



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examinations 2004

Materials Technology Wood
Higher Level
Marking Scheme

CONFIDENTIAL



SECTION A

Mark for best 16 answers. Disallow marks for any questions/parts of questions in excess of 16 as per instructions to Assistant Examiners

1. (i) Correct name for the tool...

Bevel/Sliding bevel



3 marks

(ii) Correct use for this tool:

Marking out or checking lines and surfaces at angles

2 marks

Marking out

1 mark

2. Name the three parts of the screw:

A— *Head*

B— *Shank*

C— *Thread*

2 x 2 marks

1 x 1 marks

3. Two advantages of using computers to control machines (CNC)

Accuracy of finished product

Mass production ...

1 x 3 marks

1 x 2 marks

4. (i) Suggested finish for the garden seat:

Paint, oil, polyurethane varnish, micro porous, ...

3 marks

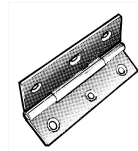
(ii) Reason for selection

Weatherproof, protective, etc... (allow for any reason appropriate to finish chosen)

2 marks

5. (i) Name of hinge:

Butt Hinge



3 marks

(ii) Normal use for this hinge type:

doors, lids, garden gates, ...

2 marks

6. *Correct directions (2 boards)*

One board only

5 marks

2 marks





7. Timber produced by the three trees...

(a) **Hardwood**

2 marks

(b) **Softwood**

2 marks

(a) **Hardwood**

1 mark

8. (i) Correct name for machine ... **scroll saw**

3 marks

(ii) Safety precaution to be observed when using a scroll saw...



Ensure that material is held firmly on the work table

Correct tensioning of blade

Even and moderate pressure on the blade when cutting

Wear goggles, dust mask

1 mark

Appropriate reason for stated precaution

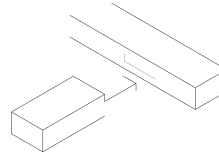
1 mark

9. Completed sketch of mortise and tenon...

Tenon

3 marks

Mortise

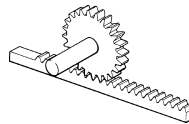


2 marks

10. (i) Correct name for gear mechanism:

Rack and Pinion

3 marks



(ii) Woodwork machine where it is used

Band saw, Mortise machine, pillar drill, router

2 marks

11. Two safety precautions when using a chisel ...

Always have both hands behind cutting edge

Ensure that the workpiece is held securely

make sure that the cutting edge is sharp ...



1 x 3 marks

1 x 2 marks

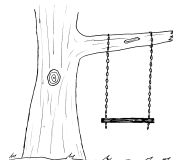
12. Force acting on the chains C ...

Gravity Tension

5 marks

Stretch/pull

2 marks





13. (i) Name of tool...

(Combination) Pliers



3 marks

(ii) Appropriate use for tool ...

Cutting wire, gripping nuts/bolts, pulling nails...

2 marks

14. (i) Suitable material for the manufacture of the picture frame ...

Acrylic

3 marks



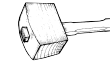
(ii) Reason for selection ...

*Thermoplastic material, easy to bend,
available in a variety of colours, transparent ...*

2 marks

15. (i) Material from which mallet is usually made...

Beech



3 marks

(ii) Why is handle is wider at A than B ...

*to prevent the loose fitting head flying off
when in use, creates a "wedging" action*

2 marks

16. (i) Function of oil on oilstone when sharpening a chisel...

*To reduce friction/heat generation
to wash away metal swarf/fragments*



3 marks

(ii) Grinding angle ... *20—25 degrees*

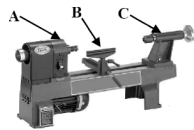
2 marks

17. Parts of the wood turning lathe...

A—Headstock

B—Toolrest

C—Tailstock



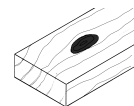
2 marks

2 marks

1 mark

18. Dead knot

*A dead knot is formed when the branch whose fibres
make up the knot has died prior to the cutting down
of the tree. Dark/black in colour and not closely
held in the wood and likely to fall out*



5 marks

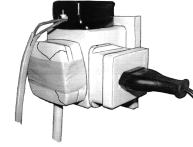
Timber defect

3 marks



19. Two safety hazards...

Cracked plug top
Too many plugs connected to the adapter
Damaged flex on one appliance/plug



1 x 3 marks
1 x 2 marks

20. Cutting list for the CD holder ...

DESCRIPTION	NUMBER	L	W	T
Sides	2	120	145	15
Top	1	270	145	15
Bottom	1	300	160	15

5 x 1 marks

Running total of allowed questions for this section to be recorded and shown as indicated at the marking conference.



SECTION B

Mark for best 3 answers. Check all stationary and indicate running total and disallowed marks as indicated at the marking conference.

Question 1

(i) Preparation of working drawing.

