

# **JUNIOR WORKSHOP**

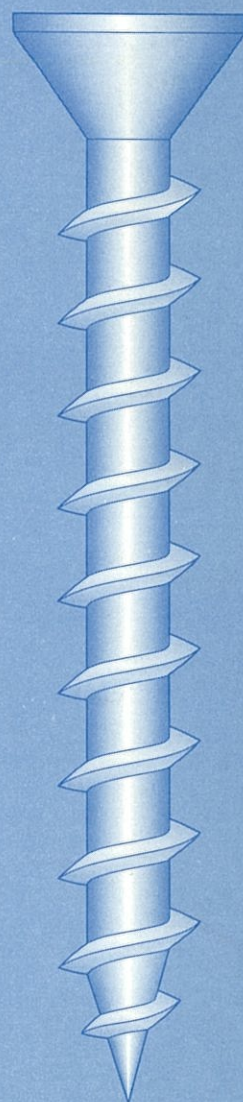
## **WORKBOOK**

# **1**

**Third Edition**

**D.Schlyder**

# **A**



# JUNIOR WORKSHOP A - Workbook 1

Third Edition - D.Schlyder

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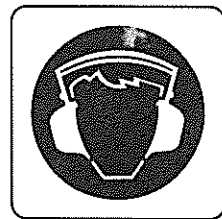
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# HEALTH AND SAFETY

1. Regulations, procedures, signs and other safety measures cannot protect students in the workshop unless they are \_\_\_\_\_  
\_\_\_\_\_
2. List three examples of good 'housekeeping' in the wood shop.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
3. Give an example of an injury that could be caused in the wood shop by using a defective hand tool. \_\_\_\_\_  
\_\_\_\_\_
4. What action should a student take if a defect is observed in any item of electrical equipment? \_\_\_\_\_  
\_\_\_\_\_
5. List three personal protective devices that could be worn to protect eyesight.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
6. What is the meaning of the safety sign shown on the right?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. Briefly describe safety precautions that should be observed when using volatile liquids such as solvents and paints.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# FORESTS AND THEIR PRODUCTS

1. Name three aspects of Forest Management.

a. \_\_\_\_\_ b. \_\_\_\_\_ c. \_\_\_\_\_

2. Write a brief sentence describing each of the aspects of Forest Management in your answer to question 1.

a. \_\_\_\_\_

\_\_\_\_\_

b. \_\_\_\_\_

\_\_\_\_\_

c. \_\_\_\_\_

\_\_\_\_\_

3. The sketch on the right shows a typical scene in a pine forest.

In the space provided below neatly sketch a similar scene after forest management techniques have been applied.

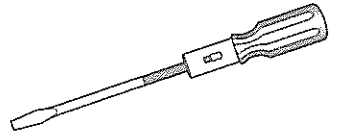
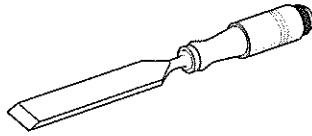
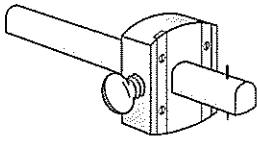
Try to illustrate your answers to question 2 in this sketch.



4. Australia's natural forests are mainly:
- a. Softwoods.      b. Exotic Timbers.      c. Hardwoods.      d. Pine.
5. Name two common softwoods grown specially for the wood-chip industry.
- a. \_\_\_\_\_ b. \_\_\_\_\_
6. List three commercial uses for thinnings from pine plantations.
- a. \_\_\_\_\_ b. \_\_\_\_\_ c. \_\_\_\_\_
7. What is the Forester's term for felling the whole of a usable crop of plantation trees?
- a. Selection      b. Clear Felling      c. Silviculture      d. Selection Clearing
8. Name three Australian timbers which are suitable for furniture and cabinet construction.
- a. \_\_\_\_\_ b. \_\_\_\_\_ c. \_\_\_\_\_
9. Name two Australian timbers suitable for heavy building construction.
- a. \_\_\_\_\_ b. \_\_\_\_\_
10. Name the Australian softwood described by the following characteristics:
- It often contains numerous knots and has a distinctive smell. It is pale yellow to light brown in colour with a close texture and is naturally termite resistant.
- \_\_\_\_\_
11. Which of the following timbers is now being used for house framing?
- a. Black Bean      b. Hoop Pine      c. Radiata Pine      d. Queensland Maple
12. Name the imported timber that is described by the following characteristics:
- It is a pale brownish colour with a darker face pattern; darker areas are harder than lighter areas; difficult to dress smoothly; has excellent load bearing capacity due to unusually long fibres.
- \_\_\_\_\_

# WOODWORK TOOLS

1. Name the woodwork tools shown below.



a. \_\_\_\_\_

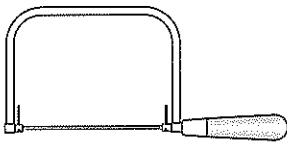
b. \_\_\_\_\_

c. \_\_\_\_\_

2. Which tool should be used to strike a chisel when cutting woodwork joints?

\_\_\_\_\_

3. Name the woodwork tools shown below.



a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

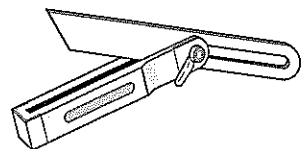
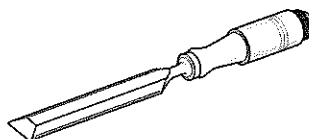
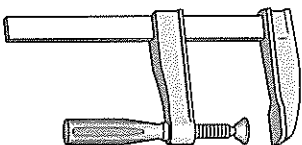
4. Name the part of the Jack Plane which holds the iron firmly in place.

\_\_\_\_\_

5. Plane irons and chisels are ground to an angle of \_\_\_\_\_ and honed or sharpened to an angle of \_\_\_\_\_.

6. A \_\_\_\_\_ plane is used for fine finishing work.

7. Name the woodwork tools shown below.



a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

8. Describe the main differences between a file and a rasp.

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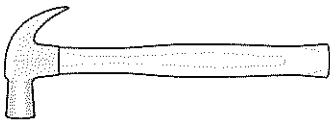
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9. Name the plane used mainly for straightening long edges.

