DESIGN AND TECHNOLOGY - GCSE SAMPLE PAPER 1

COMPONENT 1

Candidate Name	Centre Number					Candidate Number				

TIME ALLOWED - 2 HOURS

USE THE INSERT PROVIDED HALF WAY THROUGH THIS BOOKLET

EQUIPMENT REQUIRED

Drawing and writing equipment, coloured pencils and a calculator

INSTRUCTIONS

Write in black ink not pencil.

Answer all the questions.

Use the insert for when answering questions from Section B

Include all working out

TOTAL MARKS FOR THIS PAPER IS 100

SECTION A
Answer all the questions

HELPFUL LINK http://www.technologystudent.com/rmflsh1/alevq2.html

1. The photograph shows a modernist 'plastic' chair.

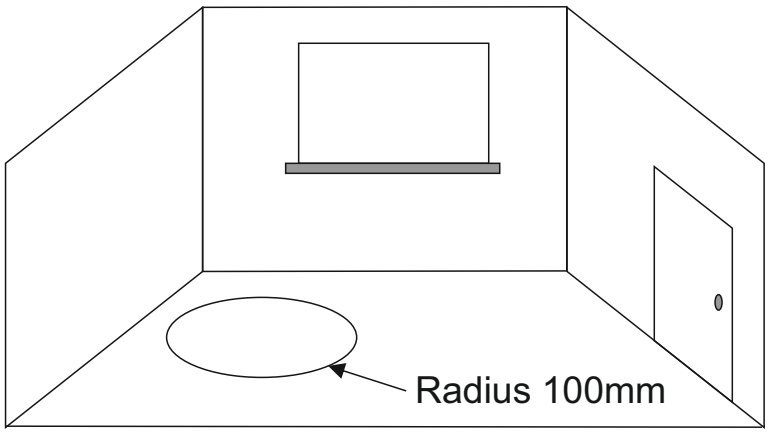
1a. Name a suitable material for the manufacture of this chair? In your answer explain the physical properties that make it suitable. ***3 marks***

1b. Name and describe a manufacturing process that would be suitable for the industrial production of the chair. ***3 mark***

1c. In the space below, sketch the process you have described, adding labels.
4 marks

1d. 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. ***2 marks***

The circle has a radius of 100mm. What is the area of the circle?

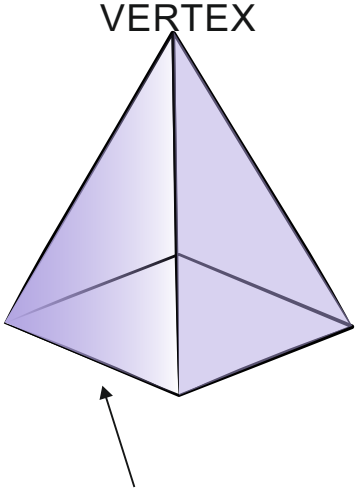


HELPFUL LINK http://www.technologystudent.com/prddes1/kite1.html

1e. Designers must consider health and safety when designing a product, such as a chair. Health and Safety in the UK is monitored by the British Standards Institute. What is the Kite Mark? ***2 marks***

