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**DESIGN AND TECHNOLOGY**

**9705/13**

Paper 1

**October/November 2019**

MARK SCHEME

Maximum Mark: 120

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**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 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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This document consists of **16** printed pages.

**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 descriptors 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.

**PUBLISHED****GENERIC MARKING PRINCIPLE 5:**

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:**

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.

**PUBLISHED****Section A**

Question	Answer	Marks	Guidance
1(a)	Cardboard (1 mark) Polypropylene (1 mark)	<b>2</b>	Accept other correct materials
1(b)	Correct 3D view sketched (0–3) Quality of sketch (0–3)	<b>6</b>	Three Dimensional view shown 1 mark Proportion of folder 1 mark Inner detail shown 1 mark  Limited detail 1 mark Good detail 2 marks Fully detailed 3 marks
1(c)	Appropriate method for marking out, cutting out and assembling folder (0–3) Details of appropriate tools, equipment and safety precautions (0–3)	<b>6</b>	Measurements, accuracy, scoring and cutting and glued. Pencil, safety rule, craft knife, scissors, glue Fingers clear of sharp objects Limited tools/equipment 1 mark Good tools/equipment 2 marks Good tools/equipment & safety precautions 3 marks
1(d)	Appropriate explanation of effects of surface treatments on recycling (0–3) Clear and appropriate explanations of why issues/points are considered relevant (0–3)	<b>6</b>	Limitations to recycling, extra processing, cost Limited detail 1 mark Good detail 2 marks Fully detailed 3 marks

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
2(a)	Mild Steel, Aluminium, Hardwood, Polyethylene (0–2)	<b>2</b>	Accept other correct materials
2(b)(i)	Appropriate method of making part A and joining to other sections (0–3) Details of appropriate tools, equipment and safety precautions (0–3)	<b>6</b>	Tube/bar measured to length, marked, cut and joined using connector/turned. Tape measure, scribe, hack saw (mechanical), file, lathe Eye protection, hair tied back, fingers clear Limited tools/equipment 1 mark Good tools/equipment 2 marks Good tools/equipment & safety precautions 3 marks
2(b)(ii)	Appropriate method of making part B and attaching to part A (0–3) Details of appropriate tools, equipment and safety precautions (0–3)	<b>6</b>	Injection moulding, laser cut, router, cut by hand, clamped between two sections of A, grub screw or similar fixing. Drill, taps, grub screw Eye protection, hair tied back, fingers clear Limited tools/equipment 1 mark Good tools/equipment 2 marks Good tools/equipment & safety precautions 3 marks
2(c)	Appropriate issues identified (0–3) Clear and appropriate explanations of why issues/points are considered relevant (0–3)	<b>6</b>	Cost, transportation, replacement parts Limited detail 1 mark Good detail 2 marks Fully detailed 3 marks

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Question	Answer	Marks	Guidance
3(a)	Each appropriate reason given 1 mark	<b>2</b>	Improves aesthetic appeal Enhances grain Appears to be more expensive once varnished Softwood, once coated becomes more hardwearing Softwood is more durable once varnished Accept other correct reasons
3(b)(i)	Appropriate method of making part A described (0–3) Details of appropriate tools, equipment and safety precautions (0–3)	<b>6</b>	Hand techniques or CAM both acceptable Mark out, cut out using hand saw or table saw, holes cut drilled and opened out, edge chamfered by hand or using sander/router, finished Measure, rule, pencil, saw, drill, sand, plane Eye protection, hair tied back, fingers clear Limited tools/equipment 1 mark Good tools/equipment 2 marks Good tools/equipment & safety precautions 3 marks
3(b)(ii)	Appropriate method of making part B described (0–3) Details of appropriate tools, equipment and safety precautions (0–3)	<b>6</b>	Hand techniques or CAM both acceptable Mark out, cut out using hand saw or table saw, holes cut drilled for connecting to part A, edge chamfered by hand or using sander/router, finished Measure, rule, pencil, saw, drill, sand, plane Eye protection, hair tied back, fingers clear Limited tools/equipment 1 mark Good tools/equipment 2 marks Good tools/equipment & safety precautions 3 marks