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10. A \_\_\_\_\_ is used to smooth rounded corners. This tool works on the same principle as the plane.

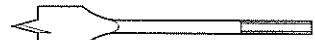
11. Name the woodwork tools shown below.



a. \_\_\_\_\_



b. \_\_\_\_\_



c. \_\_\_\_\_

12. The Tenon Saw has a special feature in its design. Name this feature and explain its purpose.

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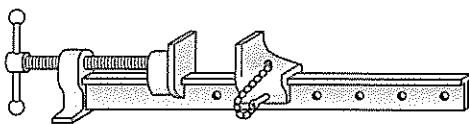
13. Name the tool used to scribe circles and arcs in marking out operations.

---

14. Describe the main difference between softwood and hardwood auger bits.

---

15. Name the woodwork tools shown below.



a. \_\_\_\_\_



b. \_\_\_\_\_

16. Draw a neat sketch of a Try Square in the space provided and name its parts. Briefly describe how a Try Square is used in woodworking.

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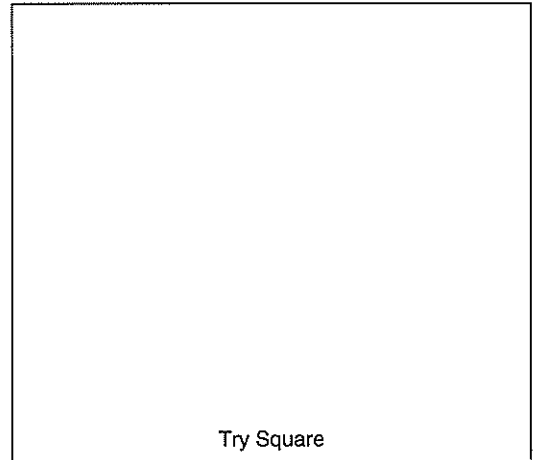
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17. Figure 1 shows a piece of softwood which is to be shaped as shown in Figure 2.

List the measuring, marking and cutting tools you would need to do the job.

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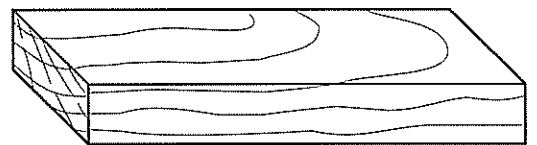


Figure 1

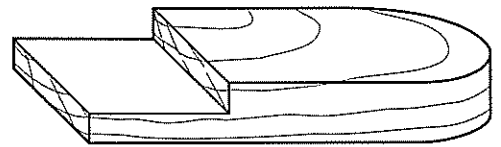


Figure 2

18. A \_\_\_\_\_ chisel would be used to remove the waste from the groove cut in the piece of timber shown in Figure 3.



Figure 3

19. Briefly explain the reason for your answer to question 18 above.

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20. Briefly describe the 'set' of a Saw and state its purpose.

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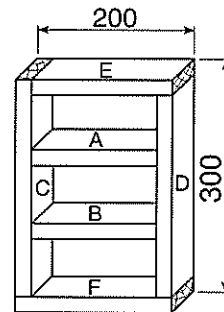
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# BUTT AND HOUSING JOINTS

The illustration on the right shows a frame made from 68 x 19 dressed softwood and assembled using Butt Joints which are glued and nailed. Parts A and B are equally spaced between parts F and E.



No.	Length

- Complete the timber list showing number and finished length of all pieces of timber required to assemble the frame.
- Name the glue generally used in the assembly of woodwork jobs such as the frame illustrated.

\_\_\_\_\_

- Which of the following nails would be most suitable for assembling of the frame?
  - Hardboard
  - Clout
  - Brad
  - Bullet Head
- Which of the following would be the most suitable length for nails used in the assembly of the frame?
  - 20mm
  - 30mm
  - 50mm
  - 70mm
- Which of the following parts would be assembled last?
  - Part A
  - Part F
  - Part D
  - Part B

- Briefly explain the reasons for your answer to question 5.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- Would Skew Nailing be the most suitable method of fixing part A and part B?
  - Yes
  - No

- Briefly explain the reasons for your answer to question 7.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9. Should it be necessary to use clamps when assembling the frame?

- a. Yes                      b. No

10. Briefly explain your answer to question 9.

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11. List the tools you would need to mark out and assemble the frame.

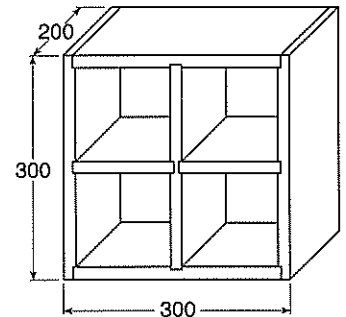
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12. The drawing on the right shows a set of 'pigeon holes' which are to be made from plywood 20mm thick and assembled using housing joints. All housings are to be 5mm deep.

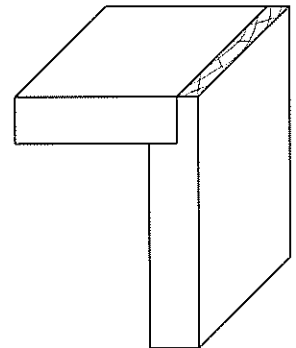
Complete the materials list showing number and finished size of all pieces of plywood required to construct the project.

No.	Size
	x 200
	x
	x
	x



13. A special nailing technique can be used to provide increased strength in a Rebate Housing joint.

Using the adjacent drawing, neatly sketch the nails started in position ready to be driven in.



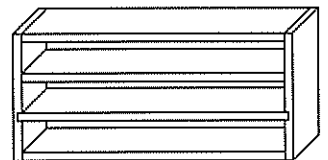
14. List all the measuring, marking and cutting tools you would need to prepare the joint and any other tools or equipment needed to assemble the joint.

