promotional purposes • to present to a client for feedback <p>Any other suitable response.</p> | 2 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p>Responses cannot be repeated across (i) and (ii)</p> <p>1 mark for each valid point leading to a clear description, up to a maximum of 2 marks.</p> <p>Unqualified '<i>cheap</i>' '<i>quick</i>' or '<i>easy</i>' responses score (0 marks).</p> <p><i>'The size of the controls can be checked to ensure they fit the size of fingers.'</i> (1 mark)</p> <p><i>'The size of the levers/buttons.'</i> (1 mark)</p> <p><i>'The position of the controls.'</i> (1 mark)</p> <p><i>'The proportion compared to other controllers.'</i> (1 mark)</p> <p><i>'If the colours look good.'</i> (1 mark) (do not need to refer to block model of game controller).</p> <p>'Easy to modify' (0 marks)</p> <p>'To test it.' (0 marks)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|-----|--|----------|---|
| | (b) | (i) | <p>A description of the benefits of computer generated graphics:</p> <ul style="list-style-type: none"> • communicates aesthetic qualities; colours, textures, patterns, proportion • it is easy to gain a quick visual indication of the number of parts • alignment of parts prior to assembly can be communicated. • communicates materials • can be used to present to a client • can be used in marketing • easy to modify • easy to share electronically <p>Any other suitable response.</p> | 2 | <p>1 mark for each valid point leading to a clear description up to a maximum of 2 marks.</p> <p>Unqualified '<i>quick</i>' '<i>easy</i>' and '<i>accurate</i>' score 0 marks. References to cost must be qualified.</p> <p>Marks can be awarded for responses regarding computer graphics or models.</p> <p><i>'You can see it in 3D'</i> (1 mark)</p> <p><i>'Alterations can be made very quickly'</i> (1 mark)</p> <p><i>'The model can be orientated to different angles'</i> (1mark)</p> <p><i>'a machining file can be generated from the model'</i> (1 mark)</p> <p><i>'doesn't use materials like a physical model'</i> (1mark)</p> <p><i>'Complex models can be generated'</i> (1 mark)</p> <p><i>'It is less time consuming than building a real version'</i> (0 marks) this dependant on the skill of the individual.</p> <p><i>'can't be lost as easy as a sketch.'</i> (0 marks)</p> <p><i>'To see if there are any mistakes.'</i> (0 marks) this is too generic.</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|------|---|----------|---|
| | (b) | (ii) | <p>Outline of two pieces of information from a working drawing:</p> <ul style="list-style-type: none"> • dimensions • exploded/assembly drawing showing how parts join together • part names/number of parts • materials • orthographic views of product • scaled up details <p>Any other suitable response.</p> | 2 | <p>1 mark for each valid point, up to a maximum of 2 marks.</p> <p><i>‘To allow manufacture.’ (1 mark)</i></p> <p><i>‘To show the sizes of the parts.’ (1 mark)</i></p> <p><i>‘To show how the parts go together.’ (1 mark)</i></p> <p><i>‘To see how it works/functions.’ (0 marks)</i></p> <p><i>‘To see what it looks like.’ (0 marks)</i></p> <p><i>‘To show the client.’ (0 marks)</i></p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|--|--|----------|---|
| 5. | (a) | | <p>Candidates should outline the following broad areas of aesthetics that would appeal to children:</p> <ul style="list-style-type: none"> • colour • shape • form • texture • line • proportion • symmetry • contrast • harmony • pattern • fashion • material • theme/style <p>Any other suitable response.</p> | 4 | <p>1 mark per correct description up to a total of 4 marks.</p> <p>To gain 1 mark, candidates should refer to one of the broad areas and link it to a part, or parts, of the child activity toy.</p> <p>A list of aesthetic terms scores 0 marks.</p> <p>Basic specification type statements such as <i>'It must look good.'</i> (0 marks)</p> <p><i>'The blue, red and yellow parts contrast.'</i> (2 marks) - this refers to two broad areas of aesthetics colour and contrast.</p> <p><i>'The red, blue and yellow are bright'</i> (1 mark) <i>'It is red, blue and yellow.'</i> (1 mark) <i>'The primary colours.'</i> (1 mark) <i>'It has bright colours.'