COMPONENT 1

TIME ALLOWED - 1 hour 45 minutes

EQUIPMENT REQUIRED

Drawing and writing equipment, coloured pencils and a calculator

INSTRUCTIONS

You are to answer all questions.

This example examination paper can be duplicated and printed out if required but not edited in any way.

The links to www.technologystudent.com cannot be removed.
The PDF file can be stored on school / college systems and distributed electronically (NO EDITING ALLOWED)

PLEASE RESPECT THE COPYRIGHT - report infringers to techteacher@technologystudent.com
Not be distributed at courses or by course instructors / consultants
Section A - CORE

Answer all the questions in this section

1a. Materials are selected for the manufacture of products, usually because they exhibit suitable properties.
Complete the table below by adding a description and explain the material’s properties.
The first answer has been completed as an example of the layout of the table.

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>DESCRIPTION</th>
<th>PROPERTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEWTER CASTING</td>
<td>JELLEWERY</td>
<td>Pewter can be cast by at low temperatures, forming detailed shapes.</td>
</tr>
<tr>
<td>PINE WOOD - LAMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOOD TRAY</td>
<td>POLYETHYLENE TEREPTHALATE</td>
<td></td>
</tr>
</tbody>
</table>

HELPFUL LINK http://www.technologystudent.com/rmfish1/pine2.html

HELPFUL LINK http://www.technologystudent.com/joints/pet1.html
<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>DESCRIPTION</th>
<th>PROPERTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image](69x609 to 139x739)</td>
<td>ALUMINIUM DRINKS CAN</td>
<td>![Image](69x609 to 139x739)</td>
</tr>
<tr>
<td>![Image](61x427 to 94x479)</td>
<td>POSTER</td>
<td>![Image](69x609 to 139x739)</td>
</tr>
<tr>
<td>![Image](61x176 to 149x346)</td>
<td>NYLON</td>
<td>![Image](69x609 to 139x739)</td>
</tr>
</tbody>
</table>

HELPFUL LINK: http://www.technologystudent.com/despro2/prneff2.htm

HELPFUL LINK: http://www.technologystudent.com/joints/nonferrous1.html

HELPFUL LINK: http://www.technologystudent.com/joints_flsh/nylon1.html
1b. The manufacturer of the can, intend to use a label with thermochromic inks.

(I) How could thermochromic inks, applied to the label, improve the presentation of the can?  

(II) The manufacturers of the aluminium can intend to operate a close loop recycling system. What is this?  

---

HELPFUL LINK  http://www.technologystudent.com/prddes1/closeloop1.html
2. The photograph shows a modernist ‘plastic’ chair.

2a. Name a suitable material for the manufacture of this chair? In your answer explain the physical properties that make it suitable. 2 marks

2d. A scaled model of the chair has been manufactured and placed in a ‘model’ room. It stands inside the circle shown below. Calculate the area of the circle. Include your working out and formula. 3 marks

The circle has a radius of 100mm. What is the area of the circle?
2c. The modernist chair will be supplied with a textile cover manufactured from polyester. List two advantages of using polyester.  

2 marks

(i) 

(ii) 

2d. The chair is to be manufactured on a production line. What is a production line?  

2 marks
3a. The diagram below represents a type of force.

(I) Name the force. 1 mark

(I) Describe the force. 1 mark

3b. In terms of ‘moments of force, what is a state of equilibrium? 2 marks
3c. The diagram below shows a state of equilibrium. Using the formula below, prove that a state of equilibrium exists.  

**FORMULA:** CLOCKWISE MOMENTS = ANTI-CLOCKWISE MOMENTS

![Diagram showing a state of equilibrium with forces and distances labeled.]  

**3 marks**

3d. Companies manufacturing cars often work with a system called ‘Lean Manufacturing’. What is Lean Manufacturing?  

**4 marks**
**4a.** The object shown opposite is seen in many mechanical devices. What is its name? **1 mark**

**4b.** Calculate the Velocity Ratio (Gear Ratio) for the spur gears seen opposite. Include your working out. **4 marks**

**4c.** Opposite is an example of one way of illustrating a graph. What is this style of graph called? **1 mark**
The question is about alternative energy.