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15. The drawing on the right shows a wall cupboard with two shelves. The top shelf is butted and nailed to the sides of the carcass and the lower shelf is housed in. Why would the lower shelf be capable of carrying more weight?

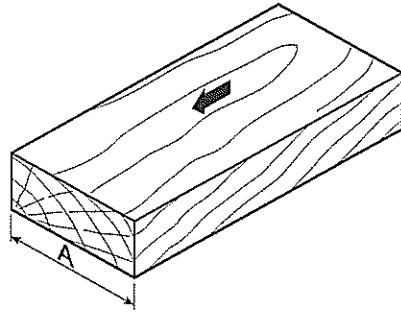


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# WOODWORK TERMS

1. If you planed the face of the piece of timber shown on the right in the direction of the arrow, you would be planing:

- against the grain.
- with the grain.
- across the grain.
- straight grain.

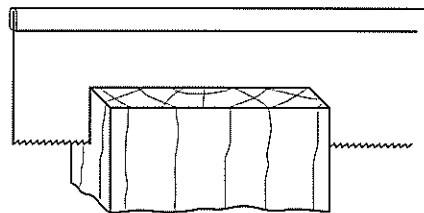


2. Which of the following dimensional terms is marked 'A' in the sketch of the piece of timber above?

- Thickness
- Length
- Depth
- Width

3. The diagram on the right illustrates a cut being made with a tenon saw:

- across the grain.
- with the grain.



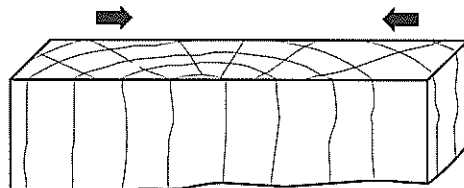
4. A saw cut with the grain is called a \_\_\_\_\_ cut.

5. The \_\_\_\_\_ is the pattern formed on the cross section of a piece of timber by the growth rings and medullary rays.

6. Why would you plane from both ends toward the centre as indicated by the arrows in the adjacent diagram?

\_\_\_\_\_

\_\_\_\_\_

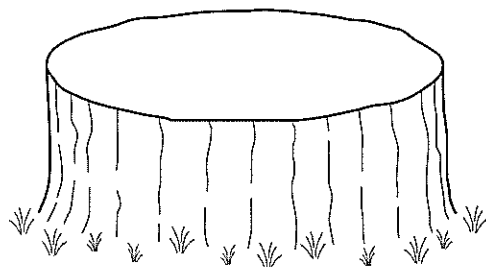


7. Sketch the 'growth rings' and 'medullary rays' in the drawing of the tree stump.

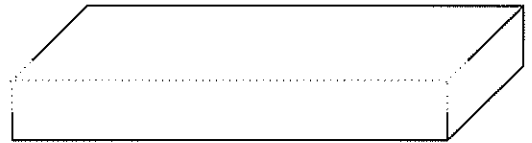
8. The \_\_\_\_\_ of the tree is represented by the distance between the growth rings.

9. How could you determine the age of the tree?

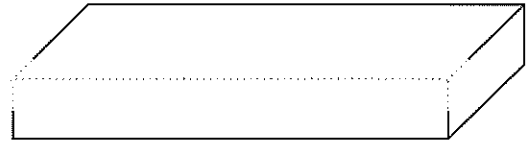
\_\_\_\_\_



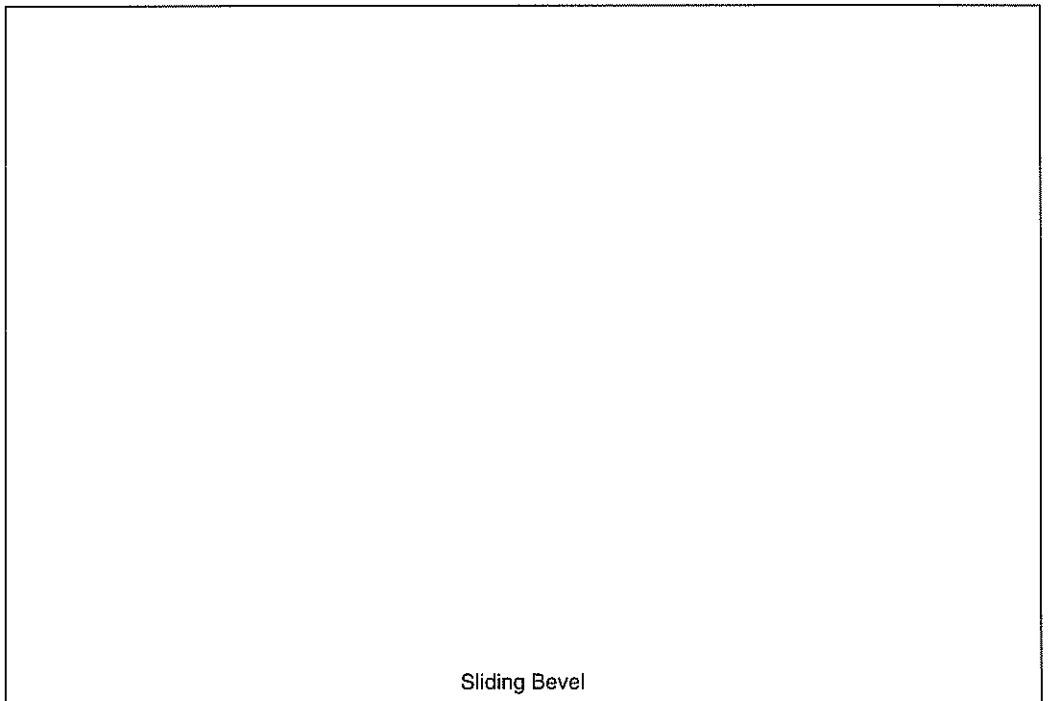
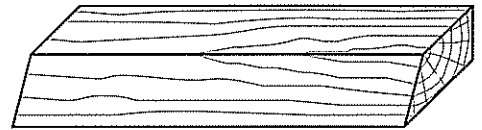
10. Complete the adjacent sketch of a piece of timber by showing a rebate on the front edge. Also show the end grain.



