



**Coimisiún na Scrúduithe Stáit  
State Examinations Commission**

**JUNIOR CERTIFICATE 2003**  
**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...

*Claw Hammer.*

**3 marks**

Hammer

2 marks

(ii) Appropriate use of tool part A:

*Pulling nails from timber, levering*

**2 marks**

2. Name Two of the three screw heads

*Countersink*

*Raised head*

**1 x 3 marks**

*Round Head*

**1 x 2 marks**

3. (i) Name of the feature shown... *Waney edge*

Bark/Rough edge



**3 marks**

2 marks

(ii) *More prone to attack due to higher proportion of sapwood in timber*

**2 marks**

4. Correct order in painting ....



*Priming*

**2 marks**

*Filling*

**2 mark**

*Undercoating*

**1 mark**

5. (i) Name of fitting ... *Stay-flap stay*



**3 marks**

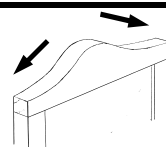
(ii) Where ... *To hold flaps in an open horizontal position e.g.*

*in drinks cabinets, jewellery boxes, windows, etc.*

**2 marks**

6. *Correct directions (2 arrows)*

One direction only



**5 marks**

**2 marks**

7. Name two of the three trees...

*Beech*

*Oak*

*Birch*

1 x 3 marks

1 x 2 marks

8. (i) Correct name for machine ... **Bandsaw**

3 marks



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

*Ensure that guards are close to material surface*

*Correct tensioning of blade*

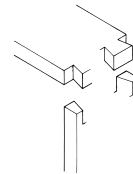
1 mark

*Appropriate reason for stated precaution*

1 mark

9. Completed sketch of box dovetail...

*Box dovetail correct (twin)*



5 marks

Single box dovetail

2 marks

10. (i) Rotational direction of Q...

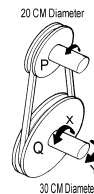
**X**

3 marks

(ii) Rotational speed of Q...

*60 Revolutions per minute*

2 marks



11. Classification of plastics ....

**Polystyrene...**

*Thermoplastic*

2 marks

**Acrylic...**

*Thermoplastic*

2 mark

**Polyurethane...**

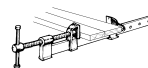
*Thermosetting*

1 mark

12. (i) Force applied by sash cramp...

*Compression*

3 marks

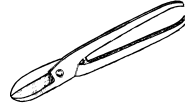


(ii) Force acting in pin P ...

*Shear*

2 marks

13. (i) Name of metalworking tool...  
*(Tin) Snips/shears*



**3 marks**

(ii) Appropriate use for tool ... *Cutting thin sheet metals*

**2 marks**

14. Meaning of letters EMC ...

*Equilibrium*

*Moisture*

*Content*

**2 + 2 + 1 marks**

15. (i) Name of power tool...

*(Electric) Router*



**3 marks**

(ii) Appropriate use ...

*Creating mouldings, grooves, etc on timber*

**2 marks**

16. (i) Appropriate adhesive to be used in items manufacture...

*Casein glues, Formaldehydes, etc.*

**2marks**

(ii) Property of adhesive that makes it suitable

*Water/weather resistant, shock resistant, etc.*

**2marks**

17. Three appropriate uses for computers in the furniture industry...

*Design (CAD)*

*Manufacture (CAM)*

*Logistics*

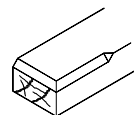
*Advertising*

**2 x 2 marks**

**1 x 1 mark**

18. (i) Name of moulding shown ....

*(Stopped) chamfer*



**3 marks**

(ii) Correct name for marking out tool ....

*Thumb gauge*

**2 marks**

19. (i) Indicating the earth terminal ...

X



*Colour code ... Green and Yellow*

**1 marks**

**2 marks**

(ii) Earthing ... *To provide a safe path for current to travel in the case of overloading or malfunction in the device and reduce the risk of electric shock*

**2 marks**

20. Safety precautions to be observed with cellulose lacquers...

*Wear appropriate respiratory protection*

*keep away from naked flames*

*Use in properly ventilated area*

**1 x 3 marks**

**1 x 2 marks**

**Running total of allowed questions for this section to be recorded 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>	1 marks	
<i>Showing overall height</i>	1 mark	
<i>Showing thickness of frames (40)</i>	2 x 1 mark	
<i>Showing height and thickness of shelves</i>	2 x 2 marks	
<i>Showing top edge of back rails</i>	2 marks	<b>10 marks</b>

**End view -**

<i>Setting out/transferring overall height (1200)</i>	1 mark	
<i>Setting out bottom width (400)</i>	1 mark	
<i>Setting out to width (300)</i>	1 mark	
<i>Showing frame thickness (back and top)</i>	2 marks	
<i>Showing frame thickness (inclined front)</i>	1 marks	
<i>Showing shelf thickness</i>	2 x 1 mark	
<i>Locating centre for curves</i>	1 mark	
<i>Drawing of curves</i>	2 marks	<b>11 marks</b>

**General -**

<i>Hidden detail (all lines)</i>	3 marks	
<i>Draughtsmanship, including scale</i>	4 marks	<b>7 marks</b>

(ii) Jointing rail R to upright U ...

