CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0445 DESIGN AND TECHNOLOGY

0445/31 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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

1 round [wire] panel pin oval 3 × 1

2 Two tools include: tenon / dovetail saw, chisels, coping saw, scroll, band, mallet **[1]**

[1]

3 Description to include: apply thin layer of glue to both surfaces 1
allow glue to become touch dry 1
bring both surfaces together and apply pressure 1 **[3]**

4 **(a)** Completed drawing to show length of hinge 1
Completed drawing to show holes for screws 1 **[2]**

(b) provides support along the whole of its length **[1]**

5 **(a)** [extrusion] blow moulding **[1]**

(b) polythene **[1]**

6 Completed drawing to show two identical legs of calipers 0–2 **[2]**
Award 1 mark for two pointed ends

7 Saw name: piercing saw **[1]**

Specific use: sawing thin sheet metal, decorative work **[1]**

8 Accuracy of completed joint 0–3 **[3]**
Through housing, double stopped= 2 marks

9 **(a)** spring **[1]**

(b) protect the surface, spread the load, prevent vibration loosening the joint **[1]**

10 **(a)** hollowing **[1]**

(b) **A** sandbag **[1]**

B [bossing] mallet **[1]**

Section B

11 (a) Hardwood: accept any hardwearing hardwood such as beech, ash, oak, mahogany, teak

2 reasons: hardwearing, takes knocks, durable, attractive appearance **[1]**

[1]

(b) Axle glued into body / rotate in wheel 0–2
Fixed on to prevent removal 1
Washer / spacer 1

OR

Appropriate screw into body 0–2
Clearance hole in wheel 1
Washer / spacer 1 **[4]**

(c) Connecting rod evident 1

Hole in chimney for rod 1

Bracket to fit around roller 0–2

Rod fixed to bracket 0–2

Details of materials, constructions and fittings 0–2 **[8]**

(d) Preparation: including marking diagonals, saw cut, plane off corners 0–3

Setting up: including mounting to fork centre, tailstock, grease, tee rest position, rotate freely 0–3

Turning shape: use of gouges, scrapers, template, calipers, method 0–2

Finishing: use of grades of glasspaper on lathe, apply finish 0–2 **[10]**

12 **(a)** Thermoplastic sheet gives opportunity to shape by heat more easily and can be rehea and reshaped.

(b) 2 methods includes: strip heater, line bender, oven **[1]**
[1]

(c)
- Fix support to base: use of round or countersunk head screws 0–2
- Roll rotates and can be removed: use of rod and 'stopper' or slotted 0–3
- Straight or serrated edge made from metal or plastic 0–1
- Fitted to support 0–1
- Details of materials, constructions and fittings 0–2 **[9]**

(d) Notes to include: plastic granules fed into hopper, a screw moves them along the chamber, heated to make soft, forced through a die of the required shape 4 × 1 **[4]**

(e) Drill holes in support and base [2 holes in each] 1

Round head rivets used 1

Swell rivet using flat face of hammer and rivet snap [dolly] 1

Use of ball pein to shape head and finish with snap 1

Quality / accuracy of communication 0–2

OR

Pop rivet

Drill holes in support and base [2 holes in each] 1

Mount rivet in gun and push parts together 1

Squeeze gun to pull rivet through 1

Expanding and then breaking head 1

Quality / accuracy of communication 0–2 **[6]**

(f) **(i)** Self-finishing is done without the application of a finish **[1]**

(ii) Aluminium self-finished: use fine emery cloth or silicone carbide paper [wet and dry paper] 1
Surface is polished by hand or on a buffing wheel 1 **[2]**

13 (a)

Part	Number required	Sizes length x width x thickness	Material
A	2	600 × 111 × 9	plywood
B	2	480 × 100 × 9	plywood
C	2	111 × 82 × 9	plywood

[4]

(b) Length of screw, head, material 3 × 1

Number of screws, spacing 2 × 1

Countersunk head screws, minimum length 20 mm–maximum 40 mm,
brass or steel, number required along length of **A** is minimum 2, equally spaced **[5]**

(c) Glass mirror supported some form of block, bead or groove in sides 1
Method of fixing mirror to bead 1
Accuracy of notes 1 **[3]**

(d) Some sort of hand hold fixed to part of the periscope 0–2

Details of materials, constructions and fittings 0–2 **[4]**

(e) Award marks for each process showing clearly or naming the tools and equipment.

Marking to length: scriber, rule 0–2

Cutting to length: hacksaw, vice 0–2

Bending to shape: vice, former, mallet / hammer 0–3

Joining it to wooden blocks: epoxy resin adhesive, application of pressure
Hole only = 1 mark 0–2 **[9]**