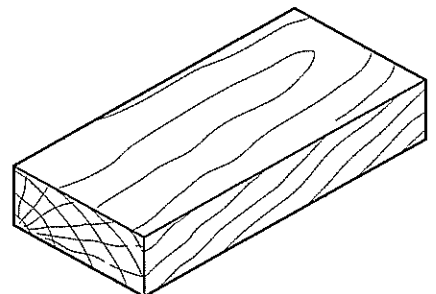
11. Complete the adjacent sketch of a piece of timber by showing a chamfer on the front edge. Also show the end grain and figure.



12. A 'Sliding Bevel' would be used to test the angle of the bevel on the edge of the piece of timber in the adjacent diagram. Draw a neat sketch of a Sliding Bevel in the space below and name its parts.



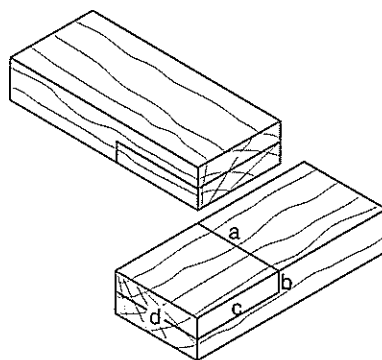
13. Draw a 'Face Mark' and an 'Edge Mark' on the piece of timber shown in the illustration on the right.



# HALVING JOINTS

- The drawing on the right shows two pieces of timber marked out ready to cut a corner halving joint.

- Clearly mark (by cross hatching) the parts to be removed (waste).
- Draw a face mark and edge mark on each piece of timber.



- Briefly state the purpose of face marks and edge marks in woodworking.

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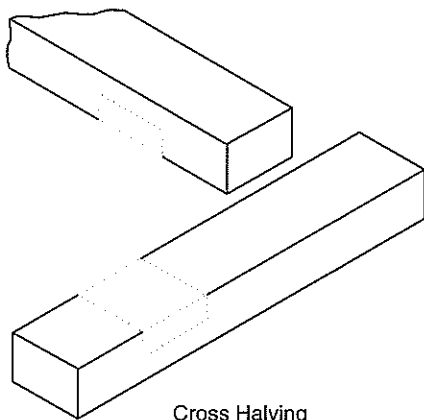


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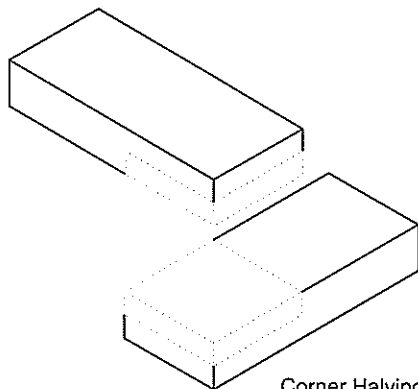
- Beside each letter below write the name of the tool which would be used to mark the corresponding line on the setting out of the corner halving joint above.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

- Complete the sketches below showing the waste material removed. Also show end grain.

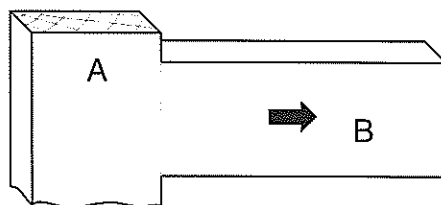


Cross Halving



Corner Halving

- The diagram on the right shows part of a project you are designing. The two pieces of timber marked A and B are to be joined together. The arrow shows the direction in which stress would be placed on the joint when the finished product is being used.



Which joint would you use in the design? \_\_\_\_\_

6. Briefly explain how the joint you have selected would resist the strain applied in the direction of the arrow.

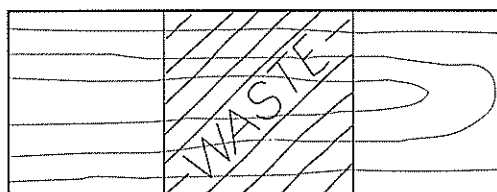
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7. The adjacent diagram represents the face side of a piece of softwood with a halving marked out ready to be cut.

Draw the saw cuts that you would make in the first stage of waste removal. The saw cuts should be about 2mm wide.



8. Briefly explain the reason why the saw cuts should be positioned as you have shown them in the sketch.

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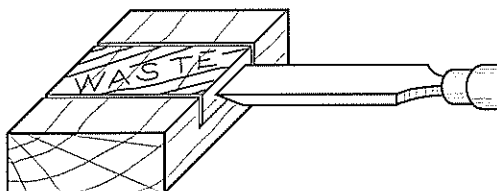
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9. The diagram on the right shows a chisel about to be used to remove some of the waste from a halving. Is the chisel in the correct position to make the first cut?

a. Yes

b. No



10. Briefly explain your answer to question 9.

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11. When marking out halving joints it is very important to use \_\_\_\_\_ and \_\_\_\_\_ marks. A slight error in setting the \_\_\_\_\_ gauge to the centre of the thickness of the material will still result in a flush joint if both pieces are gauged from the \_\_\_\_\_ side or face \_\_\_\_\_, as the case may be.

# PLASTICS

1. The history of plastics began around the year:  
a. 1800.                      b. 1870.                      c. 1930.                      d. 1950.
2. A vegetable product was first used to produce a plastic used as a substitute for ivory in the manufacture of billiard balls. This early plastic material was called:  
a. Cellulite.                      b. Cellulite Nitrate.  
c. Cellulose Nitrate.                      d. Cellulose Plastikos.
3. Animal protein, usually in the form of milk, was used to produce a range of plastic materials called:  
a. Casein Plastics.                      b. Dairy Plastics.  
c. Protein Plastics.                      d. Protein Cellulates.
4. Phenol Formaldehyde was originally produced from substances extracted from naturally occurring material. Which two of the following materials were used?  
a. Wood Alcohol                      b. Crude Oil  
c. Coal Tar                      d. Natural Gas
5. Rapid advancement in the plastics industry occurred during which 20 year period?  
a. 1870 to 1890                      b. 1910 to 1930  
c. 1930 to 1950                      d. 1960 to 1980
6. Which of the following was the most important source of raw material for the plastics industry during the 20 year period when most of the plastics used today were developed?  
a. Coal                      b. Crude Oil  
c. Natural Gas                      d. Other Natural Materials
7. Which of the following could not be made successfully from plastic materials?  
a. Carpets                      b. Clothing  
c. Food Packaging                      d. Electrical Conductors
8. Plastic materials all have the same chemical composition.  
a. True                      b. False
9. Describe a health hazard that occurs when plastic is burnt.