<i>Mortise and tenon joint</i>		
<i>Bridle joint</i>		
<i>Halving or housing joint</i>		
<i>Dowelling/Biscuits</i>	4 + 2 marks	
Named only	2 marks	<b>6 marks</b>

(iii) Design modification to prevent books falling out ...

<i>Mark for appropriateness and ingenuity</i>	6 marks	<b>6 marks</b>
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**Total 40**

**Question 2**

(i) Correct sequence in design process...

*Analysis of brief—Investigation/Research— Design Ideas/Solution—  
Sketches/Working Drawings— Evaluation*

Explanation of two of the steps ...

**Mark for clarity and exactness in description**

5 x 2 marks

2 x 2 marks

14 marks

(ii) Design solution for storage of study related items ...

*Allow for originality in design.*

*Basic unit/box with sloping top designed  
Fair attempt to accommodate items in an attractive,  
compact unit  
Good, well balanced, well sketched design,  
showing some innovation*

6 marks



9 marks

Means of supporting a book at an appropriate angle...

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

5 marks

14 marks

(iii) Identification of a suitable material and finish to be used  
in the units manufacture...

*Material—must be appropriate*

2 marks

*Finish—must relate to the material chosen*

2 marks

Two reasons for each of the choices made...

*Mark for a reasonable description of how the choices  
would be appropriate, cost, workability, attractiveness  
wearing quality, cleaning, etc.*

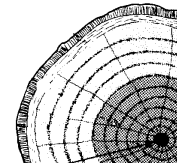
4 x 2 marks

12 marks

**Total 40**

**Question 3**

(i) Correct name for parts of tree section...



- M—Cambium or Bast (Phloem)*
- N—Bark*
- O—Heartwood or (Medullary) Rays  
or (Annual) ring*

**3 x 5 marks**

Functions of the parts labelled

	FUNCTION
<b>CAMBIUM LAYER</b>	Creates new cells that are laid down during the growing season, those on the outer edge of the layer become new bast cells, those on the inner become sapwood and carry moisture up the tree ...
<b>BAST (PHLOEM)</b>	Transports refined sap (liquid containing food produced in the leaves by photosynthesis) down the tree from the crown (leaves) ...
<b>BARK</b>	Protects the tree from attack by insects, animals, etc. Provides a protective barrier the reduces moisture loss from the tree ...
<b>HEARTWOOD</b>	Oldest portion of the tree, no longer carries sap, provides a storage area for waste products and gives the tree a large portion of its strength ...
<b>RAYS</b>	Provide a mechanism for transportation of materials from the outer to the inner portion of the tree. Also provide an area for storage within the timber
<b>RINGS</b>	Reflect the growth pattern for the tree, a band of small compacted xylem cells is laid down in the slow growing season (autumn and winter), referred to as late wood, while a band of larger xylem cells is laid down in the season of most growth (spring and summer), these being referred to as early wood. Most noticeable in softwoods and temperate hardwoods (ring diffuse) ...

**3 x 2 marks**

**21 marks**

(ii) Trees found in zone C ...

*(Tropical) Hardwoods*

**5 marks**

**5 marks**

(iii) Comparison of Softwoods and Hardwoods (zones A and C) ...

*Leaves—Broad (big) versus Needle (small)*

**2 marks**

*Seeds—Nuts/fleshy fruit versus cones*

**2 marks**

*Timber—Generally hard, dark, durable with no discernable rings versus soft, light coloured with definite rings*

**2 marks**

*Roots—broad spreading versus tap and fibrous*

**2 marks**

**8 marks**

(iv) How the use of manufactured boards can reduce deforestation ...

*appropriate reasons/advantages ...*

**6 marks**

**6 marks**

**Total 40**



**Question 4 (A)**

(i) Differences between ferrous and non-ferrous metals...

