



**JUNIOR CERTIFICATE 2002**

**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...

*Nail Punch.*

Punch



3 marks

2 marks

(ii) Correct use of tool:

*Punching/inserting nail heads below surface of timber.*

2 marks

2. Name Two of the three hinges

*Piano Hinge*

*T-strap hinge*

*Butt hinge*

1 x 3 marks

1 x 2 marks

3. Name of the defect shown... *Star Shake*



5 marks

Star or Shake

2 marks

Heart rot

2 marks

4. Correct order in sharpening ....



*Grinding*

*Honing*

*Removal of burr*

2 marks

2 mark

1 mark

5. (i) Name of wood holding tool ... *Sash cramp*

Cramp



3 marks

2 marks

(ii) Purpose ... *To hold rectangular frames while adhesive*

*sets, when jointing boards to make wider panels*

2 marks

6. *Current produced by a battery is Direct Current (DC)*



5 marks

7. Name two of the three trees...

*Oak*

*Horse Chestnut*

*Beech*

1 x 3 marks

1 x 2 marks

8. Two safety precautions to be observed when using a drilling machine...



*Operator must wear safety goggles*

*Ensure work is securely held in the vice*

*Ensure vice is securely held on the table*

*Remove chuck key before switching on*

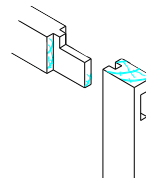
*Use appropriate drill speed for material ...*

1 x 3 marks

1 x 2 marks

9. Completed sketch of haunched mortise and tenon...

*Haunched Mortise and tenon correct*



5 marks

Mortise and tenon

2 marks

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

*Y*

(ii) Rotational speed of C...

*16 Revolutions per minute*



3 marks

2 marks

11. Classification of metals ....

**Cast Iron...**

*Ferrous*

2 marks

**Brass...**

*Non-ferrous*

1 mark

**Copper...**

*Non-ferrous*

1 mark

**Lead....**

*Non-ferrous*

1 mark

12. Force acting at Member A of stepladder...

*Tension/tensile*

Tie



5 marks

2 marks

13. (i) Name of metalworking tool...

**Junior Hacksaw**  
Hacksaw



**3 marks**  
2 marks

(ii) Material it is used to cut ... **Light metal and plastics**

**2 marks**

14. Advantage of using CAD ...

**Drawings can be produced and modified faster**

**Drawing exact size, no scaling**

**Parts lists can be obtained directly ...**

**5 marks**

15. Two lathe parts shown...

**1 —Face plate**

Plate

**2— Drive centre**

Centre



**3 marks**

2 marks

**2 marks**

1 mark

16. Most appropriate material for items manufacture...

**Nylon ...**

**uPVC ...**

**Expanded polystyrene ...**

**Gear wheel**

**Window**

**Cup**

**2marks**

**2marks**

**1 mark**

17. (i) Design defect...

**Bending shelves, legs poorly located, unstable ...**

**3 marks**

Warping, cupping ....

2 marks

(ii) Reasonable explanation of how to remedy described defect... **2 marks**

If reference to seasoning

0 marks

18. (i) Name of screw slot shown ....

**Pozidriv or Phillips**



**3 marks**

(ii) Advantage of screw slot ....

**Tip of screwdriver located exactly  
and less likely to slip**

**2 marks**

19. Method of preventing end splits in plank...



*Paint the end of the plank*

*Affix light metal or plywood covers to plank ends*

*Reduce rate of drying in kiln*

**5 marks**

20. Method of making cut edges of chipboard more attractive...



*Iron on edging*

*Solid wood slip edge*

*Aluminium edging strip*

**3 marks**

*Sketch (neat and well proportioned)*

**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 ends (70)</i>	2 x 1 mark	
<i>Showing height and thickness of arms</i>	2 x 1 mark	
<i>Showing bottom edge of seat lath</i>	1 mark	
<i>Showing thickness of seat lath</i>	1 mark	
<i>Showing back rails</i>	2 x 1 mark	
<i>Points on curve</i>	3 x 1 mark	
<i>Drawing of curve</i>	1 marks	<b>14 marks</b>