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
3(b)(iii)	Appropriate method of making part C pivot described (0–3) Details of appropriate tools, equipment and safety precautions (0–3)	<b>6</b>	Mark out, drill holes with correct positioning - in line with part C and B, cut dowels, assemble Show movement of pivot dowels Limited tools/equipment 1 mark Good tools/equipment 2 marks Good tools/equipment & safety precautions 3 marks

**PUBLISHED****Section B**

Question	Answer	Marks	Guidance
4(a)(i)	Function of part X explained	<b>2</b>	Connecting socket so that multiple barriers can be easily joined together – hook and socket attachment
4(b)	Problem one identified and described (0–2) Problem two identified and described (0–2)	<b>4</b>	Barrier can topple over easily under pressure as feet are not big enough to offer stability Lack of vertical poles in barrier allows children to climb through Lack of vertical poles also reduces strength of overall barrier Not heavy enough to resist pressure of crowd
4(c)	Explanation of how problem one could be overcome (0–3) Explanation of how problem two could be overcome (0–3)	<b>6</b>	Changing or enlarging shape/size of feet to offer better stability Adding mesh or further poles in central area of barrier thus ensuring that children or small adults cannot climb through Adding stability in lower part of barrier, which could be extra weight or lowering centre of gravity Accept other correct change
4(d)	Situation has been analysed and relevant issues/points identified (0–3) Clear and appropriate explanations of why issues/points are considered relevant (0–3) Specific examples/evidence used to support conclusions (0–2)	<b>8</b>	Identical items need ongoing and rigorous Quality Control procedures If an error in the batch this could be replicated across numerous barriers and cause waste product, dissatisfied customers and poor brand image. Jigs, fixtures and templates can help to improve repeatability and Quality Control  Waste products can be environmentally damaging Accept other correct issue



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<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
5(a)	Function of part X explained	<b>2</b>	Base gives shape structure and keeps money in the collection box Allows the whole net to join together and form the three-dimensional structure
5(b)	Problem one identified and described (0–2) Problem two identified and described (0–2)	<b>4</b>	No glue tabs to join the triangular sides together Only three triangles on show when there should be four consequently the net will not form the three-dimensional shape shown No coin slot shown on the net so no money can be donated No access for money to be removed after collection
5(c)	Explanation of how problem one could be overcome (0–3) Explanation of how problem two could be overcome (0–3)	<b>6</b>	Add glue tabs to allow sides to be glued together Add triangle to net to allow three-dimensional shape to be constructed Add slot for coins to be donated Add access door to allow donations/money to be retrieved after box is full Accept other correct change
5(d)	Situation has been analysed and relevant issues/points identified (0–3) Clear and appropriate explanations of why issues/points are considered relevant (0–3) Specific examples/evidence used to support conclusions (0–2)	<b>8</b>	Extra process for manufacturing stage which adds, tooling, time, costs – all of these would increase the cost of the overall product – the charity may not wish to have a more expensive product as they simply want to raise as much money as is possible High end confectionary products have embossing as they seek to give impression of luxury Accept other correct issue