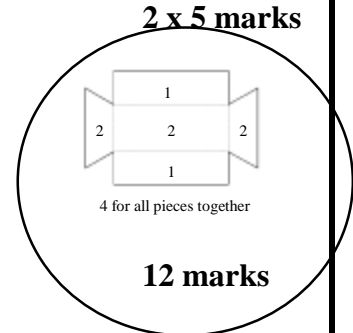
*Ferrous— Contain iron  
Corrode  
Can be magnetised  
Non-ferrous—Usually elements/alloys of elements  
Not as prone to corrosion  
Non-magnetic*

2 x 5 marks

10 marks

(ii) Sketching of development for container ...

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



12 marks

12 marks

(iii) Selection of an appropriate hardwood...

*Oak, teak, cedar, elm...*

4 marks

Reason for selection of an hardwood...

*Appearance, durability, ease of working ....*

4 marks

8 marks

(iv) Preparation of brackets and back for screwing together with countersink screws...

**Aluminium Brackets**

- *Mark centres of holes with centre punch prior to bending*
- *Evenly spaced holes, biased towards top*
- *Place bracket in vice, firmly supported*
- *Drill through using a low drill speed and slow feed rate*
- *Countersink hole using a countersink bit*

4 + 1 marks

2x2 for any two relevant steps

**Hardwood Back**

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

4 + 1 marks

2x2 for any two relevant steps

10 marks

Total 40

**Question 4 (B)**

(i) Name of three turning tools ...

- A—*Skew chisel*
- B— *Turning Gouge*
- C—*Outside callipers*

3 x 4 marks

Function ...

- A— *turning between centres (spindles), finishing cuts, creating beads*
- B— *roughing out, bowl turning, cutting grooves*
- C— *checking outside diameters and sizes*

3 x 2 marks

18 marks

(ii) Preparation of block for mounting and turning...

- *Draw the diagonals on the ends of the piece to locate the centres*
- *Draw the largest possible circle on the ends using these centres*
- *Draw tangents to the circles to create an octagon on the end*
- *Plane the corners of the piece until it is octagonal in shape*
- *Using a mallet, drive the drive centre into one end of the piece ...*

2x2 for any two relevant steps 4 + 2 marks

- *Replace the centre in the headstock and locate the piece on the mark already made*
- *Move the tailstock along the bed so that the tail centre is almost touching the end of the piece*
- *Tighten the tailstock in place and wind the tail centre into the end of the piece so that the piece is held securely*
- *Locate and tighten the tool rest so that it is close to, but not touching, the piece ...*
- *Check that an appropriate speed has been set*

2x2 for any two relevant steps 4 + 2 marks

12 marks

(iii) Forming of hole in body for flex ...

1. *Mounting of block on lathe using a hollow tail centre and using a long hole boring auger to drill a hole through the entire block while revolving at low speed*
2. *Forming a groove in two blocks which are then glued together prior to turning to form the blank from which the lamp will be turned.*

4 + 2 marks

6 marks

(iv) Most appropriate turning speed ...

**450 RPM**

2 marks

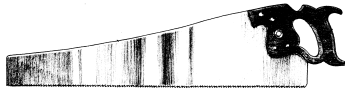
*Provides the safest compromise between obtaining a good finish and reducing vibration due to the size of the lamp*

2 marks

4 marks

**Question 5**

(i) Correct name of saws...



A ...

*Hand or panel saw*

3 marks

B ...

*Coping Saw*

3 marks

C ...

*Tenon (back) saw*

3 marks

**Function of each saw..**

3 x 2 marks

15 marks

(ii) Steps in marking out and cutting tenon ...

**Marking Out -**

- *Marking length of tenon from waste*
- *Setting mortise gauge (distance between spurs)*
- *Setting distance in from edge on mortise gauge*
- *Marking all gauge lines for tenon*

6 + 2 marks  
any two relevant steps

**Cutting (tenon saw)-**

- *Vertical Sawing with tenon saw depth of waste (6mm)*
- *Inclining piece and cutting cheek line nearest to you to shoulder*
- *Repeat for other cheek*
- *Place piece vertically and cut horizontally to shoulder*
- *Remove cheek waste*

**Cutting (band saw)-**

- *Setting of fence to thickness of cheek*
- *Selecting and fitting appropriate blade*
- *Setting guards and blade guides*
- *Slow feed rate when cutting*
- *Remove cheek waste*

6 + 2 marks  
any two relevant steps

16 marks

(iii) Saw Kerf ...

*... is the groove or trench produced by a saw when cutting*

2 marks

2 marks

(iv) Name given to bending of teeth...

*Saw set or setting*

2 marks

**Reason-**

*to create a groove or kerf that is wider than the width or thickness of the saw blade, thereby preventing it becoming jammed when in use*

5 marks

7 marks

Total 40