#### End view -

<i>Setting out/transferring overall height (880) and width (570)</i>	2 marks	
<i>Showing arm height and thickness</i>	2 marks	
<i>Showing arm projection</i>	1 marks	
<i>Showing legs thickness</i>	2 x 1 mark	
<i>Showing rail supporting seat</i>	2 marks	
<i>Showing seating laths</i>	3 x 1 mark	<b>12 marks</b>

#### General -

<i>Hidden detail (all lines)</i>	2 marks	
<i>Draughtsmanship, including scale</i>	4 marks	
<i>Dimensions</i>	2 marks	<b>8 marks</b>

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

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

**Total 40**

**Question 2**

(i) Investigation ...

*The process whereby the designer investigates all aspects of the problem including the intended use, location of use, materials available, cost, possible methods of production, etc. The gathering of information prior to the development of design ideas*

Evaluation ...

*The process of determining the effectiveness and appropriateness of the finished design or artefact, does it solve the problem in an efficient manner, are there areas that could be improved upon?, etc.*

**2 x 6 marks**

**12 marks**

(ii) Design solution for telephone related items ...

*Allow for originality in design.*

*Basic shelf with drawer designed  
Fair attempt to accommodate items in a slim, accessible unit  
Good, well balanced, well sketched design, showing some innovation*

**4 marks**

**↓  
6 marks**

**↓  
10 marks**

Means of providing for note taking while on telephone...

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

**6 marks**

**16 marks**

(iii) Identification of two design requirements relating to the units design...

*Safety                      Accessibility  
Cost                         Durability  
Appearance ...*

**2 x 3 marks**

Description of how these are been dealt with in proposed design...

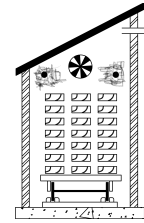
*Mark for a reasonable description of how the design contributes to the achievement of the points raised above.*

**2 x 3 marks**

**12 marks**

**Total 40**

**Question 3**



(i) Correct name for seasoning method shown ...

*Kiln seasoning*  
*Artificial seasoning*

**5 marks**

**5 marks**

(ii) Functions of the parts labelled ...

	<b>FUNCTION</b>
<b>FAN</b>	To assist in the circulation of warm air and steam through the kiln and the stacked timber to ensure even, uniform drying in a shorter period of time ...
<b>STEAM JETS</b>	Steam raises the temperature within the kiln, while at the same time maintaining a level of moisture saturation in the air that reduces the risk of timber drying too quickly on the surface while trapping moisture in deeper layers and cracking occurring on the surface ...
<b>BOGEY/ TROLLEY</b>	Timber stacked on the trolley can be easily moved into and out of the kiln for efficient operation ...

**3 x 5 marks**

**15 marks**

(iii) Naming a Second method of seasoning ...

*Name*

**4 marks**

*2 appropriate Advantages of the named method ...*

**2 x 2 marks**

*2 appropriate Disadvantages of the named method ...*

**2 x 2 marks**

**12 marks**

(iv) Protection and conservation of rainforests ...

*2 appropriate reasons for conserving rainforests ...*

**2 x 2 marks**

*2 methods whereby use of hardwoods could be reduced ...*

**2 x 2 marks**

**8 marks**

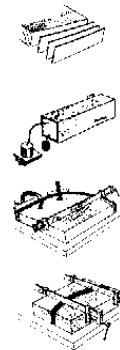
**Total 40**



**Question 4 (A)**

(i) Preparation of laminated mirror frame...

*Cutting of laminates to thickness of 3-5 mm  
Preparation of formers, the gap between male and female equal to thickness of finished member  
Laminates steamed to improve flexibility  
From the steambox placed in formers and cramped up dry to take shape  
After 1-2 days removed, glue applied to surfaces and then reclamped  
Left for 2-4 days before removal for cleaning up*



**10 + 4 marks**

**14 marks**

(ii) Selection of suitable finish ...

*Polyurethane varnish, Cellulose lacquer, Wax, Oil ...*

**2 marks**

Surface preparation for finish...

