Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

DESIGN AND TECHNOLOGY **6043/13**

Paper 1 Technology **October/November 2018**

MARK SCHEME

Maximum Mark: 100

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 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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:

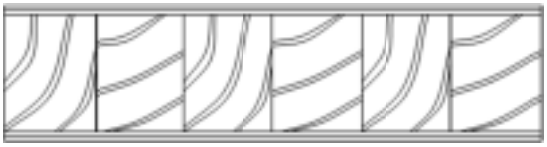
Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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.

Question	Answer	Marks
	Section A Part A – Product Design	
1(a)	 plywood	**1**
1(b)	 blockboard	**1**

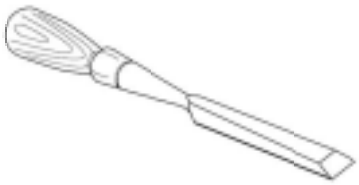
Question	Answer	Marks
2(a)	Cross pein (peen) **1** hammer **1**	**2**
2(b)	General benchwork, easing together joints, with waste piece, starting nails. brads, final nailing, finishing folds in sheet metal **1**	**1**

Question	Answer	Marks
3	Metal turning lathe could be: – wear goggles, apron - protect eyes/clothes 1 – no loose clothing; not get caught when lathe turns **1** – secure work; not fly out when turned on **1** – correct speed set. overheat, work fly out of chuck **1** **or** **1** · 3 Wood turning lathe could be: – wear goggles; apron - protect eyes/clothes 1 – no loose clothing; not get caught when lathe turns **1** – secure workpiece; not fly out when turned on **1** – only one student operating lathe not get distracted **1** **1** · 3.	**3**

Question	Answer	Marks
4	Material for boat hull could be GRP, polypropylene, aluminium, oak, ash, cedar, utile, iroko **1** mark	**1**

Question	Answer	Marks
5(a)(i)	joining acrylic **1**	**1**
5(a)(ii)	used for brazing/soldering **1**	**1**

Question	Answer	Marks
5(b)	Stages could be Tensol cement – ventilated area, – clean surfaces, – apply solvent cement to surfaces, – clean excess – secure whilst curing Flux – clean surfaces, – mix flux (borax), position with firebricks (if in hearth) – apply to surfaces or when soldering – heat joint – clean joint Three stages 1 mark each **1** · 3	**3**

Question	Answer	Marks
6	Bevel-edged chisel handle/blade **1** bevel **1**  rasp handle/blade **1** cutting action **1** 	**4**

Question	Answer	Marks
7	hardening – increases resistance to indentation/scratching – increases brittleness – heat steel to above cherry red – quench immediately – limited, one point **1** – clear description, 2 or more points **2** annealing – reduces work hardening of metal – increases malleability/workability – heat steel to above cherry red – leave to cool – limited, one point **1** – clear description, 2 or more points **2**	**4**

Question	Answer	Marks
8	Reasons for suitability of acrylic – easy to shape – transparent/see through – takes a good finish **1** · 2	**2**

Question	Answer	Marks
9(a)	File has smooth edge to file into corners of work	**1**
9(b)	Ensure straight edge for accuracy/reduce wear	**1**

Question	Answer	Marks
10(a)	Shape memory alloy – smart material – returns to original shape when reheated above 90 °C **1** – contracts when electrical current passed through **1**	**1**
10(b)	Spectacle frames **1,** medical stents **1**	**1**

Question	Answer	Marks
	Part B Section 1 – Tools and Materials	
11(a)	**A** Marking knife **1** Marking cut line on a wood joint **1** **B** Micrometer **1** Accurately measuring diameter or thickness **1** **C** **Steel rule** **1** Measuring to length/width **1**	**6**
11(b)(i)	cut line **1** 90° edge for joint **1**	**2**
11(b)(ii)	lock spindle **1** after taking measurement to read **1**	**2**
11(b)(iii)	measure **1** from inside a corner/datum edge **1**	**2**
11(c)(i)	sketch **2** marking 45° mitres **1**	**3**
11(c)(ii)	sketch **2** preparing a drilled hole, hollow rivetting **1**	**3**

Question	Answer	Marks
12(a)	metal to metal epoxy resin (araldite), two part (resin/hardener) clean surface, mix resin/hardener, usually min 6 hour curing time, ventilated area, avoid skin contact plastic to wood impact adhesive Evostik, super glue apply to both surfaces, quickly apply, ventilated area – fumes protect skin wood to wood PVA clean surface, apply, cramp for at least 30 mins, avoid skin contact Cascamite, external use PVA, Gorilla glue if powder, mix with water, protect skin, cramp, allow curing time	
12(a)(i)	correct adhesive **1** mark **3** · 1	**3**
12(a)(ii)	for **each** description – limited, one point **1** – clear description, 2 or more points up to **3** **3** · 3	**9**
12(b)	Method of joining could be brazing, welding, soldering plastic welding, friction welding heat method identified **1** mark detailed description up to **3** quality of communication up to **2**	**6**

