2018. S54A

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination, 2018

Materials Technology (Wood)

Higher Level

Section A (40 marks)

Monday, 18 June
Afternoon, 2:00 - 4:00

Instructions

(a) *Write your **examination number** in the box provided and on all other pages used.*

(b) *This booklet **must** be handed up at the end of the examination.*

(c) *Answer any **sixteen** questions.*

(d) *All questions carry equal marks.*

(e) *Answer the questions in the spaces provided.*

Examination Number

Centre Number

1.	Total of end of page totals	
2.	Aggregate total of all disallowed question(s)	
3.	Total mark awarded (1 minus 2)	
4.	Bonus mark for answering through Irish (if applicable)	
5.	Total mark awarded if Irish Bonus (3+4)	

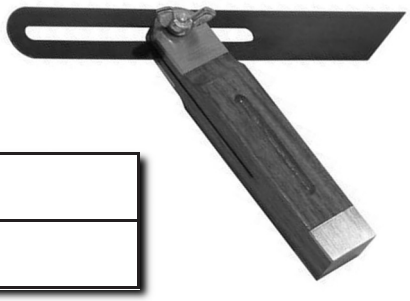
Note: The mark in row 3 (or row 5 if an Irish bonus is awarded) must equal the mark in the ***Grand Total*** box on the script.

Question	Marks	
Section A		
1		
2		
3		
4		
5A or 5B		
Total		
Irish Bonus		
Grand Total		

SECTION A - 40 MARKS

Answer any 16 questions from this Section. All questions carry equal marks.

1. (i) Name the tool shown.



NAME

(ii) Give **ONE** specific use for this tool.

USE

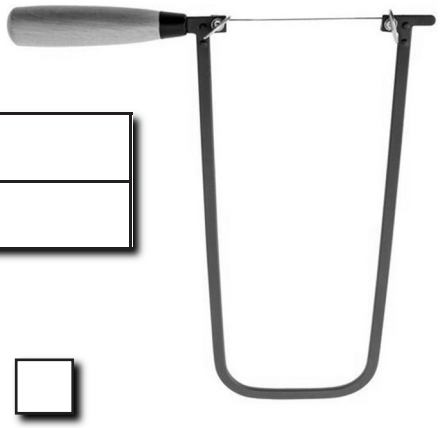
2. (i) Name the manufactured board shown.

NAME

(ii) State **ONE** advantage of using manufactured boards instead of solid wood.

ADVANTAGE

3. (i) The diagram shows a *Deep Throat Fret Saw*. Identify **ONE** advantage of using this saw instead of a *Coping Saw*.



ADVANTAGE

(ii) Use a tick **(✓)** to identify the force acting on the blade.

COMPRESSION ☐ **TENSION** ☐ **TORSION** ☐

4. (i) Name the power tool shown.

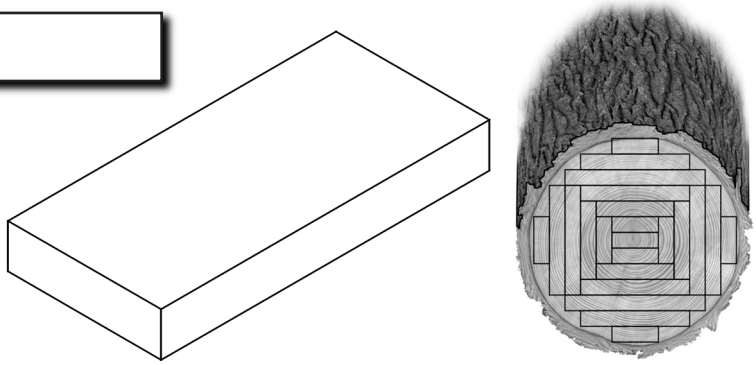
NAME

(ii) Give **ONE** specific use for this tool.

USE

5. (i) Name the method of timber conversion shown in the diagram on the right below.

NAME



(ii) On the block of wood, sketch the grain pattern that would be produced on **all three** faces when using this conversion method.

6. (i) Name the tool shown.

