Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

DESIGN AND TECHNOLOGY **0445/33**

Paper 3 Resistant Materials **May/June 2017**

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 will not enter into discussions about these mark schemes.

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Section A

Question	Answer	Marks
1	bench hook G cramp vice bench stop 4×1	**4**

Question	Answer	Marks
2	Mask – accept any dust related or toxic related process 1 Gloves – accept any heat or chemical related process 1 Must be a specific process: e.g. using a sanding disc, welding	**2**

Question	Answer	Marks
3	SMA – heated	**1**

Question	Answer	Marks
4(a)	solid wood boards not available in required width	**1**
4(b)	end grain inverted on 2. 1 end grain on 3 should match that shown on 1 1	**2**
4(c)	sash, F cramps	**1**

Question	Answer	Marks
5	stainless steel cast iron aluminium 3×1	**3**

Question	Answer	Marks
6	Completed drawing of chamfer 1 Completed drawing of bevel 1	**2**

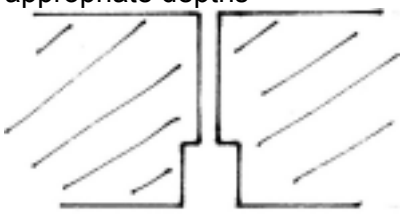
Question	Answer	Marks
7(a)	screws, nuts and bolts 1	**1**
7(b)	acrylic cement, plastic welding [not welding], rivet 1	**1**

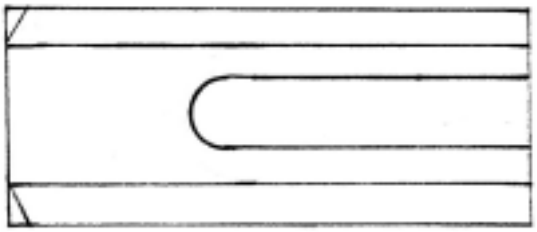
Question	Answer	Marks
8	tongue and groove	**1**

Question	Answer	Marks
9(a)	casting, die casting	**1**
9(b)	aluminium, zinc	**1**

Question	Answer	Marks
10	Award 1 mark for completed drawing and 1 mark for correct use 4×1	**4**

Section B

Question	Answer	Marks
11(a)(i)	Softwood: pine, red deal, whitewood, parana pine, yew 1 Manufactured board: plywood, chipboard, blockboard, MDF 1	**2**
11(a)(ii)	Benefit: more efficient use of materials, quicker manufacture, less waste, can be produced more cheaply	**1**
11(b)	Two ways of making top durable: apply hardwearing finish: polyurethane varnish, lacquer or paint, apply plastic laminate 2×1	**2**
11(c)(i)	Counterbored hole**:** diameter for screw head 1 diameter for screw shank 1 appropriate depths 1  Countersink = 1–2 max	**3**
11(c)(ii)	Use of recognised KD fitting 1 Correct position 1 Technical accuracy 1	**3**
11(d)(i)	Two benefits: speed, repetitive accuracy, no need for preparatory marking could keep drill vertical 2×1	**2**
11(d)(ii)	jig located against end of rail in one direction 1 jig located against end of rail in two directions 1 holes positioned correctly 1 additional explanatory notes 1	**4**
11(e)(i)	drill hole in area to be removed 1 insert saw blade [vibro saw] router 1 use of file 1 glasspaper to smooth edges 1 Do **not** reward marking out stage	**4**
11(e)(ii)	practical idea 1 some form of lipping to prevent container falling through top 1 materials and constructions used 0–2	**4**

Question	Answer	Marks
12(a)	Two items include: various dimensions of cycle; e.g. diameter of seat post, distance from wall, height off ground, parts of bike to be supported, consumer research Accept any genuine item. 2×1	**2**
12(b)	Suitable joint: dowel, housing, M and T named 1 Accuracy of completed joint drawn 0–3 Butt joint pinned and glued maximum 3 marks	**4**
12(c)(i)	 2 bend lines 2×1 1 slot 1 2 shaped ends 1	**4**
12(c)(ii)	Two advantages: non-ferrous metal does not rust, easier to bend to shape 2×1	**2**
12(d)(i)	drill hole/s for slot diameter/use of round file 1 use of tin snips, shears to remove waste 1 use of file/emery cloth/wet and dry paper to smooth edges 1 technical accuracy 1 Do **not** reward marking out stage	**4**
12(d)(ii)	sheet metal held between folding bars, scrap wood 1 secured in vice 1 use of mallet, hammer and scrap wood to bend to shape 1	**3**
12(e)	Method of locking: some form of nut and bolt [principle], bolt/rod 0–2 details of type of head method of tightening 0–1	**3**
12(f)	Method includes the use of pins or slots into which the straps could be hooked over/through Award 0–3 dependent upon accuracy of a practical modification 0–3	**3**

Question	Answer	Marks
13(a)	Accept any three sensible specification points, including: references to safety in terms of shape, size, finish, appealing in terms of movement, tip up feature, possible use of colour 3×1	**3**
13(b)(i)	**Four stages woodturning**: Set up procedure on lathe including diagonals, saw cut, removal of corners. Turning using gouge/scraper, check diameter with calipers, sanding smooth, parting tool/saw off wheel 4×1 **OR** **Four stages injection moulding:** Granules fed into hopper, rotating screw takes granules into heating chamber where it is melted, hydraulic pressure moves the ram to force the molten plastic into the mould, allows to cool. 4×1	**4**
13(b)(ii)	Some form of axle 1 Method of securing axle to base of lorry/wheel 1 Free to rotate 1	**3**
13(c)	Shape of mould: inverted shape of hopper 0–2 Rounded corners/edges 1 Draft angles 1	**4**
13(d)	Practical method of tipping includes use of pivots/pins/supports/hinges at back of hopper Award 0–3 for practical method 0–3 Award 0–3 for details relating to appropriate use of materials and constructions 0–3	**6**
13(e)(i)	Paint makes toys appealing/attractive. Colour used as the focus of a toy; e.g. shape sorting, counting, jig saws 1	**1**
13(e)(ii)	Use of varnish to enhance the appearance by showing off features of the wood 1	**1**
13(f)	Benefits to manufacturer: when moulds [tools] have been produced and set up volume production can be quick and therefore profits can be made. Wood-based materials often require fabrication which can be costly in terms of materials and their construction. Award 0–3 dependent on quality of explanation.	**3**