4d. A local wind farm produces 4 terawatt hours of electricity over a year. At the same time, a solar farm produced 0.5 terawatt hours of electrical power. What is the ratio - Wind farm : Solar Power ?  3 marks

WIND FARM : SOLAR POWER
4 : 0.5

EXPLANATION: __________________________

__________________________

__________________________

__________________________

__________________________

__________________________

HELPFUL LINK  http://www.technologystudent.com/energy1/wind8.htm

4e. Write three advantages of using wind power to produce electricity.  3 marks

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
5. The Illustrations show a solution for an aluminium remote control organiser.
5a. The remote control organiser needs to be improved to include the following specification points.

The remote controller must:
(i) Have a base that adds stability.
(ii) Be interlockable / stackable with other units of the same design.
(iii) The unit must be easy to pick up, with all the remotes in place.

Use notes and/or sketches to show how the remote control holder could be modified to satisfy the addition specification points, listed above.

Produce clear drawings / sketches, using the outline of the original design to show how a base can be added and the other specification points met.

6 marks
5b. The aluminium remote organiser must be available in a range of durable colours as shown below. This is achieved through an anodised finish.

SAMPLE ANODISED COLOUR FINISHES

In the space below explain / describe the anodising process.  4 marks
6a. Carefully study the ‘Thermo-cup’. This type of cup keeps a hot drink warm for a reasonable amount of time. The lid helps prevent spillage.

Write two reasons why stainless steel is a suitable material for the container.

4 marks

(I) _______________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

(II) _______________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________
6b. The pliers seen opposite has case hardened jaws.

Use notes and/or sketches to explain/describe the process of hardening and tempering.

Use clear sketches and notes in your answer.

4 marks
6c. The handles / levers of the pliers have been ergonomically designed to fit the hand, using anthropometric data.

What is anthropometrics?

2 marks
6d. The ‘container’ of the thermo-cup is mass manufactured from stainless steel sheet. In the space below, explain the manufacturing process. Use both notes and sketches. 

6 marks

The container is manufactured from stainless steel.

______________________________________________________________________________________________________________

______________________________________________________________________________________________________________

______________________________________________________________________________________________________________

______________________________________________________________________________________________________________

______________________________________________________________________________________________________________

______________________________________________________________________________________________________________
7. The diagram opposite shows a folding trolley. The handle can be adjusted to different heights and the steel shelf folds upright.

7a. Why is tube the most suitable section to be used in the manufacture of the trolley? 4 marks

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

7b. Why has small diameter of steel rod been used as a strengthening piece? 1 mark

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
7c. A student measures the dimensions (measurements) for the ‘round section’ handle of a machine vice, that he intends to manufacture. The student measures the radius of an existing handle and finds it to be 25mm.

What is the circumference of the handle?  
What is the area of the end of the handle?  

**FORMULA**

\[ \text{AREA} = \pi r^2 \]

\[ \pi \ (\text{pi}) = 3.14 \]

\[ \text{CIRCUMFERENCE} = 2 \times \pi \times r \]

\[ \pi \ (\text{pi}) = 3.14 \]
An hydraulic press is used to press shapes into sheet steel and also to cut out shapes. This is how the ‘shelf’ has been manufactured.

7d. The incomplete stages, showing/describing the manufacture of the sheet steel part, are outlined below.

Complete the notes and drawings. Add all the missing parts. **2 marks per stage (6 marks in total)**
8. The table shown below, has been manufactured from gilded metal and has a lacquered finish.

8a. Gilded metal is metal, that has been coated with a more precious metal, such as bronze or even silver and gold. Why has clear lacquer been applied as a finish?

2 marks
8b. The process called ‘electroplating’ has been used to apply a coating of the expensive metal to the cheaper base metal. What is electroplating? Use both notes and a sketch(s) in your answer.