</i> (1 mark)</p> <p>Vague/opinion-based responses attract 0 marks. <i>'Colourful'</i> (0 marks) <i>'The pocket is blue'</i> (0 marks) <i>'It's bright.'</i> (0 marks) <i>'It has nice colours.'</i> (0 marks) <i>'It looks nice for children.'</i> (0 marks)</p> <p><i>'The shapes on top of the toy would appeal to children'</i> (1 mark) <i>'The activity toy has a house shape.'</i> (1 mark) <i>'There is a curvy line on the front.'</i> (1 mark) <i>'The spiral and the triangular roof contrast'</i> (1 mark) <i>'The wavy line is appealing to children'</i> (1 mark)</p> <p><i>'It has organic shapes'</i> (1 mark) <i>'It has a triangular roof'</i> (0 marks)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|--|--|-------------------|----------|---|
| | | | | | <p><i>'The blue, red and yellow parts contrast.'</i> (2 marks) – this refers to two broad areas of aesthetics colour and contrast.</p> <p><i>'The shapes contrast'</i> (1 mark) <i>'The colours contrast'</i> (1 marks) <i>'The materials contrast'</i> (1 marks)</p> <p><i>'The patterns for the movable aspects look appealing'</i> (1 mark) <i>'The patterns of the cogs look appealing'</i> (1 mark)</p> <p><i>'The shapes vary in size'</i> refers to proportion (1 mark)</p> <p><i>'The design is simple and not over stimulating for children'</i> (1 mark)</p> <p><i>'The texture of the leather is soft and appealing to children'</i> (1 mark)</p> <p><i>'The texture of the wood is smooth and appealing to children'</i> (1 mark)</p> |

| Question | | Expected response | Max mark | Additional guidance |
|----------|-----|---|----------|--|
| | (b) | <p>Outline of how maintenance may have influenced the child's activity toy:</p> <p>Typical responses could include reference to:</p> <ul style="list-style-type: none"> • material choices allow the product to be easy to clean • removable parts easy to clean • fixings becoming loose and need to be tightened, replaced, or repaired <p>Any other suitable response.</p> | 1 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p>Different answers must be given in parts (b) and (c).</p> <p>1 mark for a valid point.</p> <p><i>'It must be easy to clean.'</i> (1 mark)</p> <p><i>'The activity toy is made from laminated wood so it is easy to clean.'</i> (1 mark)</p> <p><i>'Fixings should be standard sizes should they need replaced.'</i> (1 mark)</p> <p><i>'The fixings should be easy to replace, tighten.'</i> (1 mark)</p> <p><i>'It must be easy to maintain.'</i> (0 marks)</p> |
| | (c) | <p>Outline of how safety may have influenced the Child activity toy.</p> <p>Typical responses could include reference to:</p> <ul style="list-style-type: none"> • stability provided by bulky shape • no small parts to avoid choking hazard • item is secured tightly with bolts • no sharp edges • the clearance area around the lines to avoid finger traps • aspects of the product that are easy to clean • the selection of non-toxic finishes <p>Any other suitable response.</p> | 3 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p>Different answers must be given in parts (b) and (c).</p> <p>1 mark for each valid point leading to a clear description, up to a maximum of 3 marks.</p> <p><i>'Product should have no sharp edges.'</i> (1 mark)</p> <p><i>'Easy to clean'</i> (1 mark)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|--|--|----------|--|
| 6. | (a) | | <p>Description must reference how ergonomics may have influenced the hair styler and accessories.</p> <p>Anthropometric:</p> <ul style="list-style-type: none"> • a description of the relationship between the body part and all or a part of the hair dryer • handle length • handle diameter (grip size) • size and position of switches/controls • access for maintenance, changing tops <p>Physiological:</p> <ul style="list-style-type: none"> • weight of hair dryer • force required to operate buttons/switches • grip comfort • force required to twist accessories securely into place <p>Psychological:</p> <ul style="list-style-type: none"> • Textured parts provide visual information; black parts indicating safe part to hold, pink switch so it stands out • clicking sound to indicate the accessories are secure <p>Any other suitable response.</p> | 4 | <p>1 mark per correct response up to a total of 4 marks.