Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

DESIGN AND TECHNOLOGY **0445/03**
Paper 3 Resistant Materials **For Examination from 2015**
SPECIMEN MARK SCHEME **1 hour**

MAXIMUM MARK: 50

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

DC (DTC 00714 12/12) 74069/2

CAMBRIDGE International Examinations

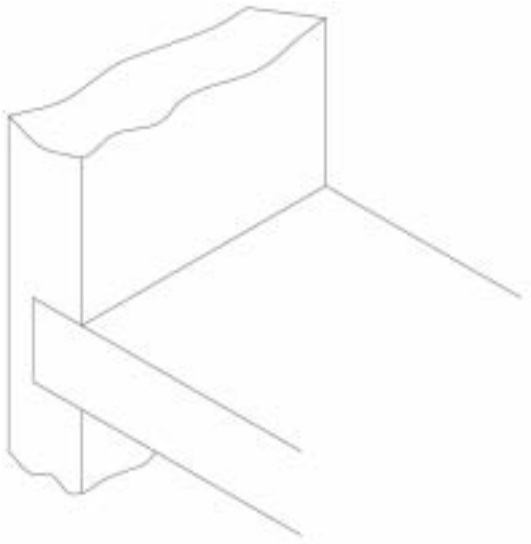
[Turn over

Section A

1 **(a)** Construction: laminating. **[1]**

(b) Advantage: replaces need for traditional stool construction. **[1]**

2 Clear/accurate sketch of through housing. (0–3) **[3]**



3 Two advantages include:
stronger, stiffer, lighter [therefore faster performance], non-corrosive. (2 × 1) **[2]**

4 **(a)** Dip-coated products: handles of tools, clothes/towel airers, vegetable racks, fridge racks, metal baskets. **[1]**

(b) Reason: protect from corrosion, provide electrical insulation. **[1]**

5 **(a)** Marking a line parallel to an edge: odd-leg callipers. **[1]**

(b) Marking an arc: dividers. **[1]**

(c) Preventing dividers from slipping: dot or centre punch. **[1]**

6 **(a)** Curtain rail process: extrusion. **[1]**

(b) Tray process: vacuum forming. **[1]**

(c) Bottle: process blow moulding. **[1]**

7 **(a)** File required: hand file. **[1]**

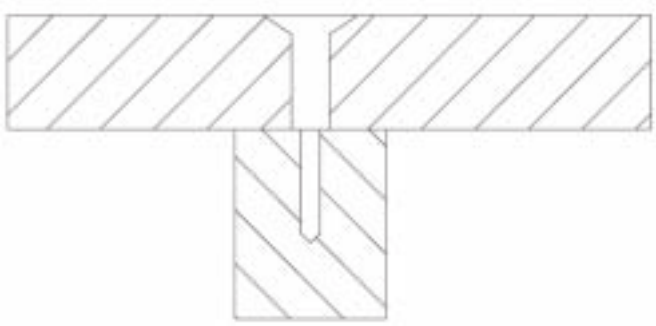
(b) File required: half-round file. **[1]**

8

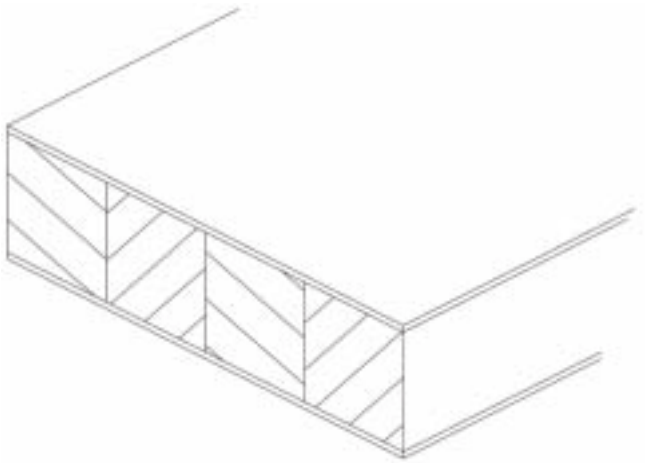
Damage	Prevention
Bruising will occur due to the pressure of the G cramp shoes.	Place scrapwood between the shoes and the workpiece.
Surface of plastic will get scratched by the vice jaws. Or Plastic too high in the vice and could snap when sawn.	Soft metal or plastic covers to fit over the vice jaws. Or Lower workpiece in the vice.