Question	Answer		Marks
13	**Beech** Chopping board, spatula **Stainless steel** Cooking pan, cheese grater **Pine** Cupboards, shelves **Chipboard** Cupboard doors, kitchen worktop **Polypropylene** Hinges, spatulas, mixing bowls **High carbon steel** Knives, tin opener **Melamine formaldehyde** Plates, worktop surface **Aluminium** Cooking utensils, foil **Polythene** Food containers, food packaging	Close grain, does not split Does not corrode, shiny attractive appearance Attractive grain, easy to construct/join Dimensionally stable, takes applied finish, large sizes Bends without breaking, high melting point Sharp edge, harder than mild steel Resists heat, does not stain Lightweight, does not react to water Available in different colours, easily formed	
13(a)	Application **1** mark	**1** · 6	**6**
13(b)	Properties up to **2** marks	**2** · 6	**12**

Question	Answer	Marks
14(a)	Properties for bowling pin Easy to turn, shape, take a good finish, impact resistant **1** · 2	**2**
14(b)	Unsuitability **(i)** cast iron – too heavy, will damage ball, does not take a good finish **(ii)** Acrylic – difficult to shape, will break on impact **(iii)** Pine – would damage easily, not heavy enough as a pin, topple easily **2** · 3	**6**
14(c)	Material could be – beech, maple, close grained hardwood, aluminium alloy, polypropylene, nylon **1** Sketch of lathe, lathe tools, casting set up, injection moulding – detailed, labelled 6–7 – some detail 3–5 – limited detail 0–2	**8**
14(d)	Template Caliper/rule measurement check	**2**

Question	Answer	Marks
	Section 2 – Processes	
15(a)(i)	Base material could be – acrylic, abs aluminium, laminated birch **1** Appropriate reason depending upon material chosen could be- easy to bend, range of colours, tough, keeps shape, easy to machine, attractive, good finish **1**	**2**
15(a)(ii)	Cutter material could be – carbon steel, stainless steel, acrylic, **1** Appropriate reason **1**	**2**
15(b)	**(i)** appropriate process **(ii)** appropriate process For both – detailed, labelled 3–5 – some /limited/ detail 0–2 **5** · 2	**10**
15(c)	Appropriate way of securing roll of tape up to **4**	**4**

Question	Answer	Marks
16(a)	Welding – include – Steel (or aluminium) welding rod – Clean, well fitting joint – Oxy acetylene or other welding process described – Finishing Press forming – include – Produce former, draft, high finish, rounded edges – Heat HDPE – Press/ hold until shape set – Trim/finish Cutting housing joint – include – Accurate marking, marking knife across grain – Cut housing with chisel, router – Test fit/modify – Fit quality of description: – fully detailed 4–7 – some detail, 0–3 quality of sketches up to 2 **9** · 2	**18**

Question	Answer	Marks
17(a)	Reasons could be: – Apply attractive coat – Protect from dirt – Protect from corrosion – Give a texture to touch **1** · 3	**3**
17(b)	**Product A** dip coating – metal cleaned, degreased – fluidising bed set up – metal heated/inserted – removed/shaken, hung to cool **Product B** turned bowl – whist on face plate – apply sealer – Fine abrasive/second coat – Apply beeswax/carnauba whilst bowl turning – Buff to high polish **Product C** watering can – Painting – clean / degrease – galvanising – Primer – Final coat quality of description: – fully detailed 4–**6** – some detail, 0–3 **6** · 2	**12**
17(c)	Finest quality wet and dry paper (1000) Metal polish/cloth Buffing wheel up to **3**	**3**

Question	Answer	Marks
18	**Product A** Jewellery container – Copper side cut to shape – Rolled to cylinder – Silver soldered – Base round cut/ different grade silver solder – Clean/finish **Product B** Aluminium handle – Mould prepared, complex two-part mould needed – Aluminium heated to molten – Mould secured/heated – Molten aluminium poured – Cooled/finished **Product C** Motorcycle box – Mould prepared, high quality finish needed – Cut glass fibre matt to size for all layers – Apply gel coat – leave to cure – Mix lay-up resin/ apply/stipple layers – Leave to cure/trim quality of description: – fully detailed 4–7 – some detail, 0–3 quality of sketches up to 2 **9** · 2	**18**