



Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

DESIGN AND TECHNOLOGY

0445/32

Paper 3 Resistant Materials

May/June 2018

MARK SCHEME

Maximum Mark: 50

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.

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PUBLISHED**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 |
|----------|--|-------|
| 1 | Attractive finish, protects against corrosion, matches existing fittings 2 × 1 | 2 |

| Question | Answer | Marks |
|----------|---|-------|
| 2 | <p>Screws in left, right and centre = 3. 2 screws in left and 2 screws in right = 3.</p> <p>1 screw in left and 1 screw in right = 2. 1 screw in centre = 3.</p> <p>1 screw/bolt in centre with wing nut = 2.</p> | 3 |

| Question | Answer | Marks |
|----------|---|-------|
| 3 | From the top to bottom: countersunk, centre, twist 3 × 1 | 3 |

| Question | Answer | Marks |
|----------|------------|-------|
| 4(a) | Veneers | 1 |
| 4(b) | laminating | 1 |

| Question | Answer | Marks |
|----------|---|-------|
| 5 | <p>Examples of modifications include: knurling to edge, insertion of shaped piece into top surface of handle, saw cut to provide space for screwdriver blade.</p> <p>Award 1 mark for practical idea.</p> <p>Award 1 mark for notes that expand upon drawing*</p> | 2 |

| Question | Answer | Marks |
|----------|-----------------|-------|
| 6 | GRP, CFRP 2 × 1 | 2 |

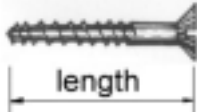
| Question | Answer | Marks |
|----------|---|-------|
| 7 | As work is done to the metal it becomes hard and brittle = 1 Hammer/hammering stated = 1 | 2 |

| Question | Answer | Marks |
|----------|--|-------|
| 8 | Grooves or applied beads in top = 1 Grooves or applied beads in bottom = 1 Depth of grooves/beads in top twice as deep = 1 | 3 |

| Question | Answer | Marks |
|----------|--|-------|
| 9 | From the top to bottom: PVC melamine polystyrene 3 × 1 | 3 |

| Question | Answer | Marks |
|----------|--|-------|
| 10 | A reach from head to fingers for comfortable access to keyboard/desk = 1 B seat height set at comfortable height appropriate for the individual = 1 C desk height appropriate for individual seated at the computer with space for legs = 1 | 3 |

| Question | Answer | Marks |
|------------|--|-------|
| 11(a)(i) | Quicker than having to draw, more accurate, repeated accuracy, no risk of damaging acrylic | 1 |
| 11(a)(ii) | Holding acrylic: vice, clamped down = 1 Named saw; coping, hacksaw, Hegner [or equivalent], band = 1 One precaution: low in vice, well supported, use of scrap wood to protect sides = 1 Technical accuracy: terms used, accuracy of sketches = 1 | 4 |
| 11(b) | Acrylic shown above strip heater/line bender, oven 0–2 Method of holding: use of strips/blocks and some form of clamping 0–2 | 4 |
| 11(c)(i) | HIPS, polystyrene, ABS | 1 |
| 11(c)(ii) | Draft angle on sides, rounded edges/corners 2 × 1 | 2 |
| 11(c)(iii) | Quicker process because the mould can be reused and provides repetitive accuracy, less waste | 2 |
| 11(d) | Well-ventilated area, no naked flames, wearing of PPE [e.g. nose and mouth masks, gloves, goggles], use of barrier cream 2 × 1 | 2 |
| 11(e) | File, scraper, various grades of wet and dry [silicon carbide] paper, polishing mop, buffing wheel, polishing compound 3 × 1 | 3 |
| 11(f) | Recognised base 1 Constructional details: e.g. how the rod is inserted, grooves routed, some form of rod or ball bearings/marbles in a groove 0–2 Named materials appropriate 1 2 important sizes 2 × 1 | 6 |

| Question | Answer | Marks |
|------------|--|-------|
| 12(a) | Top rail = 790–820 Bottom rail = 820–850 2 × 1 Hardwood: accept any named hardwood 1 | 3 |
| 12(b) | Important areas of the guitar to measure to determine sizes, number of guitars to be stored, types of guitar, which areas of the guitar are suitable for holding/supporting, environment in which the stand is located 3 × 1 | 3 |
| 12(c) | Stage 1: coping, Hegner or equivalent, band, Scroll, jig saws = 1 Stage 2: half-round, round [rat-tail] files, spokeshave, Surform tools, bobbin sander = 1 Stage 3: glasspaper, sandpaper, bobbin sander = 1 | 3 |
| 12(d)(i) | Jack, smoothing, block, moulding | 1 |
| 12(d)(ii) | To protect the guitar from scratches | 1 |
| 12(e) |  <p>Head: countersink = 1 = 1 Material: steel, brass, copper, stainless steel = 1</p> | 3 |
| 12(f) | 2 holes drilled in 'plate' = 1 location on 1 side = 1, location on 2 sides = 2, location on 3 sides = 3. Named material = 1 | 5 |
| 12(g) | Practical idea: some form of 'foot' accurately drawn 1 Method of attaching 'foot' 1 Appropriate material 1 | 3 |
| 12(h)(i) | 2 different grades means one grade will be finer to remove scratches of previous grade | 1 |
| 12(h)(ii) | Hardwood is used to show off its colour, grain, figure that would be covered by paint, paint could chip/scratch, paint could mark guitar | 1 |
| 12(h)(iii) | Wax finish is quicker to apply, more even finish, easy to maintain, easier to apply, does not chip/flake, quicker to dry | 1 |

| Question | Answer | Marks |
|------------|--|-------|
| 13(a) | Saves material if errors are made, allows faults to be seen and rectified, gives visual impression of final design, can be used as a template | 2 |
| 13(b)(i) | Mild steel, stainless steel | 1 |
| 13(b)(ii) | Aluminium, brass, copper, duralumin | 1 |
| 13(b)(iii) | From the top to bottom: try square, engineers square, odd-legs[calipers], Jenny callipers, scriber 3 × 1 | 3 |
| 13(b)(iv) | Hacksaw limited to the depth of the frame, thin sheet can bend = 1 Tinsnips provide more control = 1 | 2 |
| 13(c)(i) | 2 layers shown with same grain = 1 3 layers shown with same grain = 2 2 layers shown with alter. grain = 2 3 layers shown with alter. grain = 3 | 3 |
| 13(c)(ii) | MDF, chipboard | 1 |
| 13(c)(iii) | Panel pin, round wire, oval nail/brad | 1 |
| 13(c)(iv) | Accept a single number between 15–25 mm | 1 |
| 13(c)(v) | PVA, Cascamite, Synthetic resin, Gorilla glue | 1 |
| 13(c)(vi) | Time must correspond to named adhesive: e.g. PVA 1–4 hours, Gorilla glue 1 hour | 1 |
| 13(d)(i) | 1 hook/bracket/screw = 1 2 screw holes only [no screws shown] = 1 2 screws + 2 holes in back of holder = 2 2 screws and 2 keyholes in back of holder = 3 Added hooks/brackets and screws = 3 Additional notes to expand on drawings = 1 | 3 |

| Question | Answer | Marks |
|-----------------|---|--------------|
| 13(d)(ii) | Lid can be hinged or 'lift-off' design. Practical design: 0–2 Constructional details: 0–2 Named materials: 0–1 | 5 |