UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

0445 DESIGN AND TECHNOLOGY

0445/32 Paper 3 (Resistant Materials), maximum raw mark 50

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 must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Section A

1 **(a)** Seasoning is the drying out of wood [after it has been converted], to reduce shrinkage/warping.

(b) Kiln or artificial seasoning. [1]

2 Award 0–2 dependent upon accuracy of drawing. [2]

3 **(a)** Tang correctly labelled. [1]

(b) Safe edge correctly labelled. [1]

4 Three pieces of information include:
quantity, length, material, type of head and gauge. 3x1 [3]
Size is too vague = 0 marks.

5 **A**: mould/die. [1]
B: hopper. [1]
C: feed screw/screw. [1]

6 Award 0–3 dependent upon accuracy of drawing. [3]

7 **(a)** Surform. [1]

(b) Quick removal of wood. Not to make smooth. [1]

8 **(a)** Handle: phenol formaldehyde, specifically named hardwood. [1]
Reason: heat resistant/insulator. [1]

(b) Saucepan body: aluminium, copper, stainless steel, cast iron. [1]
Reason: conducts heat well. [1]

9 Award 0–2 dependent upon accuracy of drawing. [2]

10 **(a)** Centre lathe operation: knurling. [1]

(b) To improve/increase grip. [1]

Section B

11 (a) Two advantages include: cost, stability, availability. [

(b) Two reasons include:
to protect/preserve the wood, to keep clean, to make attractive. [1]
[1]

(c) (i) Suitable joint includes: housing, dowel, mortise and tenon, biscuit, domino, K-D fitting.
Award 0–3 dependent upon accuracy of drawing. [3]

(ii) Correct name to match drawing. [1]

(iii) Suitable adhesive includes: variety of Evostik Resin W, Cascamite, Aerolite.
Accept generic names such as synthetic resin and PVA. [1]

(iv) Correct drying times vary, dependent upon adhesive.
Evostik, PVA etc. allow 2-4 hours, Cascamite 4-6 hours, Aerolite 6 hours. [1]

(d) Marking out: sketch showing + naming at least **one** tool:
use of rule, pencil, marking knife. 0–2

Cutting out: sketch showing + naming at least **one** tool:
drill, coping saw, chisel. 0–2

Making smooth: sketch showing + naming at least **one** tool:
file, glasspaper. 0–2 [6]

(e) Preparation of wood from square section.
Mark diagonals, saw cut, plane off edges, punch centre. 0–2

Setting up of wood between centres. 0–2

Turning to shape: Use of gouges, scrapers, template, callipers. 0–2 [6]

(f) Secure work for planing: use of vice, bench stop. 0–1

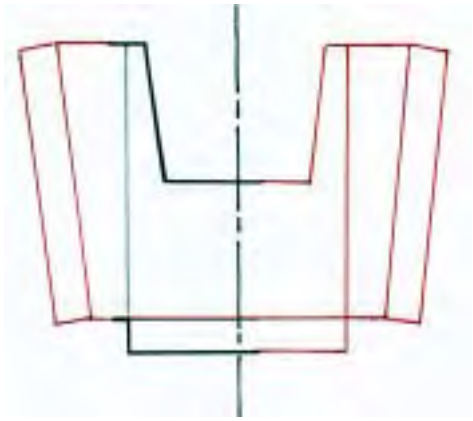
Plane off waste using smoothing or jack plane. 0–1

Use of glasspaper to smooth surface to finish. 0–1 [3]
Do not accept saw bench/circular saw.

12 (a) (i) Two items of research include: quantity of leaflets to be stored, sizes of leaflets,

(ii) Two reasons for making a model include: to check sizes, overall appearance, to avoid costly mistakes later. [1]
[1]

(b) (i)



Allow horizontal lines on top of backs.

Complete base:	1	
Complete 2 backs: [allow horizontal lines on top of backs]	2x1	
Accuracy and proportion.	1	[4]

(ii) Two marking out tools include: chinagraph pencil, felt marker, scriber, rule, try square. [1]
[1]

(c) Cut out: use of Hegner saw or equivalent, band saw, coping saw.
Accuracy of technical detail in sketch: 0–3

Make smooth: use of hand/flat files to line, scraper, wet and dry.
Accuracy of technical detail in sketch: 0–3 [6]

(d) Marking out: use of scriber, dividers. 0–1

Drill holes using drilling machine. 0–1

File to open up slot. 0–1 [3]

(e) Strip heater/line bender. 0–2

Use of former or equivalent to form bends with method of retention. 0–2

Accuracy of technical detail. 0–2 [6]

13 (a) (i) Adjustable to allow magnifying glass to examine different size objects.

(ii) Heavy to prevent being moved about or knocked easily, stability.

(iii) Horizontal to prevent objects falling or sliding off, retain same distance from glass. [1]

(b) (i) Wing nut. [1]

(ii) Can be tightened effectively without use of spanner. [1]

(c) (i) Marking out using combination of scriber, rule, odd leg calipers, try square, centre/dot punch, hammer. 0–2

Drill holes using drilling machine. Method of clamping, hand vice etc. 0–2

File ends to radii using vice to secure and hand/flat files. 0–2 [6]

(ii) Make sure two components identical by taping together and shaping as one piece or make one then use first one as a template for the second. [2]

(d) Methods are to **rivet** or to **braze** or to **weld.**

Rivet method:
A 'flat' needs to be filed on the horizontal part of the support joined to the underside of the sample tray. 0–1

Holes to be drilled in both pieces. 0–1

Countersunk holes in sample tray. 0–1

Use of rivet set/snap to join parts together.
Correct use of ball pein hammer. 0–2

Use of file to finish flat. 0–1 [6]

OR

Brazing method:
A 'flat' needs to be filed on the horizontal part of the support joined to the underside of the sample tray. 0–1

Prepare both pieces by cleaning, degreasing etc. 0–1

Secure pieces together using binding wire and flux. 0–2

Position on hearth and apply heat to joint to correct temperature. 0–1

Apply brazing rod to joint when red hot and allow to run. 0–1 [6]

OR

Welding methods:
[1] Oxyacetalene
Preparation of joint 0–1

2 gases to 3500 °C 0–1

2 surfaces melted 0–1

Gap created 0–1

Filler rod to fill gap created 0–1

Joint fused 0–1 [6]

[2] Electric arc
Flux coated filler rod to act as an electrode 0–2

Heat by low voltage, high electric current 0–2

Between filler rod and metals joined 0–2 [6]

(e) Tray made height adjustable by fitting tube into base into which support can slide up down.

Practical method shown.	0–2	
Method of locking in different positions.	0–2	
Materials and fittings named.	0–2	[6]