(4 × 1) **[4]**

9 Countersunk hole (1) Clearance hole (1) **[2]**



10 Blockboard shown with top and bottom laminates (1)
and core strips (1) **[2]**



Section B

11 (a) (i) suitable thickness for top: minimum 18 mm–25 mm. **[1]**

(ii) suitable thickness for ends: minimum 15 mm–19 mm. **[1]**

(b) (i) suitable manufactured board: plywood, MDF. **[1]**

(ii) Some manufactured boards can be made from recycled material (1)
therefore reducing need to cut down trees. (1) **[2]**

(iii) two reasons include:

ability to cut complex shapes, quick (1)
not restricted by frame, versatile (1) **[2]**

(iv) two safety factors include:

ensure work is held securely (1)
no obstructions underneath work, dangling lead (1) **[2]**

(c) (i) suitable finishes include:

polyurethane varnish, wood preservative, gloss paint. **[1]**

(ii) reasons include:

attractive appearance, protects and preserves. **[1]**

(d) (i) For 2 marks reference must be made to:

the boards are reversed (1)
minimises the possibility of movement. (1) **[2]**

(ii) minimum of three sash cramps used (1)
one on top and two underneath or vice versa (1)
spaced appropriately (1) **[3]**

(iii) suitable adhesive includes:

wide range of proprietary brands available including
EvoStik Resin W, Aerolite, Cascamite, and generic names
including PVA, synthetic resin. **[1]**

(e) (i) use of appropriate K-D fitting: plastic block or scan fitting (1)
correct fitting to both the rail and table end. (1)

quality of communication to include:
accuracy of technical detail/ clarity of sketch. (0–2) **[4]**

(ii) use of wooden block fixed to table end. (1)
use of some form of pin to locate through side of tube and into wooden block. (1)
accuracy of technical detail/ clarity of sketch. (0–2) **[4]**

12 (a) marking out plastic:

rectangular outline shape (1)
4 bend lines (4 × 1)
slot for rule (1) **[6]**

(b) two advantages include:
speed, accuracy, ease of amending/editing, email to client, on-screen modelling, transfer data to CAM (2 × 1) **[2]**

(c) 'Smart' because it can be heated and shaped (1)
then when reheated it returns to original shape (1)
Accept reference to plastic memory. **[2]**

(d) **Stage**

1	Tools/equipment: felt marker, chinagraph pencil	(1)
2	Process: drill at least one hole	(1)
2	Tools/equipment: drilling machine, drill bit	(1)
3	Process: cut out slot	(1)
3	Tools/equipment: coping saw, vibro saw abra-file	(1)
4	Tools/equipment: file	(1)

[6]

(e) producing the four bends:

use of formers or jigs (0–2)
appropriate use of strip heater/line bender (0–2)
method of holding plastic while it cools (0–2) **[6]**

(f) modified design to prevent pencils falling through:

three alternative designs include:

supporting shelf or base with folded flaps to allow surface area for cementing. (0–3)

or

extended upright to bend underneath. (0–3)

or

original design fixed to a base. (0–3) **[3]**

13 (a) two properties of mild steel include:
high tensile strength, fairly durable, tough, ductile. (2 × 1) **[2]**

(b) tools/equipment used in the four stages of making the towbar:

Stage	Tools/equipment	
1	scriber, try square	(1)
2	vice	(1)
3	hacksaw	(1)
4	file	(1) **[4]**

(c) purpose of the following when brazing:

(i) emery cloth: to clean the surfaces of the metal (1)
ensures a good joint (1) **[2]**

(ii) flux: keeps the joint clean when heat is applied (1)
allows the brazing rod to run into the joint (1) **[2]**

(iii) brazing rod: brass spelter with a lower melting point than mild steel that is used to make the joint. **[2]**

(d) accept any sensible safety precaution including:

the safe use of the brazing torch, setting of correct pressures [oxy-acetylene equipment], correct setting up of work on brazing hearth. **[1]**

(e) two reasons include:
to improve the appearance,
to protect from corrosion. **[2]**

(f) strengthening the joint:

use of appropriate size/shape additional piece to join the 2 lengths of steel tube. (0–2)

details of materials used and method of joining. (0–2) **[4]**

(g) fixing the end of the towbar to the underside of the trailer:

some form of modification/addition to the tube, e.g. a plate that is brazed onto the tube.
Solution must be practical and give adequate support.
Communication must be good for maximum marks. (0–4)

Method of fixing to trailer: use of nuts and bolts/screws. (0–2) **[6]**