Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

DESIGN AND TECHNOLOGY **0445/33**

Paper 3 Resistant Materials **October/November 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.

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Question	Answer	Marks
1	Three safety features: hardwearing materials, strong joints, no sharp corners/edges, no 'trapping' places, appropriate sizes for key parts- handlebars, footrest, brake, grips on handlebars, footrest. Accept any sensible safety feature. 3×1	**3**

Question	Answer	Marks
2	Cold chisel: cutting sheet metal 1 Bevel-edge chisel: cutting joints in wood 1	**2**

Question	Answer	Marks
3	Award 0–2 dependent on technical accuracy Award 1 mark for shape of blade. Award 1 mark for back drawn.	**2**

Question	Answer	Marks
4	Alloy	**1**

Question	Answer	Marks
5	**F E C H** 4×1	**4**

Question	Answer	Marks
6(a)	Polyethylene, polythene, polyether terephthalate	**1**
6(b)	plastics are non-biodegradable, some plastics cannot be recycled [easily] give off toxic fumes when burnt, pollution, decompose extremely slowly	**1**

Question	Answer	Marks
7	Award 0–3 dependent on technical accuracy	**3**

Question	Answer	Marks
8	Non-ferrous is a metal that does not contain iron 1 Alloy is a mixture of two or more pure metals 1	**2**

Question	Answer	Marks
9	Advantage: convenient, quick to use, precise placement of adhesive 1 glue dries quickly. Disadvantage: not very strong, possible danger with heat from gun 1	**2**

Question	Answer	Marks
10	Fastening device: nut [hexagonal] [lock] 1 Method of tightening: spanner, wrench, socket 1 Fastening device: wing nut 1 Method of tightening: fingers 1	**4**

Question	Answer	Marks
11(a)	Thermoplastic: acrylic, ABS 1 Thickness: 3–5 mm 1 Ferrous metal: mild steel, stainless steel 1 Thickness: 1.5–2.0 mm 1	**4**
11(b)(i)	Thermoplastic: marker pen, chinagraph pencil, pencil on paper covering	**1**
11(b)(ii)	Ferrous metal: scriber	**1**
11(c)(i)	Bending thermoplastic: strip heater/line bender/hot air gun 1 use of former 1 method of retention 1	**3**
11(c)(ii)	Bending ferrous metal: use of folding bars, vice and scrap wood 1 use of former 1 method of force: mallet or hammer and scrap wood 1	**3**
11(d)(i)	**Join thermoplastic** using acrylic cement, 'Tensol' 1 Apply to surface and join 1 Apply pressure, weight or clamping 1 Award 1 mark if safety consideration is stated **Join ferrous metal** using epoxy resin **or** by brazing Epoxy resin: mix equal amounts hardener and resin 1 Mix thoroughly and apply 1 Apply pressure, weight or clamping 1 **or** Brazing: clean/prepare joint 1 Apply flux and heat 1 Apply brazing rod/spelter to joint 1 Award marks for other intermediate relevant stages	**3**

Question	Answer	Marks
11(d)(ii)	Practical method: use of additional 'clips', cut out slots and 'lugs' Award 0–3 dependent upon technical accuracy	**3**
11(e)(i)	Self-finished means no applied finish 1 The material can be cleaned and buffed to a high quality 1	**2**
11(e)(ii)	Heat metal in an oven 1 Plunge metal into tank of 'fluidised' polythene 1 Reheat metal to produce an even finish 1	**3**
11(f)	Two benefits: less material used means lower costs 1 fewer processes means quicker production [more profit] 1	**2**

Question	Answer	Marks
12(a)(i)	Wide variety of hardwoods available for choice. Award 1 mark for any recognised hardwood that could be used for the sign.	**1**
12(a)(ii)	A variety of saws could be used to cut out each area **A B C** Award 1 mark for a **different** appropriately named saw for each area including: Hegner, vibro, band, jig, tenon, coping saws.	**3**
12(a)(iii)	Use of glasspaper, different grade/s, cork block, cloth to remove dust. Award 0–2 dependent details provided.	**2**
12(a)(iv)	Suitable finish: [polyurethane] varnish, shellac, wax, lacquer, various oils/stains	**1**
	How to achieve a high quality finish: brush strokes along the grain, no runs or drips, brush not overloaded. For oils: use of cotton wad, appropriate amount of oil onto wad, appropriate action onto surface of wood. 0–2	**2**
12(b)	Some form of bracket attached to the back of the clock with provision for fixing to wall. Alternative method: plate with keyhole slot. Not visible from front 1 Award 0–2 dependent upon accuracy of practical idea. 0–2 Materials and constructions 0–2	**5**
12(c)	Stand with stable base [solid or legs] Practical idea. 0–2 Method of joining sign to stand 0–2 Two important sizes 2×1 Named materials and constructions: 0–2	**8**
12(d)	CAD used to model different font styles, size and spacing, colour. CAD allows for on-screen modelling, trialling before manufacture. Award 0–3 for any practical knowledge of using CAD.	**3**

Question	Answer	Marks
13(a)	ash	**1**
13(b)	**Edge/butt joint**, **tongue and groove, dowel** or **biscuit joint** process 0–1 Preparation: wood held in vice, edges planed 0–2 Gluing and clamping 0–2 Technical accuracy 0–1	**6**
13(c)	Suitable joint: dowel, M&T named 1 Award 0–3 dependent on technical accuracy 0–3	**4**
13(d)	Use of coping saw, Hegner saw or equivalent, band saw 1 Use of files/glasspaper to make smooth 1 Technical accuracy: wood held securely, correctly named file 1	**3**
13(e)(i)	Accept saw tooth or forstner bit	**1**
13(e)(ii)	Wood should be shown on top of scrap wood 1 Securely clamped in position 1 Technical accuracy 1	**3**
13(f)	Application of some form of non-slip material. Award 0–2 dependent on technical quality of description.	**2**
13(g)(i)	polypropylene	**1**
13(g)(ii)	injection moulding, rotational moulding	**1**
13(g)(iii)	Wooden stool more expensive than plastic stool: More materials used, more constructional process take longer to produce Longer production times means greater costs compared to speed of production of plastic stool. Award 0–3 dependent on quality of explanation and points made.	**3**