- 10.** List the two general properties of plastics which you consider to be most important in the design of an electrically illuminated advertising sign intended for exterior installation and positioned within reach of passers by.

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- 11.** Briefly describe a 'Thermoplastic' material.

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- 12.** What is the general term used to describe plastic materials which require a catalyst to effect the chemical change that causes them to set?

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- 13.** What is the full chemical name for acrylic?

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- 14.** Cast acrylic sheet becomes pliable at about:

a. 85°C.                      b. 100°C.                      c. 120°C.                      d. 200°C.

- 15.** The best moulding temperature for acrylic sheet is in the range:

a. 90°C to 100°C.    b. 100°C to 110°C.    c. 120°C to 130°C.    d. 150°C to 160°C.

- 16.** Briefly describe the effects of attempting to mould acrylic sheet at temperatures below those recommended.

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- 17.** If cast acrylic sheet is heated above 170°C it will begin to degrade. Briefly describe the changes which occur in acrylic when it shows the first signs of degrading.

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- 18.** When cast acrylic sheet is heated to moulding temperature for the first time it:
- a. shrinks in thickness but increases in length and width.
  - b. increases in thickness but shrinks in length and width.
  - c. shrinks in length but increases in width and thickness.
  - d. increases in length but shrinks in width and thickness.
- 19.** Reheating acrylic will repeat the dimensional changes referred to in question 18.
- a. True
  - b. False
- 20.** Acrylic sheet is a poor conductor of heat. How does this affect the cooling of a moulded article?
- .....
- .....
- .....
- 21.** Shaped acrylic articles should be held in the mould or jig until the material temperature has lowered to about:
- a. 30°C.
  - b. 40°C.
  - c. 50°C.
  - d. 60°C.
- 22.** Briefly describe the effect of forced cooling on moulded acrylic articles.
- .....
- .....
- 23.** Briefly describe the 'plastic memory' that characterises acrylic sheet.
- .....
- .....
- .....
- 24.** Briefly describe the differences between 'adhesive' bonding and 'cohesive' bonding.
- .....
- .....
- .....
- .....
- .....

- 25.** Which of the following is not a solvent that is suitable for bonding acrylic sheet?
- a. Mineral Turpentine
  - b. Chloroform
  - c. Ethylene Di-chloride
  - d. Methylene Chloride
- 26.** When would you use an oven in preference to a strip heater for heating a sheet of acrylic?

- 27.** The illustration on the right shows a simple bathroom shelf which is made from cast acrylic sheet.

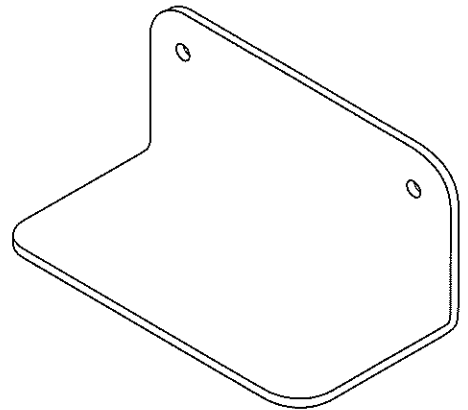
List the tools, equipment and abrasives you would need to:

- a. Prepare the flat sheet to the required size;

- b. Shape the corners to a specified radius;

- c. Provide the means for fixing the shelf to the wall;

- d. Finish the edges and bend to the required shape.



- 28.** Briefly describe incorrect use of the buffing machine which could result in the piece of plastic being suddenly pulled from the operator's hands.

**29.** Does the mop (buff) on a buffing machine rotate toward the operator or away from the operator?

.....

**30.** Briefly describe five safety requirements which should be observed when using the buffing machine.

a. ....

b. ....

c. ....

d. ....

e. ....

**31.** Mops used for polishing the edges and faces of plastic sheet materials are usually dressed with a wax based dressing compound. What does the wax contain?

.....

.....

**32.** Would you remove the masking paper from a piece of acrylic sheet before working on it?

a. Yes                      b. No

**33.** Briefly explain you answer to question 32.

.....

.....

.....

**34.** 'Wet and dry' abrasive paper is often used to remove file marks from the edges of acrylic sheet. Briefly explain the reason why water is used in conjunction with the abrasive paper.

.....

.....

.....

.....

## A WOODWORK DESIGN PROBLEM

**SITUATION:** Your polished silky oak study desk is usually cluttered with text books and you have been given an ultimatum. Keep it tidy or else!

**BRIEF:** It has been suggested that you put your woodworking skills to good use and make a matching portable book rack that can be placed on your desk and will hold all your text books. List all factors in the 'situation' and the 'brief' which you should consider when designing your book rack. These design factors could relate to the needs of the project or instructions you have been given in the brief. Briefly list all factors in a manner similar to the example below.

*(a) Must hold all the text books. (b)*

**INVESTIGATION:** When you have determined the needs of the project you must then decide how to meet these requirements. Investigate the following factors and write down any information you think may be helpful in designing your book rack.

**Availability of timber:** Is the timber you wish to use readily available?

- a. Yes                      b. No

If 'yes' name the local timber merchant or hardware store where you can purchase the timber.

If 'no' name a timber that is available and might be a reasonable substitute.

List four stock sizes of dressed timber that are readily available and might be suitable for the project. Show also the current cost per metre for each size.