</p> <p>Typical responses could include reference to anthropometric, physiological and/or psychological aspects of ergonomics. The is no need to identify which.</p> <p>No marks for noting percentiles only eg <i>'95th Percentile'</i> on its own scores 0 marks. Ignore incorrect percentile range if given.</p> <p>0 marks for referencing the attachments to the size of the head.</p> <p><i>'The length of the handle must be the correct size for the width of the hand.'</i> (1 mark)</p> <p><i>'The size of the buttons must relate to thumb/finger size.'</i> (1 mark)</p> <p><i>The length of the handle has to be the correct size to be lifted by everyone.'</i> (0 marks)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|--|---|----------|--|
| | (b) | | <p>Description including two of the following:</p> <ul style="list-style-type: none"> • trust in brand name/reputation • guaranteed sales • self-promoting/advertising • premium pricing • customer loyalty • perception of a high-quality product from the brand. <p>Any other suitable response.</p> | 2 | <p>To be awarded marks candidates must provide a description when answering this question.</p> <p>1 mark for each valid point leading to a clear description, up to a maximum of 2 marks.</p> <p><i>‘If customers believe the brand produces high quality products, then they are more likely to purchase on additional product from the same brand.’ (2 marks)</i></p> <p><i>‘Well known, so people are more likely to buy it.’ (1 mark)</i></p> |

Section 2

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|------|---|----------|---|
| 7. | (a) | (i) | <p>Correct reasons for POLYPROPYLENE are likely to include reference to:</p> <ul style="list-style-type: none"> • strong/sturdy • durability/tough • waterproof/weatherproof • resistance to wear • suitable for rotational moulding • easy to mould • readily available • available in a range of colours/built in colour • easy to clean • chemical resistant <p>Any other suitable response.</p> | 2 | <p>1 mark for each correct statement up to a maximum of 2 marks.</p> <p>Different answers/reasons must be given in parts (a)(i) and (a)(ii).</p> <p>Unqualified '<i>cheap</i>' responses score 0 marks.</p> <p><i>'Scratch resistant'</i> 1 mark (has some degree of scratch resistance)</p> |
| | | (ii) | <p>Correct reasons for BRASS are likely to include reference to:</p> <ul style="list-style-type: none"> • strong/sturdy • durability/tough • doesn't rust • suitable for casting • readily available • does not require a finish • easy to machine • aesthetic reasons <p>Any other suitable response.</p> | 2 | <p>1 mark for each correct statement up to a maximum of 2 marks.</p> <p>Different answers/reasons must be given in parts (a)(i) and (a)(ii).</p> <p>Unqualified '<i>cheap</i>' responses score (0 marks).</p> <p><i>'it's heavy'</i> (1 mark)</p> |
| | (b) | | <p>Outline including any of the following reasons for rotational moulding:</p> <ul style="list-style-type: none"> • hollow item • light weight • made in one piece • good surface finish • consistent wall thickness • little wastage • surface detail • large scale item • repeatable • accuracy <p>Any other suitable response.</p> | 2 | <p>1 mark for each correct statement up to a maximum of 2 marks.</p> <p>Candidates must give different responses in (b) and (c).</p> <p>Unqualified '<i>quick</i>', '<i>cheap</i>' or '<i>easy</i>' on their own score 0 marks.</p> <p><i>'Can run constantly with no breaks'</i> (0 marks)</p> <p><i>'It can create complex shapes/parts'</i> (0 marks)</p> <p><i>'Suitable for mass production.'</i> scores (0 marks) as this is a repeat of the question.</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|-----|--|---|----------|--|
| | (c) | | <p>Identifying feature of sand casting.</p> <p>Typical statements are likely to include reference to:</p> <ul style="list-style-type: none"> • made in one piece • low dimensional accuracy • split lines • fillets/rounded corners • fettling marks due to removal of runners/risers/split lines • draft angles <p>Any other suitable response.</p> | 2 | <p>1 mark for each correct statement up to a maximum of 2 marks.</p> <p>Candidates must give different responses in (b) and (c).</p> <p><i>'It is rough.'</i> (1 mark)</p> <p><i>'Sprue marks.'</i> (1 mark).</p> <p><i>'Poor/uneven surface finish.'</i> (1 mark)</p> |