7 marks
8c. Complete the table of ferrous and non-ferrous metals by adding two examples of each. **4 marks**

**FERROUS METALS - Metals that contain iron.**

**NON-FERROUS METALS - Metals that do not contain iron.**

<table>
<thead>
<tr>
<th>FERROUS METALS</th>
<th>NON-FERROUS METALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HELPFUL LINKS

http://www.technologystudent.com/joints/ferous1.html
http://www.technologystudent.com/joints/fermetal1.html
http://www.technologystudent.com/joints/nonferrous1.html

8d. Either a FERROUS or NON-FERROUS metal from your completed table. Describe a suitable practical application for your chosen metal and explain why each is suitable. **Total of 5 marks**

METAL: __________________________________________

PRACTICAL APPLICATION: __________________________________________

(1 mark)

WHY SUITABLE:

(4marks)
5. A design solution for a Charity Collection Box, for a charity called 'Be Active' is shown below. The charity aims to promote active life styles to all age groups.

- 100 % recycleable
- Lightweight
- Environmentally friendly material.
- Materials supplied from a certified sustainable source.
- Supplied in flat sheet form and folded to form the 3D version, when required.
5a. The charity collection box for the charity ‘Be Active’, needs to be improved to include the following specification points.

The charity collection box must:
(I) Have an appealing logo applied to the back, that reflects ‘be active’.
(I) Appeal to all age groups.
(iii) The unit must be easy to pick up and must have a simple handle.

Use notes and/or sketches to show how the collection box could be modified to satisfy the addition specification points, listed above

Produce clear drawings / sketches, using the outline of the original design to show how the additional specification points can be met.

6 marks
5b. The drawing below shows the packaging for perfumed products.

Explain why the materials identified on the diagram, are suitable for the packaging.

4 marks

MATERIAL:

EXPLANATION:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

MATERIAL:

EXPLANATION:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
6a. The free car park sign has been produced by the Design and Technology Department of a school, for an Open Evening.

Explain why a vinyl cutter is the most appropriate way of cutting the ‘vinyl lettering’.  

2 marks

6b. Drinks cartons such as those manufactured by Tetra Pak, are manufactured from laminated card. Why is this?  

2 marks
6c. The corrugated card charity collection box shown opposite, is manufactured from recycled card, processed into Corrugated card.

Corrugated board is supplied in different thicknesses.

On the diagram below, 4 thicknesses of corrugated card are shown. One has been labelled for you.

Add labels to the other three thicknesses.

3 marks

6d. Corrugated board can be recycled. In the space opposite, draw / sketch the recycling symbol that applies to corrugated board.

1 mark
6e. The graphics / colour and decoration is to be added to the packaging for perfumed products (question 5b). In the space below, name a suitable printing process, draw a labelled diagram to represent the process and add notes that explain the process. 

**Total of 8 marks**

**PROCESS NAME:** 

(1 mark)

**LABELLED DIAGRAM**

NOTES: (3 marks)
6f. The design team working on the packaging for a perfumed product, have decided to add the name of the product (in gold/silver lettering) through ‘Foil Blocking’. In the space below, explain the foil blocking process. Use notes and sketches in your answer.

**Total of 5 marks**

**LABELLED SKETCH (3 marks):**

**NOTES (2 marks):**

[Image of a perfumed product with lettering to be foil blocked]
A new lid has been designed for the packaging (see below). The packaging has been redesigned to suit this shape.

7a. Calculate the area of the material required for the lid, before it is cut to shape (the overall rectangle of material required, before it is cut to an L shape).  

7b. Calculate the area of the final L shaped lid.
8a. Manufacturers of the packaging are encouraged to source their materials from sustainable forests.

What is a sustainable forest and why are sustainable forests important? 3 marks

8b. The logo shown opposite is sometimes printed on timber and packaging. Explain the meaning of this logo. 3 marks
8c. A clear window has been added to the packaging for a perfumed product.

List one advantage of adding a window and one disadvantage. 2 marks

ADVANTAGE: ____________________________________________________________

DISADVANTAGE: ________________________________________________________

8d. The clear window is manufactured from BIOPOL. Describe / explain three reasons why this material is a good choice. 3 marks

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________
8e. In the space below, sketch a labelled diagram that represents the life cycle of Biopol.