NAME

(ii) Give **ONE** advantage and **ONE** disadvantage of using this tool.

ADVANTAGE

DISADVANTAGE

7. (i) **CAD** is often used by students when designing MTW projects.

What do the letters **CAD** stand for?

C

A

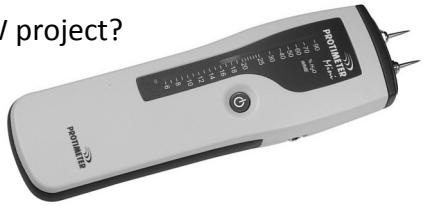
D

(ii) Give **ONE** advantage of using **CAD** instead of traditional drawing when designing projects.

ADVANTAGE

8. (i) Why is it necessary to season wood before using it in an MTW project?

REASON



(ii) The letters ***E.M.C.*** are associated with seasoning. What do the letters ***E.M.C.*** stand for?

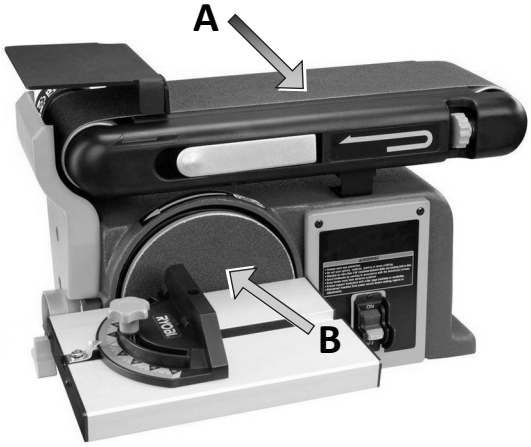
E **M** **C**

9. The diagram shows the leaves of five common Irish trees.
From the following list, identify each tree: ***Yew***, ***Alder***, ***Maple***, ***Ash***, ***Oak***.

10. (i) Name the woodworking machine shown.

NAME



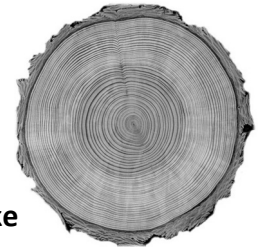
(ii) Two work areas, **A** and **B**, on the machine are shown. Describe the different work processes that would be carried out in each area.

Process A

Process B

11. The diagram on the left below shows the cross section of a tree with a ***'Shake'*** defect.
On the other two diagrams draw a ***'Cup Shake'*** and a ***'Heart Shake'***.

Cup Shake



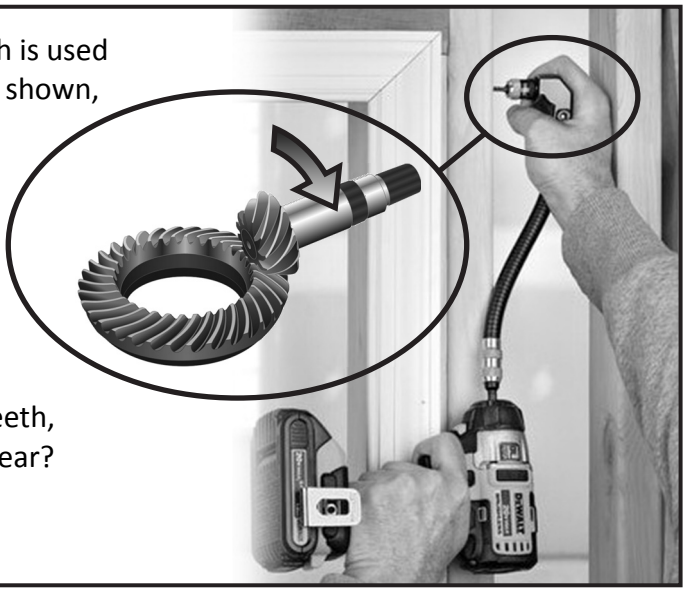
Heart Shake

12. The diagram shows a flexible ***'Angle Chuck'*** which is used when drilling in confined spaces. Bevel gears, as shown, are used in these chucks.

(i) If the smaller gear rotates clockwise as shown, use another arrow to clearly indicate the rotational direction of the larger gear.