HELPFUL LINK http://www.technologystudent.com/prddes1/repair1.html

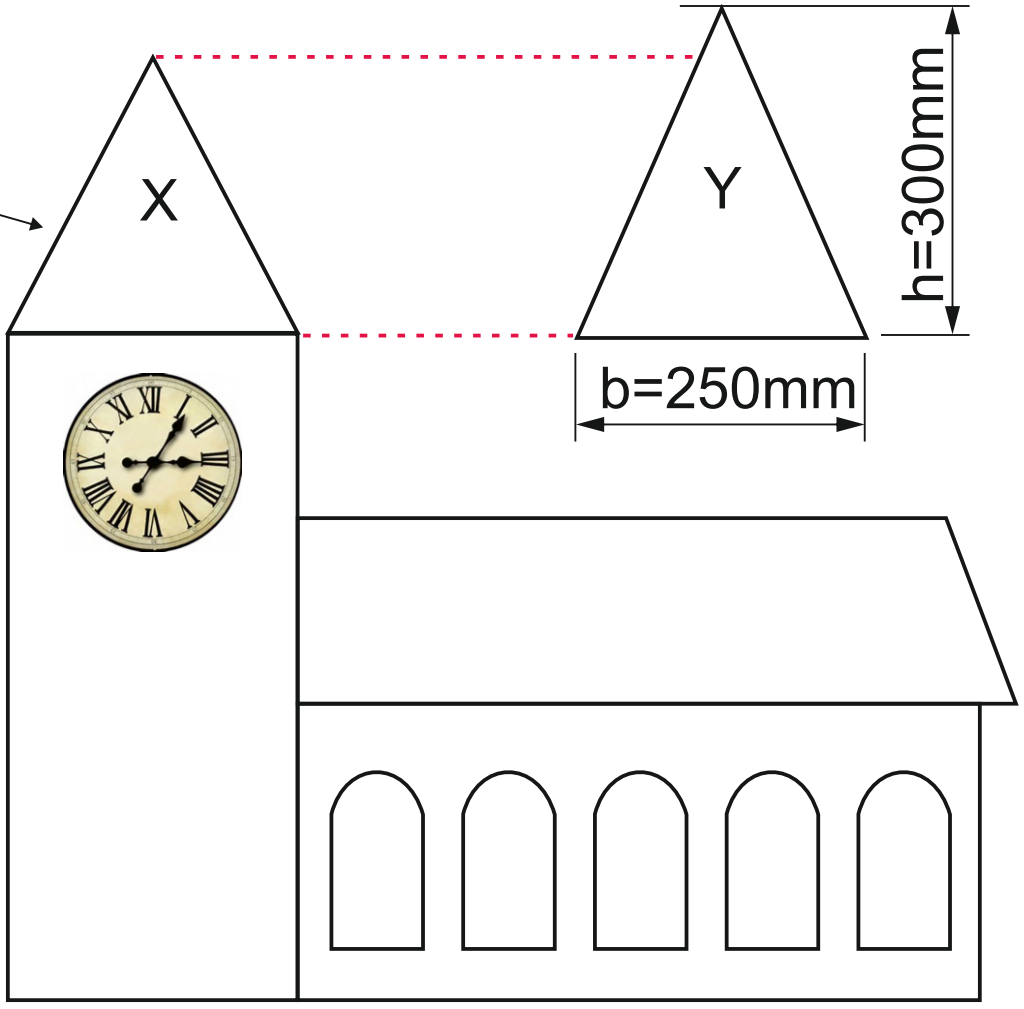
1f. The chair has been designed to be repairable. What are the advantages of a product that can be repaired? ***8 marks***



Below is a model a typical village church.

The roof of the tower is a square pyramid.

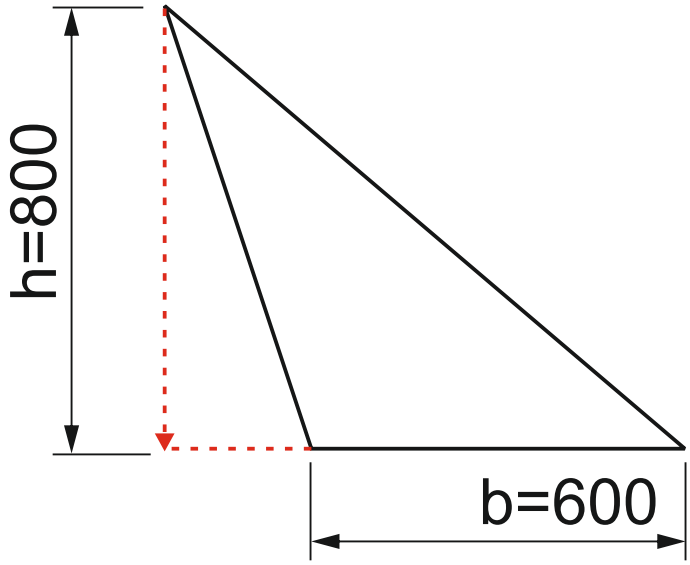
2a. What is the area of **one side** of the square pyramid?
4 marks