| 8. | (a) | | <p>Outline including any of the following reasons for one-off production:</p> <ul style="list-style-type: none"> • more labour intensive • takes more time • requires skilled labourers • traditional manufacturing methods required • tends to use higher quality materials <p>Any other suitable response.</p> | 2 | <p>1 mark for each correct statement up to a maximum of 2 marks.</p> <p><i>'It's more expensive as it requires skilled workers.'</i> (1 marks)</p> <p><i>'Personalisation for each product gives it a higher value'</i> (1 mark)</p> <p><i>'Specialist equipment'</i> (1 mark)</p> <p><i>'Handmade'</i> (0 marks)</p> |
| | (b) | | <p>Description of the impacts mass manufacturing may have on the workforce including any of the following:</p> <ul style="list-style-type: none"> • reduction in labour/loss of jobs • loss of traditional skills • workforce needs to retrain/ new skills gained • 24-hour shift patterns required for 24/7 production • less motivated staff, due to repetitive tasks <p>Any other suitable response.</p> | 2 | <p>1 mark for each correct description up to a maximum of 2 marks.</p> <p><i>'Manufacturers need to employ less workers due to automation.'</i> (1 mark)</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|--|--|---|----------|--|
| 9. | | | <p>Description of the benefits of laser cutters:</p> <ul style="list-style-type: none"> • repeatability/consistency as each part is manufactured identically • accuracy • extremely detailed/complex • fast speed of production • high volumes/have a faster production rate than tradition methods • reduced waste material • cutting internal shapes • ability to etch and engrave • low labour costs • reduces lead time as less tooling is required • many products can be made • it is still necessary that skilled craftspeople are needed to create certain products • the process is automated • product can be created/edited directly from CAD drawing • good quality finish • increased efficiency as machines can run 24 hours a day <p>Any other suitable response.</p> | 4 | <p>1 mark for each benefit up to a maximum of 4 marks.</p> <p>Unqualified '<i>cheap</i>' or '<i>easy</i>' responses score 0 marks.</p> <p>Responses referring to the benefits of computerised systems can gain marks.</p> <p><i>'Laser cutter files are easy to send via email/the internet.'</i> (1 mark)</p> <p><i>'You get a good quality finish'</i> (1 mark)</p> <p><i>'Fast/faster.'</i> (1 mark)</p> <p><i>'efficient/more efficient.'</i> (1 mark)</p> <p><i>'reliable/more reliable.'</i> (1 mark)</p> <p><i>'You get a good quality finish'</i> (1 mark)</p> <p><i>'Looks good'</i> (0 marks) too vague</p> |

| Question | | | Expected response | Max mark | Additional guidance |
|----------|--|--|---|----------|---|
| 10. | | | <p>Description of the steps designers could take to make products more sustainable including any of the following:</p> <ul style="list-style-type: none"> • recyclable • reduce • reuse • rethink • lifespan <p>Candidates can gain marks with multiple responses under each bullet point.</p> | 4 | <p>1 mark for each valid point leading to a clear description, up to a maximum of 4 marks.</p> <p>Mention of manufacture or distribution scores 0 marks</p> <p>0 marks awarded for references to recycled materials as this is given in the question.</p> <p>Responses may be of an environmental nature.</p> <p><i>‘Extending the lifespan by using better quality materials.’ (2 marks)</i></p> <p><i>‘Reduce packaging’ (1 mark)</i></p> <p><i>‘Designers could label parts to make products easier to recycle.’ (1 mark)</i></p> <p><i>‘Using computer models during the design process can save materials’ (1 mark)</i></p> <p><i>‘Reuse materials’ (1 mark)</i> <i>‘Extending the lifespan.’ (1 mark)</i> <i>‘Use biodegradable materials’ (1 mark)</i></p> <p><i>‘Increasing thickness to increase strength’ (1 mark), however, ‘Increasing thickness.’ (0 marks)</i></p> <p><i>‘Locally sourced materials’ (0 marks)</i></p> <p><i>‘Using sustainable energy sources’ (0 marks)</i></p> <p><i>‘Replanting trees’ (0 marks)</i> <i>‘Sustainable materials’ (0 marks)</i></p> <p><i>‘Use environmentally friendly materials’ (0 marks)</i></p> |

[END OF MARKING INSTRUCTIONS]