4 marks
9a. Packaging has a variety of functions. Complete the table below by stating a function, followed by an explanation. The first row has been completed for you. **Total of 9 marks**

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>To protect a product from damage or contamination by micro-organisms and air, moisture and toxins.</td>
<td>Protected against being dropped, crushed, and the vibration it suffers during transport. Delicate products such as fruits need to be protected by a rigid package such as a laminated container. It must also be protected against micro-organisms, chemicals, soil and insects.</td>
</tr>
<tr>
<td>1 mark</td>
<td>2 marks</td>
</tr>
<tr>
<td>1 mark</td>
<td>2 marks</td>
</tr>
<tr>
<td>1 mark</td>
<td>2 marks</td>
</tr>
</tbody>
</table>
Manufactured from a food safe material. Free from chemicals such as BPA, PVC and Phthalates.

Clips hold the lid tightly shut and contents sealed in. Secure food storage.

Drop resistant, relatively unbreakable.

Integrated drinks container

Separate food compartments.

Personalised photographic lid, simple logo/symbol.

Recycling and Healthy Eating symbols.
5a. The Food Carrier, needs to be improved to include the following specification points.

The food carrier must:
(I) Have an ergonomically designed handle.
(I) Have an area that includes a logo, representing healthy eating.
(iii) The drinks container must be detachable, so that it can be used separately.

Use notes and/or sketches to show how the food carrier could be modified to satisfy the addition specification points, listed above

Produce clear drawings / sketches, using the outline of the original design to show how the additional specification points can be met.

6 marks
5b. Name a suitable material for the manufacture of the food carrier. 

1 mark

5c. The food carrier is manufactured through a process called Blow Moulding. Describe blow moulding. 3 marks

5d. In the space below, draw a labelled diagram that represents the Blow Moulding process. 4 marks
5e. Why is the material you named in question 5b, suitable for the manufacture of this food carrying product. **2 marks**


5f. Name another material that would be suitable for the food carrier and explain why it is suitable. **2 marks**

NAME:

WHY SUITABLE:


5g. in the space opposite, sketch the recycling symbol for material you named in question 5b. **2 marks**
6a. The lunch carrier has proved popular with young children, because it comes with the free gift of a model glider. The parts of the glider push out of a polystyrene sheet and fit together.

Name and describe the industrial process that is capable of producing the free gift. You must include notes and a sketch(s) in your answer.

6 marks

PROCESS NAME:

(1 Mark)

SKETCH

NOTES (Marks):

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
7a. The products seen below are manufactured from oxo-degradable polymers

(i) What are Oxo-degradable Polymers? 1 mark

(ii) Although oxo-degradable polymers decay over several months, when buried in soil, they are derived from crude oil. What is it that allows them to decay? 2 marks

(iii) Describe two products that are often manufactured from oxo-degradable polymers. 2 marks
8a. An engineering company has manufactured a ‘plastic / polymer’ cylinder. This is for a company that will machine the part for the automotive industry.

What is the volume of the cylinder?

5 marks

**FORMULA**

\[ V = \pi r^2 h \]

volume = \( \pi \times \text{radius}^2 \times \text{height} \)

\( \pi (\pi) = 3.14 \)
9a. The food container seen opposite, is manufactured from polyethylene terephthalate, pet, pete, (polyester).

Write two reasons why this material is suitable for the food container. **Total of 4 marks**

(i) __________________________________________________________________________

(ii) __________________________________________________________________________

(iii) List two other products that are manufactured from polyethylene terephthalate. **2 marks**

(iv) Name and describe the process used to manufacture the food container. **2 marks**

______________________________________________________________________________

______________________________________________________________________________
9b. Produce a labelled sketch(s) that represents the manufacturing process you named and describe in the previous question (5k (iv))  

3 marks

9c. The food container undergoes Quality Control and Quality Assurance during the manufacturing process. What is the difference between Quality Control and Quality Assurance?  

4 marks
10. Describe how ‘polymers’ can significantly contribute to the sustainability of our use of materials.  

**9 marks**
An engineer has designed a barrier system for a roller coaster. The specification drawn up by the client says - “As a carriage approaches the platform, it breaks a light beam and the barrier is lowered, stopping excited and unruly riders getting too close to the stopping carriages.