Elevation -

<i>Setting out overall length</i>	2 marks
<i>Showing overall height</i>	2 mark
<i>Showing thickness of legs (60)</i>	2 x 1 mark
<i>Showing thickness of top rail</i>	2 marks
<i>Showing position and thickness of middle rail</i>	2 marks
<i>Showing splay on legs</i>	2 x 2 marks

14 marks

End view -

<i>Setting out/transferring overall height (400)</i>	1 mark
<i>Setting out to width (420)</i>	1 mark
<i>Showing leg thicknesses (35)</i>	2 x 1 mark
<i>Showing thickness top rail</i>	2 marks
<i>Showing position and thickness of middle rail</i>	2 x 1 mark

8 marks

General -

<i>Hidden detail</i>	
<i>Elevation (all lines)</i>	2 marks
<i>End View (all lines)</i>	2 marks
<i>Scale</i>	2 marks
<i>Dimensions</i>	4 marks

10 marks

(ii) Jointing rail R to leg L ...

<i>Mortise and tenon joint</i>	
<i>Halving or housing joint</i>	
<i>Dowelling/Biscuits</i>	
<i>Two screws, sunk and plugged/concealed</i>	4 + 4 marks

Nails

0 marks

8 marks

Total 40



Question 2

(i) Explanation of steps in design process...

Working Drawings— a detailed and accurate drawing of the artefact, showing all dimensions and details that will enable the production of the artefact

5 marks

Evaluation— an assessment of how well the artefact meets the design requirements set out in the analysis of the problem

5 marks

10 marks

(ii) Design solution for storage of magazines ...

Allow for originality in design.

Basic unit/box without any design features

Fair attempt to accommodate items in an attractive, compact unit

Good, well balanced, well sketched design, showing some innovation, must incorporate some means of storing remote control units...

5 marks



10 marks



14 marks

14 marks

(iii) Statement of two design requirements specific to the unit...

Appearance, fitting in with surroundings

Neat and easily accessible

magazine titles easy to see ...

(Must be appropriate and relevant)

2 x 3 marks

6 marks

(iv) Incorporation/accommodation of two design requirements ...

candidate must show clearly using notes and sketches how they have tried to accommodate each of the design requirements identified above

2 x 5 marks

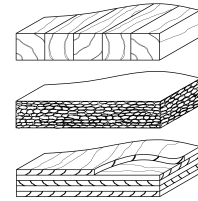
10 marks

Total 40



Question 3

(i) Correct name for the three manufactured boards...



- A—Laminboard, blockboard, battenboard*
- B—Chipboard*
- C—Plywood*

3 x 4 marks

12 marks

(ii) Advantages of manufactured boards ...

- Generally stronger than solid wood due to structure/engineering*
- Available in large sheets*
- More stable than solid wood, less likely to warp, swell, etc*
- Environmentally friendly, uses cheaper timbers, managed forests*
- Manufactured from cheaper timbers and an expensive veneer facing*
- Uniform thicknesses ...*

4 x 2 marks

8 marks

(iii) Manufacture of **ONE** of the boards

	PRODUCTION
LAMINBOARD	Timber cut into thin strips, thickness not usually less than 12 mm and between 12 and 30 mm wide. Strips bonded together using an synthetic adhesive. The heartwood face of the boards is alternated in order to reduce warping/twisting. When the adhesive is dry, boards sanded to uniform thickness. Sometimes a decorative veneer is applied
CHIPBOARD	Wood chips, often from off cuts and smaller branches, are graded and mixed with a synthetic resin adhesive. A core of larger chips is faced on either side with a layer of smaller chips for a smoother finish. The layers of chips and adhesive are pressed at high pressures and temperatures to give thin, even sheet. Can be faced with a decorative veneer/plastic laminate.
PLYWOOD	Thin sheets of timber called veneers or plys are cut from logs, usually by rotary cutting peeling. These are trimmed to size and oriented so that the grain in adjacent layers is running at right angles. An uneven number of plys is used to ensure the grain on the outer faces runs in the same direction. Synthetic resin adhesives are used to bong the veneers or plys together.

6 + 4 marks

10 marks

(iv) **TWO** corner jointing methods for wardrobe ...

- Timber Dowels*
- Steel dowels and locking inserts*
- Biscuit jointing*
- Knock-down fittings*
- Timber corner block and screws*
- Concealed screws*
- Dovetailing, finger joints*

3 + 2 marks

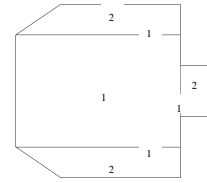
3 + 2 marks

10 marks

Total 40



Question 4 (A)



(i) Sketching of development for tray ...

Neat sketch of well proportioned development showing correct cutting pattern and fold lines

10 marks

10 marks

(ii) Preparation of tray and hardwood supports for screwing together with countersink screws...