AREA = 1/2 X BASE X HEIGHT

2b. The labels X and Y represent the same part, one side of the square pyramid. Why does Y appear taller than X ? ***2 marks***

2c. A piece of waste material is left over, from making the model. What is the area of the waste? ***4 marks***



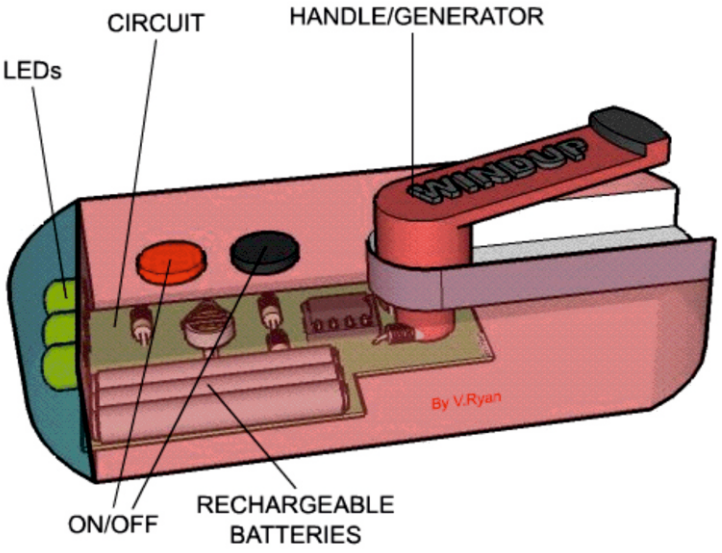
2d. Standard components are often used in the manufacture of products. What is a standard component? ***2 marks***

HELPFUL LINK http://www.technologystudent.com/prddes1/standard2.html

2e. What are the advantages of using standard components, when manufacturing a product. Include an example of a product that includes standard components.
4 marks

HELPFUL LINK http://www.technologystudent.com/pics/intputs1.htm

3. A 'wind-up' torch is shown below. The casing holds a circuit, that includes a range of electronic components, such as those displayed in the table on this sheet.



3a. Using a tick or a cross, identify each of the components, as either an 'input' or an 'output'. ***4 marks***

COMPONENT	INPUT	OUTPUT
TOGGLE SWITCH 		
SPEAKER 		
MICRO-SWITCH 		
THERMISTOR 		

3b. Compared to conventional torches (those that need batteries), what are the advantages of the 'wind-up' version? ***4 marks***

HELPFUL LINK http://www.technologystudent.com/pdf14/ratios1.pdf Page 12

The question is about alternative energy.

3c. 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

3d. Write two **advantages** of using wind power to produce electricity. ***2 marks***

3e. Write two **disadvantages** of using wind power to produce electricity. ***2 marks***