The engineer has decided to use a PIC microcontroller, to control the motor that raises and lowers the barrier. The student uses outputs 1 and 2 to control the motor. Output 1 will turn the motor on and off. Output 2 changes the direction of the motor.
5a. The circuit, needs to be improved to include the following specification points.

The circuit must:
(I) The relay must have diode protection.
(I) The motor must lift and lower the barrier.
(iii) The circuit must have a simple on/off switch, that can be used in event of an accident / emergency situation.

Use notes and/or sketches to show how the circuit could be modified to satisfy the addition specification points, listed above

Produce clear drawings / sketches, using the outline of the original design to show how the additional specification points can be met.

6 marks
5b. Photovoltaics is a form of solar power. Explain, in simple terms, how a photovoltaic panel works.  

2 marks

HELPFUL LINK  http://www.technologystudent.com/energy1/solar5.htm

5c. Describe two practical applications of solar power.  

2 marks

HELPFUL LINK  http://www.technologystudent.com/energy1/solar6.htm
6a. The breadboard shown opposite is used to test circuits. Describe one advantage of using a breadboard.  

2 marks

http://www.technologystudent.com/elec1/bread1.htm

6b. Software can be used to design a circuit and then to simulate the circuit working. What are the advantages of using software to simulate circuits in operation?  

2 marks

http://www.technologystudent.com/pics/picgen1.html
The product seen opposite, is a warning light system, composed of a ‘plastic’ casing and an electronic circuit.

When the switch is ‘on’, the LEDs flash.

6c. What thermoplastic material, is most suitable for the manufacture of the casing? 1 mark

6d. What is the name of the process, that results in the base being manufactured? 1 mark

6e. The mould for the casing is seen opposite. How is the mould finished, to ensure that it can be removed from the moulded ‘plastic’, after vacuum forming? 2 marks
6f. In the space below, explain the stages involved in the vacuum forming process, of the casing of the warning light. Use both labelled sketches and notes in your answer. 

8 marks

<table>
<thead>
<tr>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SKETCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
7a. Sliding doors have electromechanical systems to enable them to work. The two doors are shown below. Add to the drawing, a suitable mechanical system, that would allow the doors to be opened and closed, in the event of an electronic / electrical failure. Add explanatory notes and labels.  

**5 marks**
7b. The sliding doors are to be updated again, so that they work automatically, through a system of pulleys (shown in the diagram below).

![Diagram of pulley system](http://www.technologystudent.com/gears1/pulley3.htm)

(i) Calculate the Velocity Ratio of the pulley system. Include all your working out

2 marks

(ii). Calculate the RPM of pulley ‘B’. Include all your working out.

3 marks
8a. Industrial wave soldering is a process, whereby circuit boards and their components, are soldered on a mass production line. This is the way thousands of circuits are manufactured.

Using the table below, explain each of the stages in the wave soldering process, adding notes and diagrams / sketches. The first stage has been completed for you.

**6 marks**

<table>
<thead>
<tr>
<th>NOTES / EXPLANATION</th>
<th>DIAGRAM / SKETCH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APPLICATION OF FLUX</strong></td>
<td><img src="http://www.technologystudent.com/pcb/wave1.html" alt="Mist of flux sprayed by flux applicator." /></td>
</tr>
<tr>
<td><em>The first stage is the application of flux. This is a substance that helps keep the circuit board clean, by preventing oxidisation, during the heating process. The flux is sprayed in the form of a fine mist, onto the underneath of the board, covering the tracks and exposed ‘pins’ of the components.</em></td>
<td></td>
</tr>
<tr>
<td><strong>HEATING OF THE CIRCUIT BOARD</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>THE WAVE SOLDERING TANK</strong></td>
<td></td>
</tr>
</tbody>
</table>
8b. The two graphs shown below, visually represent signals. Name each of the graphs with the correct type of signal. 2 marks

SIGNAL: ________________________________

VOLUME

TIME

SIGNAL: ________________________________

VOLTS

TIME

8c. A range of wind-up rechargeable devices exist, such as the torch seen opposite. Give three advantages of modern rechargeable torches. 3 marks

---

---

---

---

---

---
9a. The carriage of a roller coaster seen below is at the top of an incline. At any point it could roll downwards, gathering speed. What is potential energy?