- |                  |            |                  |            |
|------------------|------------|------------------|------------|
| a. _____ x _____ | \$ _____ . | b. _____ x _____ | \$ _____ . |
| c. _____ x _____ | \$ _____ . | d. _____ x _____ | \$ _____ . |

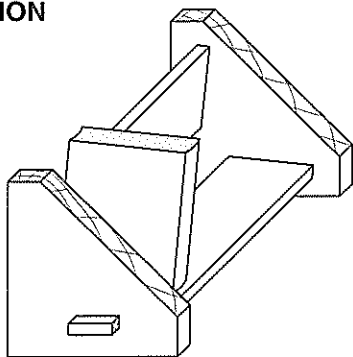
**Finishing Materials:** List the brand name, size of the can required, price, and the name of a local supplier of a suitable clear plastic finish for the project.

**Overall Size:** Assuming you have 5 books 20mm thick, 10 books 15mm thick and 4 books 25mm thick, determine the minimum total storage space required.

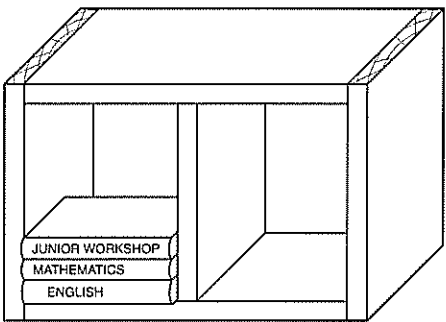
\_\_\_\_\_ mm

**Other Considerations:** After considering other factors such as shape of the book rack, joining methods, availability of tools and equipment etc., you sketched two preliminary designs as shown below. Because of lack of tools and equipment you decide to construct your project using glued and nailed butt joints.

**SOLUTION**



Design A



Design B

List the good points and the bad points of each design shown in the sketches.

Design A: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

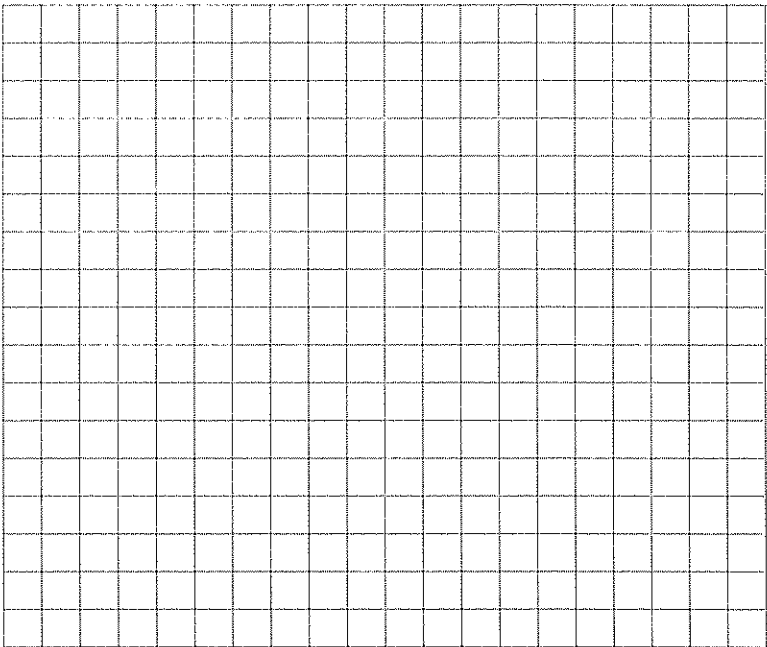
Design B: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Draw a neat sketch of your final design using the grid on the right.

Show material sizes and overall dimensions of the book rack.



**REALISATION:** Assume that you constructed the book rack according to the final design sketch.

**EVALUATION:** Briefly describe how your finished book rack satisfies the design brief. Mention all design factors referred to in the 'brief' and the 'situation'.

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**Materials List:**

List all materials used in the book rack. The timber list should show number, size and length of pieces required.

Timber: 

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**Finishing Materials:**

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**Joining Materials:**

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List all the tools and equipment you used in the construction of your book rack.

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# ASSEMBLY AND FINISHING MATERIALS

1. Abrasive paper which is used for smoothing timber and other wood products consists of

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2. The abrasive material on garnet paper is:

- a. a synthetic material.
- b. a semiprecious stone.
- c. extremely hard.
- d. black in colour.

3. Briefly explain how the grit on garnet paper maintains sharp edges.

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4. Which is the finer grade of abrasive paper?

- a. 80
- b. 100

5. List four advantages of PVA glue.

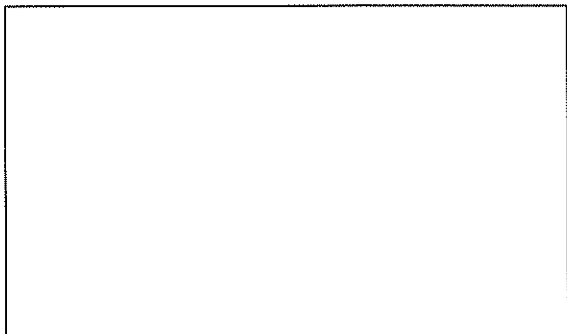
- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

6. List two disadvantages of PVA glue.

- a. \_\_\_\_\_
- b. \_\_\_\_\_

7. PVA stands for \_\_\_\_\_ which is made by reacting \_\_\_\_\_ with \_\_\_\_\_

8. In the space provided on the right neatly sketch and name the following nails; bullet head, hardboard, clout.



9. Briefly describe the use of a brad.

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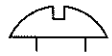
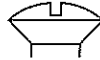
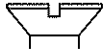
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**10.** What is the purpose of the twisted thread on a particleboard nail?

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**11.** Name the three screw head types shown below.



a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

**12.** Briefly describe how you would sand a piece of timber that is to be given a clear finish.

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**13.** Name a plastic material used in the manufacture of a popular clear finish (varnish).

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**14.** Briefly describe the procedure for applying two coats of a clear plastic finish to a woodwork project.