(ii) The small gear has 10 teeth and rotates at a speed of 80 RPM. If the large gear has 50 teeth, calculate the rotational speed of the large gear?

SPEED **RPM**



13. The diagram shows wooden flooring which has been affected by *Dry Rot*.

List **THREE** conditions necessary for Dry Rot to develop.

1.

2.

3.

14. List **FIVE** specific safety precautions that must be observed when using a pillar drill in the MTW workshop.

1.

2.

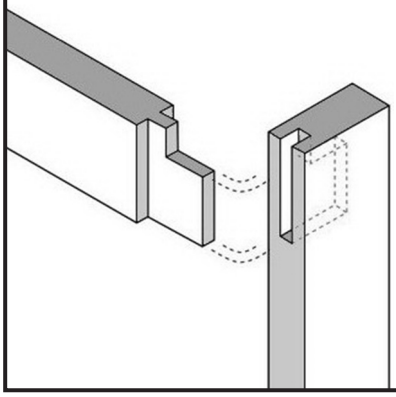
3.

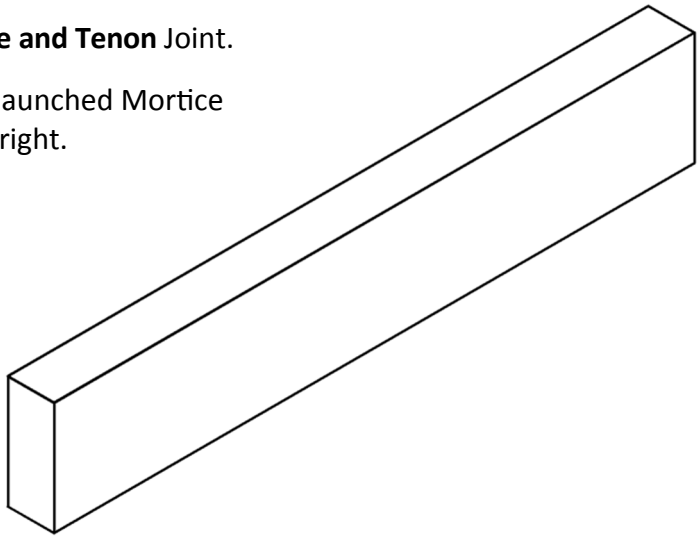
4.

5.

15. The graphic below shows a **Haunched Mortice and Tenon** Joint.

Sketch the ***marking out*** of both parts of the Haunched Mortice and Tenon joint on the piece of wood on the right.





16. *Anthocyanins* are chemical pigments that develop late in the growing season giving trees their rich autumnal red to purple appearance.

Name the chemical in leaves that makes trees look green in spring.

CHEMICAL

17. Name the **FIVE** woodworking tools shown.

1.	2.	3.	4.	5.

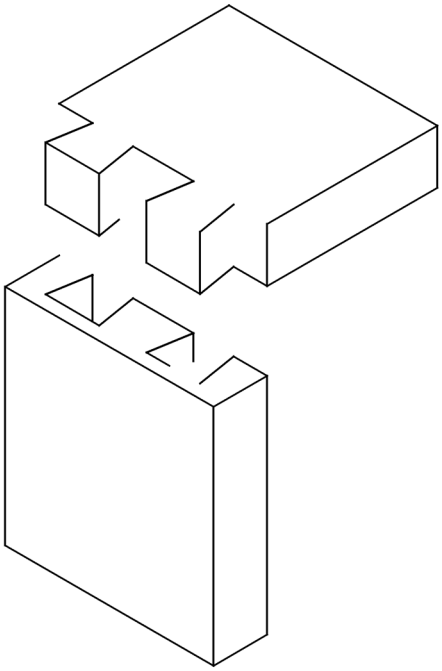
18. A combination of wood and metal is often used in the design of projects such as the lantern shown. Metals are divided into two main categories. Using a tick **(✓)** in the table below, identify whether the metal listed is **Ferrous** or **Non-Ferrous**.