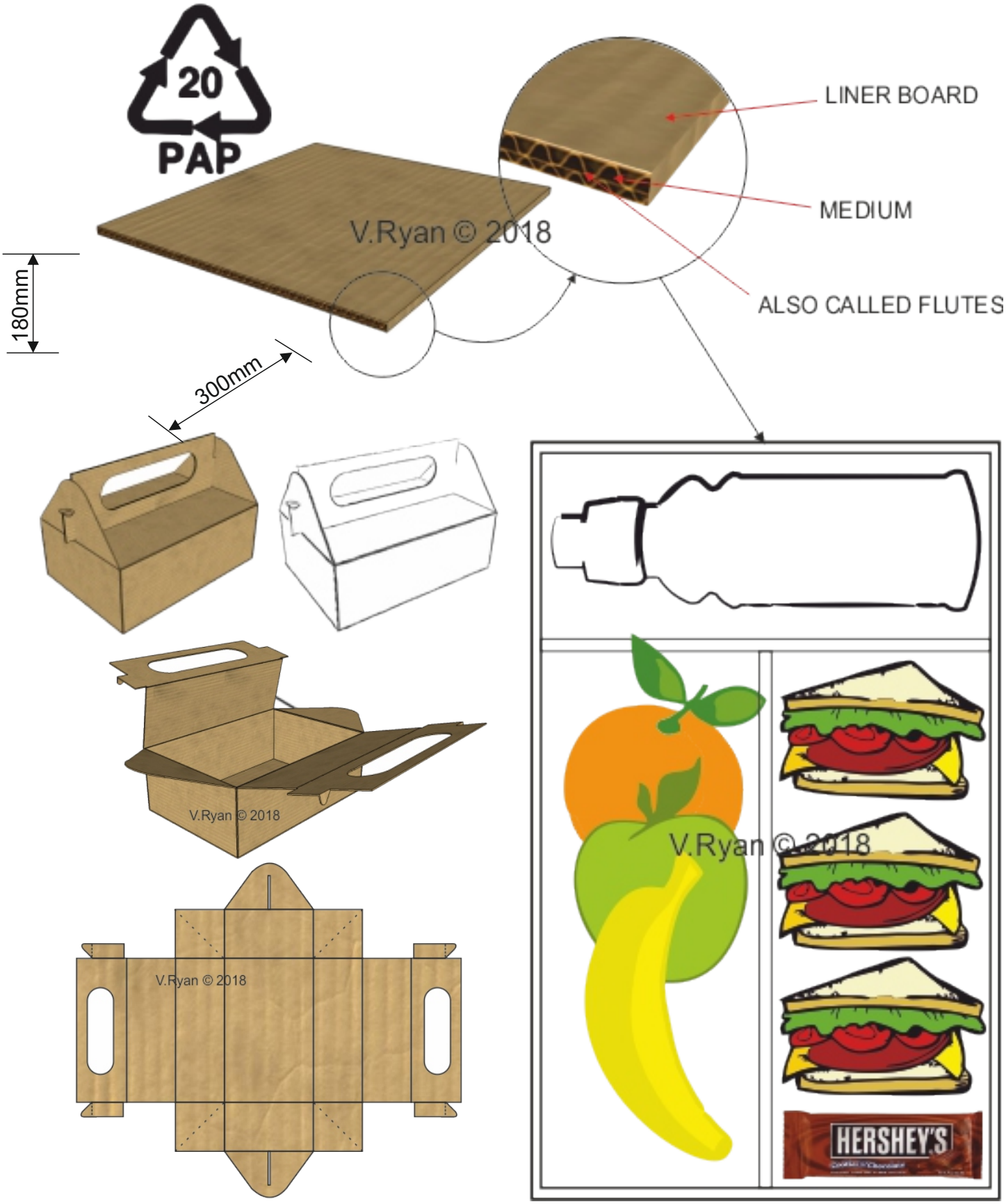
HELPFUL LINK http://www.technologystudent.com/prddes1/carenviron5.html

3f. Some car manufacturers regard the use of **carbon neutral** energy sources (alternative energy) as being important. Describe an example of this approach. ***2 marks***