Acrylic Tray

- *Mark centres of holes with marker prior to bending*
- *Place acrylic in vice, supported with timber under hole position*
- *Drill through using a low drill speed and slow feed rate*

4 + 1 marks

2x2 for any two relevant step

Hardwood Supports

- *Mark centres of holes on the hardwood supports*
- *The distance between screw holes must correspond to those on the tray*
- *Using a drill bit slightly smaller than the core diameter of the screw being used, drill a pilot hole into the support*

4 + 1 marks

2x2 for any two relevant steps

10 marks

(iii) Cutting Out and Finishing of the base corners ...

Cut corners approx 2 mm away from line using a coping saw.

Alternatively a scroll saw or jig saw could be used.

Workpiece must be firmly held and supported when using any method.

Using a spokeshave, clean the curve to the line, working with the grain.

A light sanding with a fine grade abrasive paper wrapped around a cork sanding block to finish smoothly.

6+ 4 marks

10 marks

(iv) Design modification to prevent movement of uprights ...

Mark for a reasonable description of how the modification contributes to the achievement of this

Extra screws, solid sides, angled supports ...

10 marks

10 marks

Total 40



Question 4 (B)

(i) Suitable wood for manufacture of shelf unit ...

Mark for any suitable wood (Including manufactured boards) 4 marks

Reasons ...

*Reasons appropriate to selected timber :
Cost, appearance, workability* 2 x 2 marks

8 marks

(ii) selection of an appropriate finish...

*Mark for any suitable finish:
Cellulose lacquer, polyurethane varnish, paint,
wax, ...* 4 marks

Reasons ...

*Reasons appropriate to finish :
Appearance, ease of application, durability* 2 x 2 marks 8 marks

(iii) Preparation of surface for an applied finish:

- *Punch nails*
- *Use a smoothing plane or scraper to remove pencil marks*
- *Fill any holes or imperfections*
- *Sand lightly moving from rough to smooth abrasive paper*
- *Dust down surfaces*
- *Wipe surface with a damp cloth*
- *Cut back with very smooth paper when dry*
- *Wipe down with white spirit ...*

8 + 2marks 10 marks

(iv) Means of making shelves adjustable:

*Mark for a reasonable and appropriate method of allowing adjustment in shelves ...
Studs and inserts/dowels
Fixed height brackets.*

Sketch

V. good, neat well proportioned, clearly descriptive 10 mark(max)
Good sketch reasonable detail 8 marks
Fair sketch, some detail 6 marks

Description

V. good, clear description of how method works 4 marks (max)
Just named 1 mark

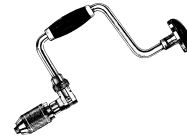
14 marks

Total 40



Question 5

(i) Correct name of tools...



A ...

Handrill

3 marks

B ...

Countersink/ rose bit

3 marks

C ...

Carpenters/ratchet brace

2 marks

9 marks

(ii) Steps in boring of the different holes ...

(a) A hole of 25 mm diameter through a piece of hard wood 40 mm

- *Secure piece in vice, using cramps, etc.*
- *Place waste backing/support piece behind*
- *Using a brace and bit or drill and auger or flat bit, drill until the point of the bit emerges from the back of the piece*
- *Turn the piece over and place point of the bit in hole created and finish boring through*

4 + 2 marks

(b) A hole of 20 mm diameter to a depth of 40 mm in a piece of hardwood 100 mm thick.

- *Place piece to be drilled in vice/ hold securely*
- *Using a brace and bit or drill and auger or flat bit, set a depth gauge attached to the drill or bit so that it is 40 mm from the cutting edge of the bit*
- *Drill until the point of the depth stop comes into contact with the surface of the wood.*
- *Alternatively use a mark on the bit (tape, etc) 40 mm from the cutting edge*

4 + 2 marks

(c) A hole of 12 mm diameter through a piece of acrylic 6 mm thick.

- *Mark hole centre with centre punch*
- *Place acrylic in vice, supported with timber under the holes position*
- *Drill through using an engineers pattern drill bit with a low drill speed and slow feed rate*

4 + 2 marks

18 marks

(iii) Two advantages of cordless drills ...

Versatile, not constrained by power sockets
Multiple torque settings (screw driving)
No risk of electric shock in wet conditions ...

2 x 1 mark



Question 5 (contd.)

(iii) Two disadvantages of cordless drills ...

- *Tend to be less powerful than mains powered tools*
- *More expensive*
- *Require several batteries to prevent work stopping when recharging is required*

2 x 1 marks

4 marks

(iv) Names of drill bits ...

P— Flat/spade Bit

2 marks

Q— Auger Bit

2 marks

R—Masonry Bit

2 marks

P—suitable for use with cordless drills

1 mark

Cuts holes smoothly at appropriate speeds

1 mark

R—suitable for use with cordless drills

1 mark

Drills that have a masonry or hammer action for use on stone, concrete, etc.

1 mark

10 marks

Total 40