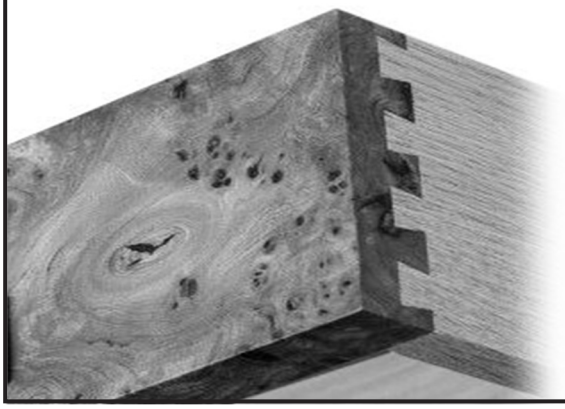
Metal	Ferrous	Non-Ferrous
Copper		
Cast Iron		
Zinc		
Brass		
Mild Steel		

19. The diagram on the right shows an incomplete exploded isometric sketch of a **Stopped Box Dovetail** joint commonly used in MTW projects.

(i) Complete the sketch of this joint.

(ii) Colour or shade the completed sketch.



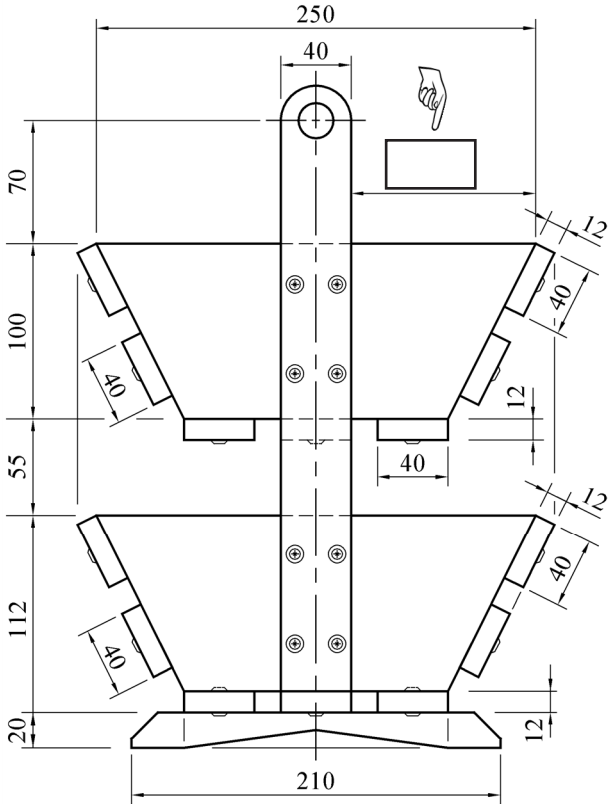


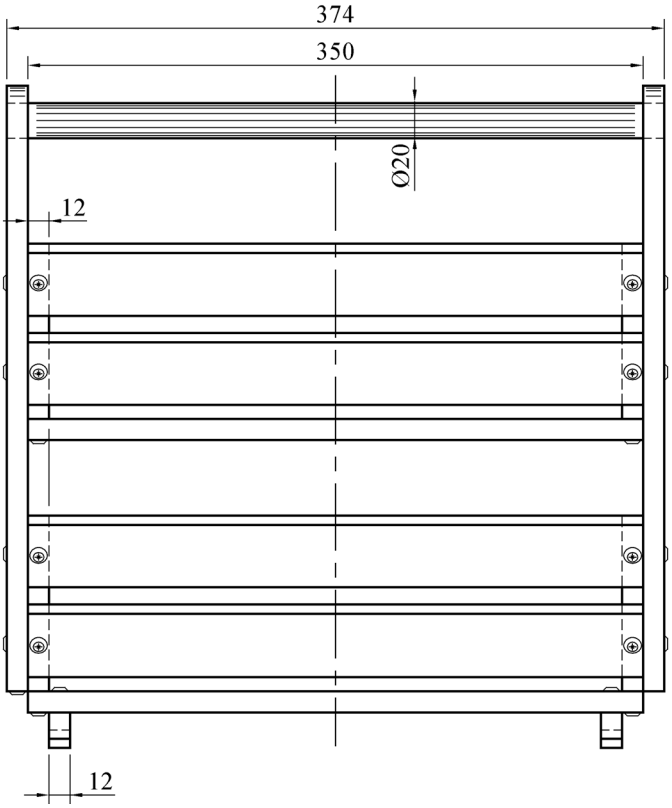
20. The image on the right shows a *Fruit & Veg Holder*.
A student modified the design to include a handle and supporting legs, as shown in the Elevation and End view below.