(I) Potential energy is (1 mark):

(II) What is Kinetic Energy (1 mark)?

(iii). The carriage at the bottom of the roller coaster incline has a special gear system. On the diagram, the gear system is marked A and B. What are the correct names for parts A and B?

PART A:________________________________ 1 mark

PART B:________________________________ 1 mark
10. Environmental damage, pollution and climate change, are serious global problems, affecting everyone. Discuss some of the problems we face and potential solutions. 9 marks
5. The drawing below shows the basic solution to a children’s trolley, which stores building blocks.

The trolley has a fixed handle, that is permanently in one position. The corners of the storage unit are ‘pinned and glued’, for speed of manufacture. The handle is plain, being manufactured from dowel. The trolley is spray painted in a variety of colours.
5a. The children’s trolley, needs to be improved to include the following specification points.

The trolley must:
(I) Have an ergonomically designed handle.
(I) The handle must fold flat, so that the trolley can be stored, saving space.
(iii) The corner joints of the storage unit, need to be upgraded so that they are strong and can withstand ‘knocks’.

Use notes and/or sketches to show how the children’s trolley could be modified to satisfy the addition specification points, listed above

Produce clear drawings / sketches, using the outline of the original design to show how the additional specification points can be met.

6 marks
5b. The recycling bin shown opposite is suitable for a kitchen. It has three separate storage bins, for different materials.

Describe TWO other ways in which this design meets the design requirements for a recycle bin.

4 marks

(I) 

(II)
5c. The modern recycling bin seen below, is manufactured from MDF or PLYWOOD. Old plastic shopping bags can be ‘hung’ inside each compartment on hooks. There is a central compartment for used shopping bags. It is delivered to the customer as a flat pack and can be assembled within ten minutes. It rests on casters for ease of movement. As it is wood based and can be recycled at the end of its useful working life.

(I) Explain why a ‘template’ is useful when manufacturing a number of these bins. 
2 marks

(I) Explain why a fretsaw or bandsaw could be useful when cutting the sides of the bin.
2 marks
5d. The panels / sides of the bin are to be painted, producing a high quality finish.

(I) Using notes and sketches, describe the stages involved in preparing the surface of the ‘wood’ panels / sides and the application of a quality paint finish.  
4 marks

(II) Why is the use of water based paints more environmentally friendly, than using oil / solvent based paints?  
2 marks
6a. A retailer has ordered a large number of the ‘wood’ based recycle bins. It has been decided to manufacture the bins using CAM, such as the CNC Router seen below. To start with, the sides are drawn using CAD software.

(I) Describe 6 advantages of using CAD and CAM in the manufacture of large numbers of this design of bin. 6 marks
7a. The table below has been permanently fixed together using plain mortise and tenon joints, as seen opposite.

The table has been found to be weak. Name and produce a labelled sketch, of a more sophisticated mortise and tenon joint, that is likely to strengthen the table.

5 marks
The plain table top is to be modified. A rectangular acrylic window is to be added. The top is now composed of two rectangular pieces, accurately cut to size on a CNC router. They fit perfectly together.

7b. Calculate the total area of piece A, before ‘B’ is removed  

7c. Calculate the area of piece B.  

7d. Calculate the area of A, after ‘B’ is removed.
7e. European Beech has been selected for the manufacture of the table. Explain why this is a good choice.  

7f. Name another natural wood that would be suitable for the manufacture of the table. Explain why you consider it to be suitable.  

NAME:

WHY SUITABLE:
8. The products shown below have been manufactured from flexi-ply.

![MP3 Station](image1.png) ![Rocking Chair](image2.png) ![Bookcase](image3.png)

(I) Why is flexi-ply a suitable material for these shapes / forms of products?  

(II) Another way of producing curves in woods is to use layers of veneers / plywood and to ‘steam bend’. Describe the process called ‘steam bending’.  

9. Describe how natural wood can significantly contribute to the sustainability of our use of materials.  **9 marks**
ADD YOUR OWN TEXTILES
SPECIFIC EXAMINATION
QUESTIONS