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**15.** Name the solvent for 'oil based' paints and many clear finishes.

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**16.** Why are stoppings used when a woodwork project is being finished?

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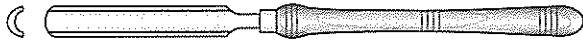
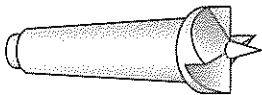
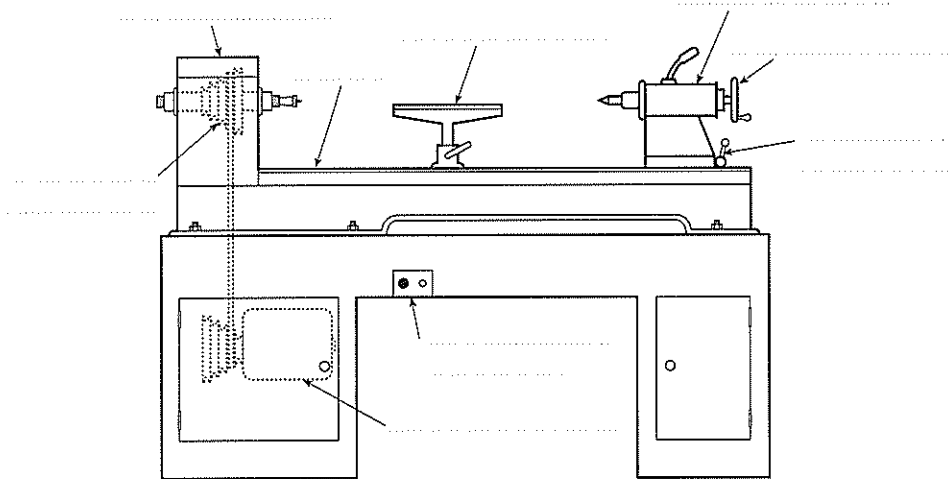
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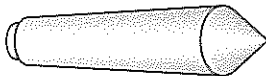


# THE WOOD LATHE

1. Name the wood lathe parts, tools and accessories shown in the diagrams below. Neatly print the names in the spaces provided.



a. \_\_\_\_\_



b. \_\_\_\_\_

2. Briefly explain why saw cuts at right angles to each other are usually made in one end of a piece of timber which is to be turned between centres.

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3. How should the tool rest be positioned in relation to the job when turning between centres?

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4. Briefly describe the main uses of the lathe tool 'a' shown in question 1 above.

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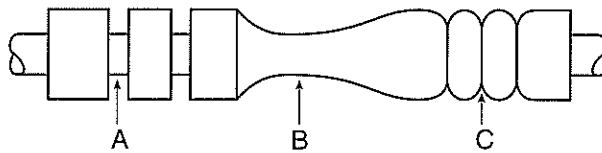
5. List three personal safety precautions that should be observed before you use the wood lathe.

a. \_\_\_\_\_  
b. \_\_\_\_\_  
c. \_\_\_\_\_

6. List three operating safety precautions that should be observed while you are using the wood lathe.

a. \_\_\_\_\_  
b. \_\_\_\_\_  
c. \_\_\_\_\_

7. Name the lathe tools you would use to finish the shapes shown in the diagram below.



A \_\_\_\_\_  
B \_\_\_\_\_  
C \_\_\_\_\_

8. What is the main advantage of using a 'live' centre to support the tailstock end of a turning job?

\_\_\_\_\_  
\_\_\_\_\_

9. Which lathe tool has its sides relieved so that it can be fed into the work with little side friction?

\_\_\_\_\_

10. Wood lathe tools can be classified into two groups; \_\_\_\_\_ tools and \_\_\_\_\_ tools.

11. Machines similar to the modern wood lathe were first invented during the Industrial Revolution.

a. True                      b. False

# AN ACRYLIC DESIGN PROBLEM

**SITUATION:** You are a junior design technician employed by a plastics manufacturing company. Your company has been asked by the management of a large hotel chain to design and manufacture serviette rings for use in the hotel dining rooms.

The chief designer has decided that you should be given the job of producing a design that meets the customer's needs. He has asked you to sketch your ideas for his consideration and to produce a prototype for possible manufacture by the company.

**BRIEF:** The serviettes used by the hotel chain are folded and rolled into a cylindrical shape approximately 40mm in diameter. The serviette ring need not be circular but the rolled serviette must be able to fit neatly into the ring.

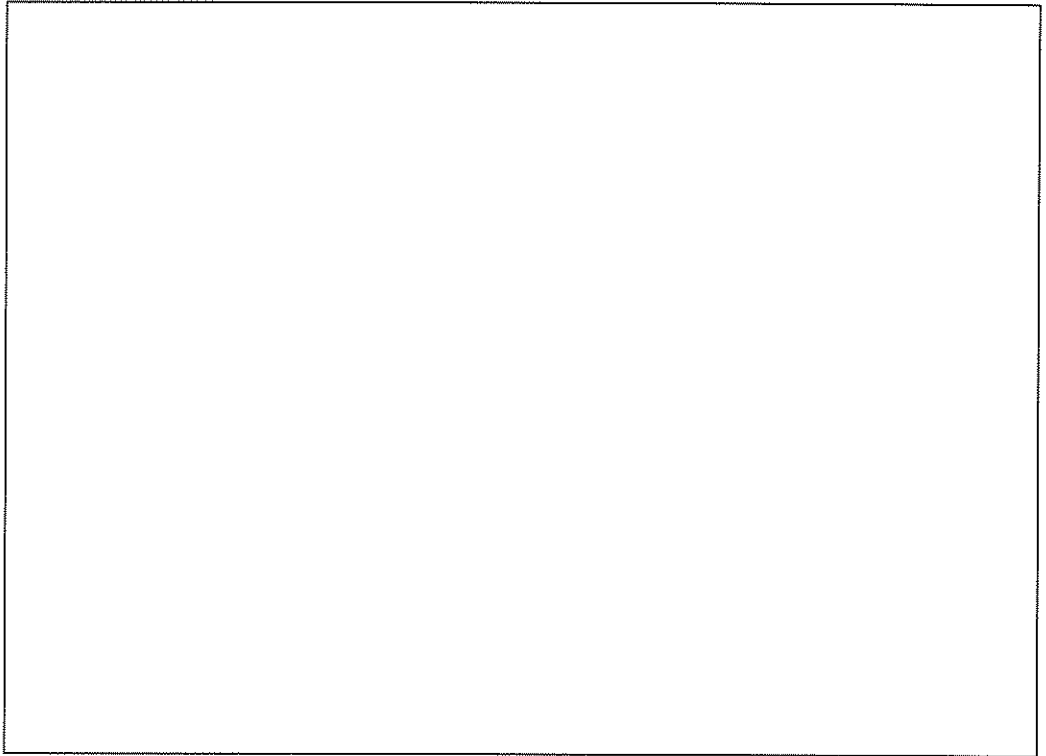
To enable dining room tables to be set neatly, it is necessary that serviette rings be made in such a way that they cannot roll or move easily.