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
6(a)	Function of part X explained	<b>2</b>	Table to support vice or material whilst being drilled. Also used for clamping materials to aid safety and accuracy
6(b)	Problem one identified and described (0–2) Problem two identified and described (0–2)	<b>4</b>	Drill guard missing On/Off switches not identified by shape or name No emergency stop No mechanism to adjust height of table No base No clamps on table
6(c)	Explanation of how problem one could be overcome (0–3) Explanation of how problem two could be overcome (0–3)	<b>6</b>	Add a drill guard – usually perspex so that drill bit can be seen Colour code, shape or label on/off switches Add adjusting handle/mechanism to table Add emergency stop Add clamps or show clamps that could be usefully used Add base to whole machine Accept other correct change
6(d)	Situation has been analysed and relevant issues/points identified (0–3) Clear and appropriate explanations of why issues/points are considered relevant (0–3) Specific examples/evidence used to support conclusions (0–2)	<b>8</b>	Knowledge of risk assessments for staff and students helps to avoid risks thus keeping themselves and other workshop users safe Machines and apparatus are inherently dangerous, safe working procedures need to be taught as well as clear labels. Ventilation systems, hair tied back, eye protection, clamping work, drill guard in place Accept other correct precaution Safety precautions that are learnt now will enable safe operation throughout life – eg DIY tasks at home. Accept other correct issue

**PUBLISHED****Section C**

Question	Answer	Marks	Guidance
7(a)	One pre-conceived idea presented (0–4) <b>OR</b> The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail (5–8) <b>OR</b> The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work (9–12) Clarity and quality of sketching and explanatory notes (0–4) Evaluation (reasons for selection) (0–4)	<b>20</b>	
7(b)	One pre-conceived idea presented (0–4) <b>OR</b> The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail (5–8) <b>OR</b> The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work (9–12) Clarity and quality of sketching and explanatory notes (0–4) Evaluation (reasons for selection) (0–4)	<b>20</b>	

**PUBLISHED**

Question	Answer	Marks	Guidance
7(c)	<p>One pre-conceived idea presented (0–4)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail (5–8)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work (9–12)</p> <p>Clarity and quality of sketching and explanatory notes (0–4)</p> <p>Evaluation (reasons for selection) (0–4)</p>	<b>20</b>	
7(d)	<p>The drawing will exhibit a reasonable standard of outcome and show some of the required design features (0–5)</p> <p><b>OR</b></p> <p>The drawing will exhibit a good standard of outcome and show most of the design features required to make the product function as intended (6–9)</p> <p><b>OR</b></p> <p>The drawing will be completed to a high standard of outcome and fully show the design features required. To make the product function as intended (10–14)</p> <p>Some use made of colour and tone to enhance the visual impact of the drawing (0–2)</p> <p><b>OR</b></p> <p>Good use has been made of colour and tone to enhance the visual impact of the drawing (3–4)</p> <p><b>OR</b></p> <p>Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing (5–6)</p>	<b>20</b>	

**PUBLISHED**

Question	Answer	Marks	Guidance
8(a)	<p>One pre-conceived idea presented (0–4)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail (5–8)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work (9–12)</p> <p>Clarity and quality of sketching and explanatory notes (0–4)</p> <p>Evaluation (reasons for selection) (0–4)</p>	<b>20</b>	
8(b)	<p>One pre-conceived idea presented (0–4)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail (5–8)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work (9–12)</p> <p>Clarity and quality of sketching and explanatory notes (0–4)</p> <p>Evaluation (reasons for selection) (0–4)</p>	<b>20</b>	
8(c)	<p>One pre-conceived idea presented (0–4)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail (5–8)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work (9–12)</p> <p>Clarity and quality of sketching and explanatory notes (0–4)</p> <p>Evaluation (reasons for selection) (0–4)</p>	<b>20</b>	

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Question	Answer	Marks	Guidance
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9(b)	<p>One pre-conceived idea presented (0–4)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail (5–8)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work (9–12)</p> <p>Clarity and quality of sketching and explanatory notes (0–4)</p> <p>Evaluation (reasons for selection) (0–4)</p>	<b>20</b>	
9(c)	<p>One pre-conceived idea presented (0–4)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail (5–8)</p> <p><b>OR</b></p> <p>The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work (9–12)</p> <p>Clarity and quality of sketching and explanatory notes (0–4)</p> <p>Evaluation (reasons for selection) (0–4)</p>	<b>20</b>	

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