CAMBRIDGE
International Education

Cambridge IGCSE™

DESIGN & TECHNOLOGY **0445/03**

Paper 3 Materials **For examination from 2028**

MARK SCHEME

Maximum Mark: 50

Specimen

This document has **8** pages.

[Turn over

Generic Marking Principles

All examiners must apply these general marking principles when marking candidate responses. Examiners must apply them alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme must 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 descriptions for the question
- the specific skills defined in the mark scheme or in the generic level descriptions 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 descriptions.

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 descriptions in mind.

Question	Answer	Marks	Guidance
1(a)	Accept any alternative material including: • Bamboo • Stainless steel • Paper/ Cardboard	**1**	One mark for specific named material Accept recycled named polymers Any other valid response
1(b)	Accept any valid justification including: • Renewable material • Uses waste rather than it go to landfill • Can be washed and reused many times so reduces waste	**1**	One mark for justification Any other valid response
2(a)	Tube	**1**	
2(b)	Accept **any two** of the relevant explanations including: • Ease of ordering • Accessibility of replacements parts • Competitive rates • Speeds up manufacturing • Readily available • Uniform sizes	**2**	Any other valid response
3	A **combination** of **two or more elements** [1] to improve or enhance the properties of the materials. [1]	**2**	Candidates must refer to a combination and multiple elements to gain the mark Candidates must explain the purpose of mixing two or elements to gain the second mark
4(a)	Suitable manufactured boards may include: • MDF • Chipboard • Block board • Plywood	**1**	Any other valid response

Question	Answer	Marks	Guidance
4(b)	Accept any suitable temporary method including: • Knock Down (KD) fittings • Screws • Dowels [2 × 2]	**4**	For each method: One mark for a suitable temporary method One mark for clear communication in the response Do not accept any adhesive or glue. Any other valid response
5	Accept any suitable ways of collaborating including: • Emails or video calling to discuss ideas • Sharing CAD files of designs • Use of AI for communication • Use of communication software to work together on documents/files [2 × 1]	**2**	One mark for each point made Any other valid response
6(a)	A smart material is a material that changes its properties [1] in response to external factors [1]	**2**	
6(b)	Shape memory alloy / SMA	**1**	
7	Suitable reasons could include: • To make it weather resistant • To make it waterproof • Increase durability • Reduce risk of corrosion • To add grip or texture • To inform the user of use e.g green / red for go / stop [2 × 1]	**2**	One mark for each reason Do not accept reasons relating to aesthetic improvements e.g. make it attractive Any other valid response
8	Suitable alternatives to throwing away could include: • Recycling • Repairing • Repurposing • Reusing [2 × 1]	**2**	One mark for each alternative Any other valid response

Question	Answer	Marks	Guidance
9	Polymer Hat: Accept any suitable thermoplastic, e.g. HIPS, ABS, PP Metal Drinks Can: Accept aluminium or stainless steel Hardwood bench: Accept any suitable wood, e.g. Oak, Teak [3 × 1]	**3**	One mark for each material Generic terms such as wood, metal, plastic **not** accepted Do **not** accept balsa Any other valid response and local equivalents
10	Toughness	**1**	
11(a)(i)	Suitable uses could include: • Researching anthropometric data / data about sizes suitable for children • Collating information from surveys/interviews • Modelling design ideas using software or 3D printing • Creating mood boards and story boards • Evaluating design ideas for benefits or areas of improvement • Rendering designs in different materials/finishes/environments	**1**	One mark for a suitable use Any other valid response
11(a)(ii)	Explanations could include: • Complex shapes/angles [1] are hard to repeat/reproduce accurately using hand tools [1] • Complex shapes/angles [1] mean it is more time efficient to use CAD/CAM [1]	**2**	One mark for a reason that specifically relates to the design; one mark for the explanation Any other valid response
11(b)(i)	Candidates may choose to answer this using whichever category of material they have the most experience of working with. Suitable sheet materials may include: • Plywood • Acrylic • Aluminium	**1**	One mark for suitable material Any other valid response
11(b)(ii)	Explanations could include: • Wipe clean [1] for easy maintenance / for good hygiene [1] • Durable [1] to withstand knocks and bumps when the child is playing / to improve the product lifespan [1] • Aesthetically pleasing [1] to attract the child / fit in with décor of room [1] • Malleable [1] so it can be folded into the shape of the elephant [1] [2 × 2]	**4**	Allow up to two marks for each reason and its explanation Any other valid response

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>11(c)</td><td>Award up to 8 marks for the following:

<table>
<tr><th colspan="2">Selection of tools and equipment</th></tr>
<tr><th>Mark</th><th>Performance description</th></tr>
<tr><td>5–6</td><td>Tools and equipment are selected that are appropriate to the design. Tools and equipment are suitable for measuring and marking out, cutting and finishing and forming or joinery.</td></tr>
<tr><td>3–4</td><td>Tools and/or equipment are selected that are mostly suitable for the design and the required tasks.</td></tr>
<tr><td>1–2</td><td>Tools and equipment are selected that have some relevance to the design but are not appropriate for the tasks.</td></tr>
<tr><td>0</td><td>No creditable response.</td></tr>
</table>

<table>
<tr><th colspan="2">Design communication</th></tr>
<tr><th>Mark</th><th>Performance description</th></tr>
<tr><td>2</td><td>Clear sketches and notes show the processes, referencing the use of all the tools and equipment.</td></tr>
<tr><td>1</td><td>Simple sketches with notes show some understanding of the use of the tools and/or equipment.</td></tr>
<tr><td>0</td><td>No creditable response.</td></tr>
</table>
</td><td>8</td><td>Candidate should include notes and sketches to access the full 8 marks

Tools and equipment should be appropriate to the material given by the candidate in their answer to 11(b)(i)</td></tr>
<tr><td>11(d)</td><td>Award up to 6 marks for the following:

• Clear use of notes and sketches [1]
• Selection of method for the manufacture of batch of 100: award one mark per point made [2]
• Appropriate method of quality assurance [1]
• Reduction of waste: award one mark per point made [2]</td><td>6</td><td>Candidate should include notes and sketches to access the full 6 marks</td></tr>
</table>

Question	Answer	Marks	Guidance
11(e)	Any one suitable method e.g. rivet, weld, adhesive [1] Award up to two marks for: • Communication of method [1] • Process used [1]	**3**	Any other valid response