All of the pieces are joined together using brass screws and decorative screw cups as shown.
All material is 12mm thick.

(i) Complete the given cutting list in the table below.

(ii) Insert the missing dimension in the box indicated by the hand in the end view.

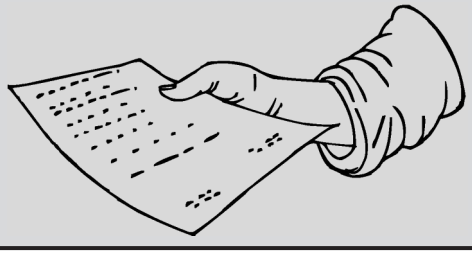




Description	Quantity	Length	Width	Thickness
Basket Ends	4	250		12
Horizontal Rails	14		40	12
Uprights	2		40	12
Supporting Legs	2	210	20	12
Dowel	1	374	Ø20	
Brass Screws	50		Ø4	
Screw Cups	50	Ø10		

This booklet must be handed up at the end of the examination.

Make sure your Examination Number is on the front page.



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2018. S54B

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination, 2018

Materials Technology (Wood)

Higher Level

Section B (60 marks)

Monday, 18 June
Afternoon, 2:00 - 4:00

Instructions

(a) *Answer **three** questions. All questions carry equal marks.*

(b) *You may answer either question 5A **or** question 5B but **not both** questions.*

(c) *Where sketches are required, they should be done freehand.*

(d) *Write your examination number on the answerbook and on all other pages used.*

(e) ***Question 1** from this section must be answered on drawing paper. All other questions should be answered on the answerbook supplied.*

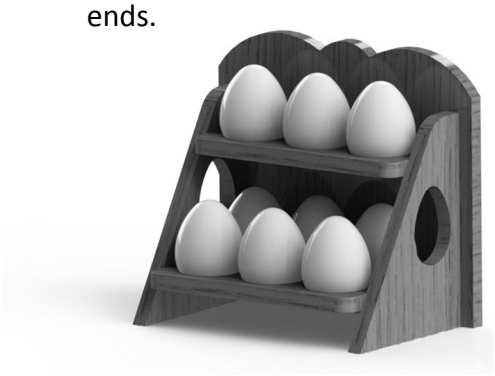
1. The diagrams show details of an egg stand. Construction details for the egg-shaped design on the two ends are also shown.

(i) Draw a full size **Elevation** of the egg stand in the direction of arrow **A** *(including hidden detail)*.

