



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

DESIGN AND TECHNOLOGY

0445/32

Paper 3 Resistant Materials

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MARK SCHEME

Maximum Mark: 50

Published

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This document consists of **6** printed pages.

Question	Answer	Marks
1	PVA	1

Question	Answer	Marks
2	Point = 1 mark 'Step' = 1 mark	2

Question	Answer	Marks
3	Smart	1

Question	Answer	Marks
4	Award 1 mark for each correctly drawn groove and rebate	2

Question	Answer	Marks
5	A nut and bolt B [pop] rivet C screw D nail Accept incorrectly named screw or nail. Not cut tack.	4

Question	Answer	Marks
6	Completed drawing showing grain at 90° to previous layers	1

Question	Answer	Marks
7	Electric plug body	1
	Plastic blister packaging	1
	Knife handle	1
	Urea/phenol formaldehyde	
	Polythene, PVC, PET	
	Phenol formaldehyde, ABS	

Question	Answer	Marks
8(a)	Chipboard	1
8(b)	Very small particles of scrap/wood chips	1
	With an adhesive	1
	Not sawdust. Ignore references to recycled wood	
8(c)	Cost	1

Question	Answer	Marks
9(a)	1.5–3 mm. Do not accept ranges of thicknesses.	1
9(b)	Two methods of permanent joining: brazing [soldering], welding, riveting Not pop rivets, epoxy resin	2

Question	Answer	Marks
10(a)(i)	Stainless steel, mild steel	1
10(a)(ii)	Aluminium, brass, copper	1
10(b)	Base fitted: to collect crumbs, add rigidity to rack, stability Prevent scratches to surfaces, pick up more easily Not wider surface area.	2

Section B

Question	Answer	Marks
11(a)	Two good design features include: angled for comfort [ergonomics], storage unit useful, ledge prevents pens/pencils/paper sliding off, rounded corners for safety	2
11(b)	Board plywood, faced chipboard only, MDF, 1 Blockboard, Laminboard, not chipboard Storage unit PVC, ABS, HIPS, acrylic polystyrene 1 Ledge accept any suitable named hardwood 1 Support mild steel, stainless steel, aluminium, not steel 1	4
11(c)(i)	Power saw: jig saw, circular saw	1
11(c)(ii)	No trailing leads, no loose clothing, long hair tied back, work secured, face mask, safety of hands, ear defenders Not goggles, gloves	1
11(d)(i)	Two features of mould design: draft angle, rounded edges/corners, no undercuts Not vent holes	2
11(d)(ii)	If the plastic is overheated = 1 it will melt = 1 If the plastic is not hot enough = 1 it will not form to the mould = 1 Plastic can be moulded to the shape of the former = 1 Plastic is made soft = 1	2
11(e)(i)	The drawing board is only 15mm thick and the metal rod would not be secure or the holes would wear and the support work loose. Additional blocks provide a thicker material to provide deeper holes Makes more stable/stronger Hole will be visible	2
11(e)(ii)	Metal rod bent: Held in vice or clamped to a bench 1 Vice, former or anvil around which the rod can be bent 1 Method of force hammer and scrap wood or mallet 1 Not hammer on its own	3
11(f)	Practical method: Angled 1 Stable and secure 0–2 Named materials 1 Constructions 0–2 Total redesign of board = max 3	6
11(g)	Portable sander benefits: faster than by hand, more even pressure exerted. Produces a smooth surface, removes marks and scratches.	2

Question	Answer	Marks
12(a)	Two reasons include: easily formed, self-coloured, durable outdoors, waterproof, easily cleaned, corrosion resistant, windproof Not self-finishing.	2
12(b)	Hole saw	1
12(c)(i)	Hegner saw or equivalent, scroll saw, band saw, jig saw	1
12(c)(ii)	Half-round file, round [rat tail] file, spokeshave, scraper, bobbin sander	1
12(c)(iii)	Safety glasses, goggles, eye protection, no loose clothing, long hair tied back, finger safety	1
12(d)	Sketch showing: butt joint glued and pinned/screwed, dowel, half-lap, dovetail, finger, biscuit Award use of adhesive Technical accuracy of joint Not mitre joint, hot glue gun	3 1 0–2
12(e)(i)	Two items of equipment: chinagraph pencil, marker pen, wax pencil, crayon, pencil on protective paper, felt-tip pen. Not scriber	2
12(e)(ii)	lower acrylic in vice, support behind acrylic while sawing, fine tooth blade, speed of sawing, clamping/securing acrylic. Award 1 mark for 1 point and 1 mark for additional description OR Award 2 marks for 2 separate points.	2
12(f)	Method of shaping roof: 3 stages: Heat plastic in oven, hot air 'gun' use of former over which to shape acrylic Method of retention Technical accuracy of stages/equipment used	4 3 0–1
12(g)(i)	Two features of mould include draft angle, smooth surfaces, radiused edges/corners, no undercuts	2
12(g)(ii)	Vacuum forming process involves numerous stages: Position mould on platen, clamp plastic to machine, heat plastic, test for flexibility, lift platen into plastic, turn on blower to suck out air, lower platen, leave to cool, trim edges of plastic, finish edges appropriately Award 1 mark for 6 specific stages	6

Question	Answer	Marks
13(a)	MDF, plywood, chipboard, blockboard, laminboard	1
13(a)(ii)	Reason for choice: durable, hardwearing, stable, references to recycled materials, cheaper than...[qualified], MDF [only] low risk of splinters Not cheap.	1
13(b)(i)	Suitable joint: mortise and tenon, dowel, bridle named Technical accuracy of joining method Not butt joint, screwed joint, mitre joint Must be in correct orientation/proportion for maximum marks	1 0–3 4
13(b)(ii)	Support joined using screws/KD fitting/nuts and bolts, brackets technical accuracy of details provided	1 0–2 3
13(c)(i)	Medium grade glasspaper: used to clean hardwood and remove small scratches and marks Fine grade glasspaper: used after medium grade to produce an even smoother finish Progression through 2 grades of glasspaper Damp cloth: used to remove dust following glasspapering Cork block: used to wrap glasspaper around to provide more even pressure	1 1 1 1 4
13(c)(ii)	Polyurethane varnish is hardwearing, tough, easily cleaned, stain resistant, durable, gives protection, attractive/aesthetic, waterproof/resistant.	2
13(d)(i)	Length of computer desk top dependent on items to be positioned on the top, anthropometric measurements	1
13(d)(ii)	Height of desk dependent on seat height of user	1
13(e)	Drawer supported under desk top and made to slide in and out Use of runners, rebates or grooves for drawer to run on and be supported Award 0–2 for practical idea Joined to supports = 1 mark Two important sizes Details of materials and constructions used	0–2 0–2 0–2 6
13(f)	Two drawbacks: some methods of construction may not be as durable, parts sometimes missing, limited consumer skill, difficult instructions, tools not available. References to strength of materials and/or constructions must be qualified otherwise 0 marks.	2