Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

DESIGN AND TECHNOLOGY **0445/33**

Paper 3 Resistant Materials **October/November 2018**

MARK SCHEME

Maximum Mark: 50

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.

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This document consists of **10** printed pages.

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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.

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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.

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Section A

Question	Answer		Marks
1	Round rod, bar Hexagonal bar	1 1	**2**

Question	Answer	Marks
2(a)	Surform/rasp	**1**
2(b)	The teeth have a ‘cheese grater’ shape, sharp edges, very coarse teeth	**1**

Question	Answer		Marks
3	**A** countersink **B** clearance **C** pilot	1 1 1	**3**

Question	Answer		Marks
4	Hard plastic: acrylic, polystyrene Manufactured board: plywood Close-grained hardwood: beech, hickory, box, maple, lignum vitae Corrosion resistant metal: brass	1 1 1 1	**4**

Question	Answer	Marks
5(a)	Thumbscrew shown	**1**
5(b)	Pin or spur shown	**1**

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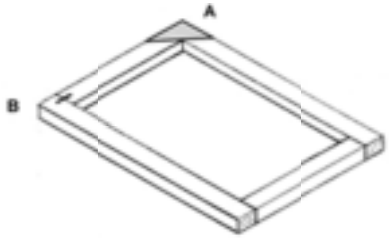
Question	Answer	Marks
6(a)	Press forming, plug and yoke	**1**
6(b)	To locate the male and female formers	**1**

Question	Answer	Marks
7	Wood: hard wearing, stable, solid, not easily broken 1 Plastic: colour will not chip, lightweight, moulded shapes safe, comfortable, water resistant, easily cleaned 1	**2**

Question	Answer	Marks
8(a)	Hardboard corner plate in correct position [not inside frame]	**1**
8(b)	Metal fastener in correct position	**1**



Question	Answer	Marks
9	7.00 **7.74** 1 0.50 1 0.24 1	**3**

Question	Answer	Marks
10(a)	Polishing metal or plastic	**1**
10(b)	Two safety precautions other than safety glasses: hold work piece correctly, hair tied back, no loose clothing, fingers away from wheel, face mask 2 · 1	**2**

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Section B

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>11(a)</td><td>
<table>
<tr><th>Part</th><th>Number reqd.</th><th>Length · width · thickness</th><th>Material</th></tr>
<tr><td>Top</td><td>1</td><td>450 · 350 · 19</td><td>Veneered chipboard</td></tr>
<tr><td>Shelf</td><td>2</td><td>332 – 391 · 300 – 330 · 19</td><td>Veneered chipboard</td></tr>
<tr><td>End</td><td>2</td><td>481 – 486 · 350 · 19</td><td>Veneered chipboard</td></tr>
</table>
</td><td>4</td></tr>
<tr><td>11(b)</td><td>Two advantages: cheaper, does not warp/shrink, more readily available, accept environmental advantages, large sheets
2 · 1</td><td>2</td></tr>
<tr><td>11(c)</td><td>Component named: castor, skid
Sketch 0–2 dependent on technical accuracy</td><td>1
0–2</td><td>3</td></tr>
<tr><td>11(d)</td><td>KD fitting: corner/modesty block drawn [Accuracy]
Appropriate number: maximum three under shelf
Method of fixing to unit</td><td>0–2

1</td><td>4</td></tr>
<tr><td>11(e)</td><td>Solid lipping appropriate width and thickness shown
Method of fixing: use of adhesive or pin and glue
Technical accuracy
If iron-on lipping is used award one mark maximum</td><td>1
1
1</td><td>3</td></tr>
<tr><td>11(f)</td><td>Practical idea: some form of ‘tidy’ clearly drawn
Position of modifications clearly shown
Details of materials, constructions and fittings</td><td>0–2
1
0–2</td><td>5</td></tr>
<tr><td>11(g)</td><td>Method includes addition of a rail, back or ‘tray’: practical idea
Details of materials, constructions and fittings [screws, dowels, nails and use of an adhesive]</td><td>0–2
0–2</td><td>4</td></tr>
</table>

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Question	Answer	Marks
12(a)	Two items of research: sizes of headphones weight of headphones, existing designs, location. Accept individual dimensions for lead, width of headphone, depth, etc. 2 · 1	**2**
12(b)	Two reasons: to check sizes, appearance, does it work, cheaper than making a mistake using acrylic, use as a template/development [net] 2 · 1	**2**
12(c)(i)	Use of a line bender, strip heater or heat gun 1 Appropriate former 1 Method of retention 1 Technical accuracy 1	**4**
12(c)(ii)	Acrylic is a smart material because: it can return to its original shape 1 when reheated 1	**2**
12(d)(i)	Acrylic cement would be applied to both parts of the joint 1 The joint is clamped securely while the cement sets 1 Accept clamp together and apply cement along edge relying on capillary action	**2**
12(d)(ii)	Two safety precautions: well-ventilated room, no naked flames, protective gloves worn, face mask worn, avoid contact with skin 2 · 1	**2**
2(e)(i)	Suitable joint: mortise and tenon, biscuit or dowel named. Not butt 1 Award 0–3 for sketch dependent on clarity and technical accuracy 0–3	**4**
2(e)(ii)	Template/pattern	**1**
2(e)(iii)	Two saws: coping saw, Hegner saw, scroll saw or equivalent, band saw, jig saw 2 · 1	**2**
2(f)	Some form of bracket, rods, box, recessed back, added base or other relevant solution Practical modification [0–2] Details of materials, sizes, constructions [0–2]	**4**

Question	Answer	Marks
13(a)	Reason: difficult to clean surfaces after gluing, quicker, more efficient	**1**
13(b)	Benefit: attractive appearance, does not corrode, easily cleaned, self-finished, covers chipboard edges	**1**
13(c)(i)	Hardwood shelf needs allowance for movement 1 If no allowance is provided it could split 1	**2**
13(c)(ii)	Some form of slot screw 0–2	**2**
13(d)(i)	Sawing jog: Method of holding/securing wood while sawn 0–1 Accurate sawing to length 0–2 Ease of use 0–1 Materials and fittings used 0–2	**6**
13(d)(ii)	Mortise and tenon, dowel, corner bridle, corner halving named 1 Butt joint: for three marks butt must be pinned or screwed and glued Award 0–3 for sketch dependent on clarity and technical accuracy 0–3	**4**
13(d)(iii)	Three tools must relate to joint drawn in previous part (i) even if joint is inappropriate. Do **not** accept marking out tools. Examples include: tenon saw, coping saw, bevel edge chisel, mortise chisel, mallet, drill, dowel jog 3 · 1	**3**
13(e)	One functional improvement to **A**: lipping applied above shelf level to prevent item falling off, edges radiused to relieve sharp edges, fill in triangular brackets to add strength, method of fixing shelf to bracket allows for movement, additional rail under shelf	**2**
13(f)	Design **A** more expensive than Design **B** More constructions means more labour time, therefore greater expense Hardwood shelf more expensive than manufactured board shelf **OR** Design **B** is more expensive because of cost of stainless steel and welding processes involved	**2**

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Question	Answer	Marks
13(g)(i)	Benefit to consumer: cheaper than pre-assembled products, self-satisfaction, compact, easy to transport, provides practical experience	**1**
13(g)(ii)	Benefit to manufacturer: takes up less storage, cheaper to manufacture, costs reduced	**1**

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