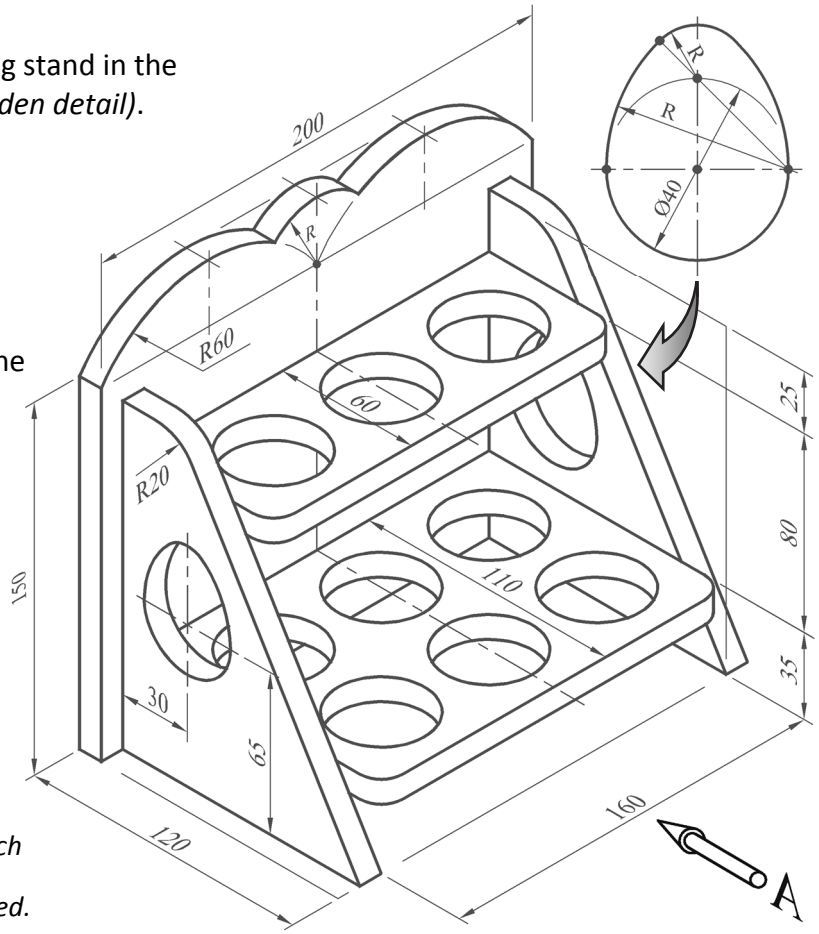
(ii) Project an **End view**.

(iii) Project a **Plan** from the elevation.

(iv) Using notes and a ***neat freehand sketch,*** suggest a suitable method of joining the shelves to the ends.



All material is 10mm thick. The nine circular holes for the eggs are 40mm in diameter and are equally spaced from each other and from the edges of the pieces. All fillets are 10mm unless otherwise stated.



2. (i) Two stages in a typical design process are **Research/Investigation** and **Working Drawings**.

Explain these **TWO** stages.

(ii) Corner shelving units are often used for display and storage in the home. They may be free standing or wall-mounted as shown in the images on the right.

Using notes and ***neat freehand sketches*** to communicate your ideas, design a new attractive **Corner Shelf Unit** with a minimum of **THREE** shelves.

(iii) Lighting is often used to enhance the items displayed on corner shelving. Using notes and a ***neat freehand sketch,*** show how you would incorporate suitable lighting into your unit.

(iv) Using notes and a ***neat freehand sketch,*** briefly describe **ONE** woodworking joint used in your proposed design.

3. The diagram shows a cross-section of a tree which is to be used as a cake display stand for a wedding.

(i) Draw a cross-section through a typical tree trunk and on your drawing label the following features: ***Bark***, ***Bast***, ***Cambium Layer***, ***Heartwood***, ***Sapwood***, ***Pith***, ***Medullary Rays*** *and* ***Annual Rings***.

(ii) Select any **FOUR** of the above features and give a brief description of **EACH** feature.

(iii) Trees are divided into two main groups, **hardwoods** and **softwoods**. Compare these two groups under **EACH** of the following headings: **Leaves**, **seeds**, **timber** and **suitable climate**. (Use examples where appropriate).

(iv) Food is manufactured in the leaves of a tree through a chemical reaction which requires a number of raw materials. What is the correct name for this **chemical reaction**? Name **THREE** of the raw materials necessary for this chemical reaction to take place.

4. (i) State the correct name for **EACH** of the power saws labelled **A**, **B, C** and **D**.