*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**

Application of finish...

*Working with the grain  
Application of first coat  
cutting back when dry  
Application of additional coats ...*

**6 + 2 marks**

**20 marks**

(iv) Two reasons why stains might be used...

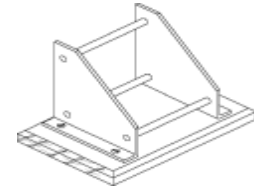
*To improve the appearance of a bland timber  
To make a cheap timber look like an expensive timber  
To match new timber to older timber...*

**2 x 3 marks**

**6 marks**

**Total 40**

**Question 4 (B)**



(i) Forming 90° bend in acrylic end ...

*Shape of side cut out using either hacksaw  
or scrollsaw*

*Edges filed to the lines and finished by draw-filing and  
use of carbon-silicate (wet and dry) paper.*

*Foldline marked with non-permanent pen*

*Foldline placed over strip heater and  
when softened, bent to correct angle using former*

10 + 2 marks

12 marks

(ii) Preparation of side and base for screwing together with  
countersink screws...

**Acrylic side S**

*Mark centres of holes with scribe prior to bending*

*Tape over hole position to prevent splintering*

*Place acrylic in drill press vice, firmly supported  
with timber behind to prevent splintering*

*Drill through using a low drill speed and slow feed rate*

*Countersink hole using a countersink bit*

8 + 2 marks

**Base B**

*Mark centres of holes on the mahogany base*

*Using a drill bit slightly smaller than the core diameter  
of the screw being used, drill a pilot hole into the base  
equal to the length of the screw*

*Alternatively use a bradawl*

*Using a drill bit equal in diameter to the shank of the  
screw, drill out the hole for one third its depth ...*

8 + 2 marks

20 marks

(iii) Differentiation between Thermoplastic and Thermosetting materials ...

**Thermoplastics**—softened by the application of heat,  
allowing them to be moulded and shaped, set when cooled  
down. Process of hardening, moulding and setting can be  
repeated several times.

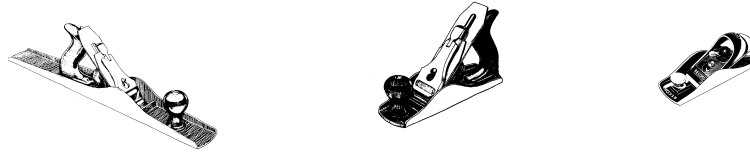
**Thermosetting**— application of heat allows to be shaped but  
cooling causes a chemical and physical change to occur which  
is not reversible, further application of heat will cause the article to  
smoulder, burn or break down.

8 marks

8 marks

### Question 5

(i) Correct name of planes...



X ...  
Y...  
Z ...

*Try Plane*  
*Smoothing Plane*  
*Block Plane*

2 x 5 marks

10 marks

(ii) Parts of the plane ...

A ...      *Adjustment wheel*

2 marks

*Allows you to adjust the thickness of shavings being removed, controls the protrusion of the cutting edge of the blade below the sole of the plane*

3 marks

B ...      *Lever Locking Cap*

2 marks

*Tightens and holds the cutting assembly firmly in place on the frog*

3 marks

10 marks

(iii) Reasons for the clogging of the mouth of plane ...

*Shaving cut thickness set too deep*  
*Cap iron set too far from cutting edge and not curling shavings as they are cut*  
*Cap iron not clamped tightly to cutting iron*  
*Timber being used damp, incorrectly seasoned*  
*Mouth opening set too narrow for timber being planed*

2 x 3 marks

Methods of preventing it happening again ...

2 x 2 marks

10 marks

(iv) Restoring cutting edge of plane...

*Use an oil or water cooled grindstone, grind the cutting surface back at an angle of 25 degrees until chips are removed*  
*On a flat oilstone, raise the bevel of the iron to a 30 degree angle*  
*Move the chisel in a figure of eight pattern over the oilstone to hone the cutting edge*  
*To remove the burr formed, either back-hone the blade by placing it flat on the stone or use a leather strop*

8 + 2 marks

10 marks

Total 40