So that costs can be kept to a minimum the chief designer has set a limit of 100 sq. centimetres on the amount of acrylic sheet that can be used to produce one serviette ring. The material from which the serviette rings are to be made is available in strips 20mm, 40mm and 60mm in width.

- 1. List four important design factors mentioned in the 'brief'.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
- 2. List three requirements for the material to be used in the project.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_

3. Draw a neat sketch of your design for the serviette ring in the space below.

4. Draw the pattern development of the serviette ring you have designed. Show dimensions on the development.



5. Briefly explain how your design satisfies the four design factors and three material requirements listed in questions 1 and 2.

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6. Make up your serviette ring and have it assessed by the chief designer.

# BUILDING BOARDS

1. Describe one effect that the introduction of particleboard in the early 1960's had on the cabinet making and joinery industries.

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2. The production of particleboard utilises:

- a. thinnings and trimmings from pine plantations.
- b. thinnings and trimmings from hardwood forests.
- c. whole pine trees cultivated specially for the production of particleboard.
- d. both 'a' and 'c' above.

3. Particleboard consists of wood flakes or chips:

- a. which are all uniform in size.
- b. of varying size distributed evenly throughout the sheet.
- c. compressed with the smaller flakes sandwiched between outer layers of coarse flakes.
- d. compressed with the coarse flakes sandwiched between outer layers of fine flakes.

4. Particleboard has no grain direction. How does this affect the strength and rigidity of the sheet?

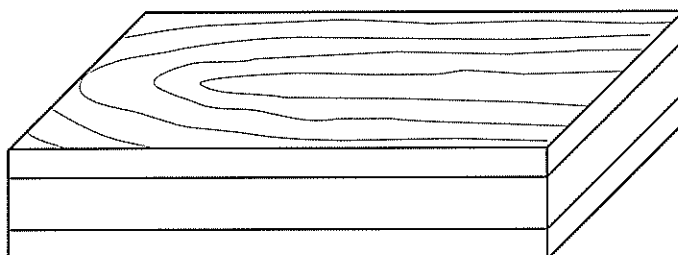
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5. The two most common methods of cutting veneer used in industry today are

\_\_\_\_\_ and \_\_\_\_\_

6. Neatly sketch the end grain of the three layers which make up the piece of plywood represented in the enlarged diagram below.



7. Briefly explain the reason why the layers in plywood should be assembled with the grain lying in the direction you have illustrated in question 6.

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8. Hardboard is manufactured from:

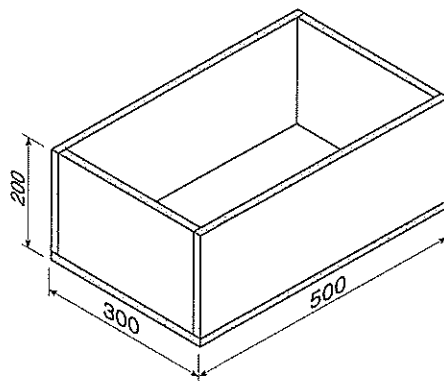
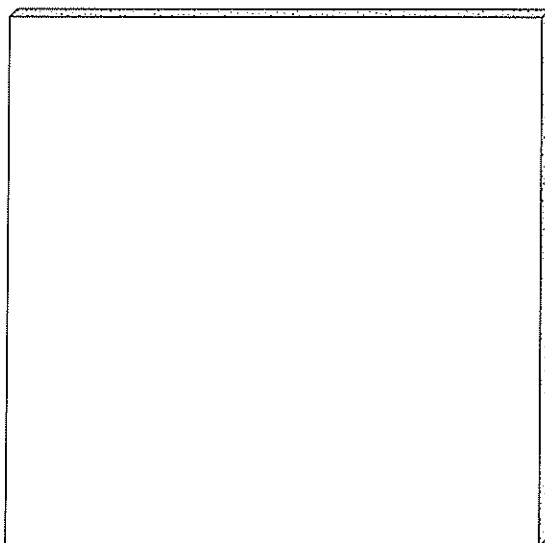
- a. pine chips which are compressed much harder than in particle board.
- b. a mixture of softwood and hardwood chips.
- c. hardwood chips processed mainly from eucalyptus.
- d. a fibrous substance left after sugar cane is crushed.

9. The fibrous texture of medium density fibreboard is:

- a. coarse and uniform throughout the sheet.
- b. a mixture of fine and coarse particles evenly distributed throughout the sheet.
- c. a mixture of fine and coarse particles unevenly distributed throughout the sheet.
- d. fine and fairly uniform throughout the sheet.

10. The pictorial drawing below shows a box made from 18mm particleboard.

- a. Determine the number and finished size of pieces required to construct the box, then complete the materials list below.
- b. Also shown below is a sketch of a sheet of 18mm particle board 700mm x 700mm drawn to a scale of 1/10. Using the same scale mark out on the sheet all pieces required to construct the box.



No.	Finished Size



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