A

B

C

D

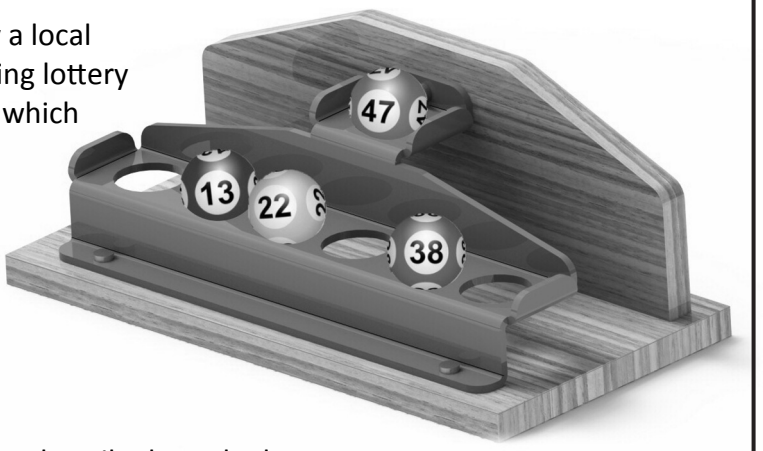
(ii) Draw a table to compare **EACH** of the above saws under the following headings: ***Saw Size, Saw Cut Type, Accuracy, Portability, Cutting Depth*** *and* ***Safety****.*

(iii) The saw labelled **D** above has many features which can be set by the user. With the aid of notes and ***neat freehand sketches***, identify and describe any **THREE** of these adjustment features.

(iv) The teeth on the blade of a saw are bent alternately to the left and to the right. Name this feature and with the aid of a ***sketch***, briefly explain why it is present in most saw types.

5. Answer 5A *or* 5B

5A. The diagram shows a display stand used by a local charity organisation for its weekly fundraising lottery draw. The stand is made from bent acrylic which is attached to a hardwood base and back.



(i) Using a ***neat freehand sketch,*** draw the surface development that would be marked out on an acrylic sheet in order to manufacture the plastic portion of the stand.
(You may estimate the dimensions.)

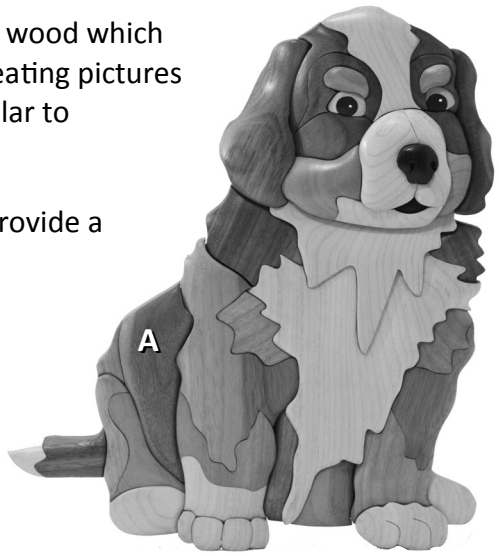
(ii) Using notes and ***neat freehand sketches***, describe how the large circular holes in the acrylic could be created.

(iii) With the aid of ***neat freehand sketches,*** describe how the acrylic sheet would be bent to a 90° angle, as shown.

(iv) The acrylic is to be attached to the wood using three *chrome capped screws* as shown. Using notes and ***neat freehand sketches***, describe the steps involved in this process.

OR

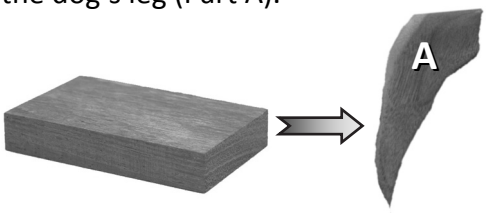
5B. The MTW project design on the right is made from pieces of wood which have been shaped and glued together. This technique of creating pictures from contrasting solid woods is known as **intarsia** and is similar to marquetry *(which uses thin veneers)*.



(i) Identify **FOUR** different woods which could be used to provide a contrast in colour and grain pattern as shown.
Briefly describe each wood.

(ii) Describe, using notes and ***neat freehand sketches***, how the design for the project is transferred from a sheet of paper to the individual pieces of wood to ensure that they fit together accurately.

(iii) The image on the right shows an enlarged view of part of the dog's leg (Part A). Describe, using notes and ***neat freehand sketches***, the various steps involved in cutting this piece from the rectangular block of wood shown.



(iv) The front edges of all of the wooden pieces are rounded to create a 3-D effect, enhancing the design. Describe, using notes and ***neat freehand sketches***, how this could be achieved.