PRODUCT INSERTS

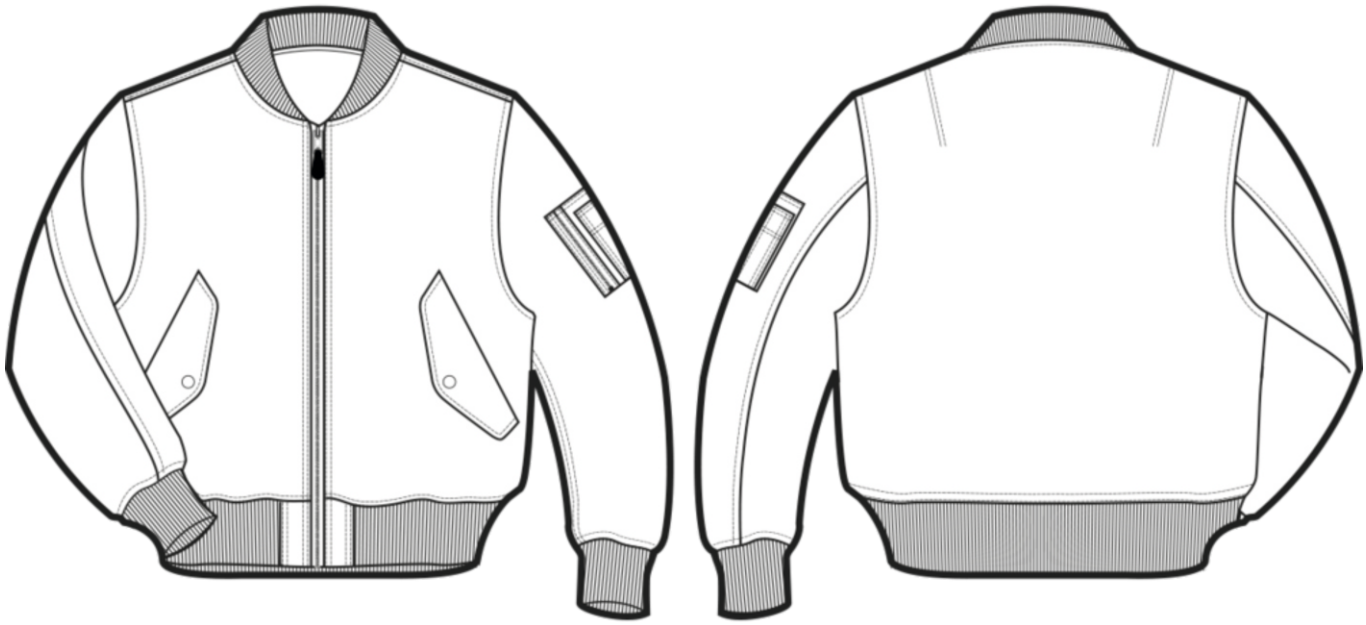
Page 1

Product 1 - Disposable Food Carrier (papers and boards)



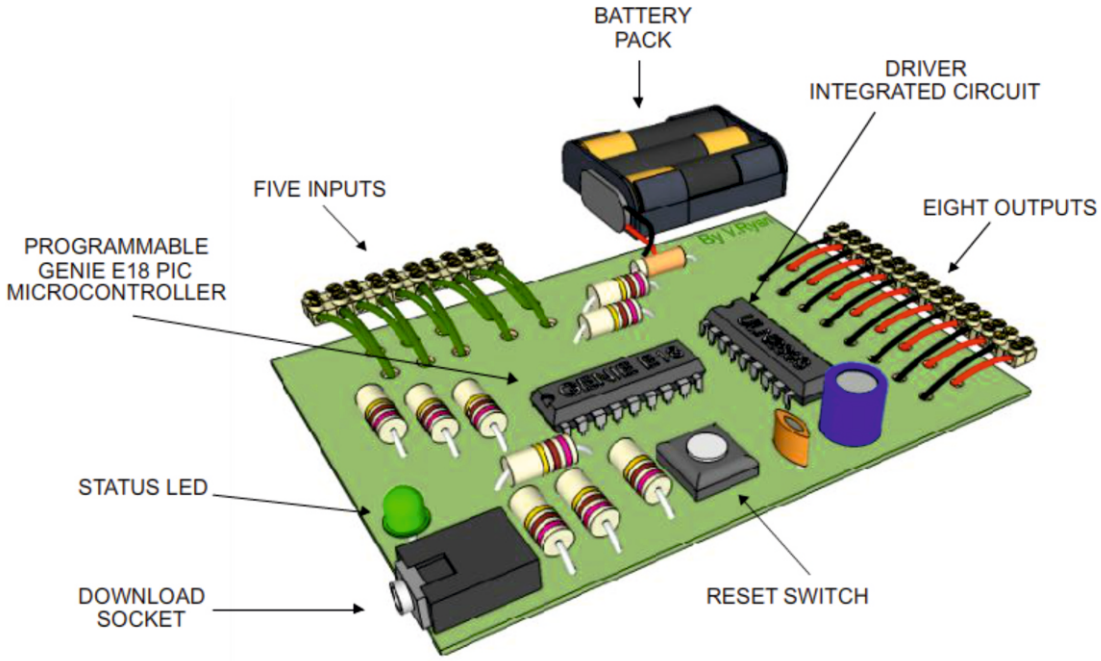
The food carrier is manufactured through mass production. It has been designed to be recycled and to be sturdy, capable of withstanding drops and knocks. It has internal compartments.

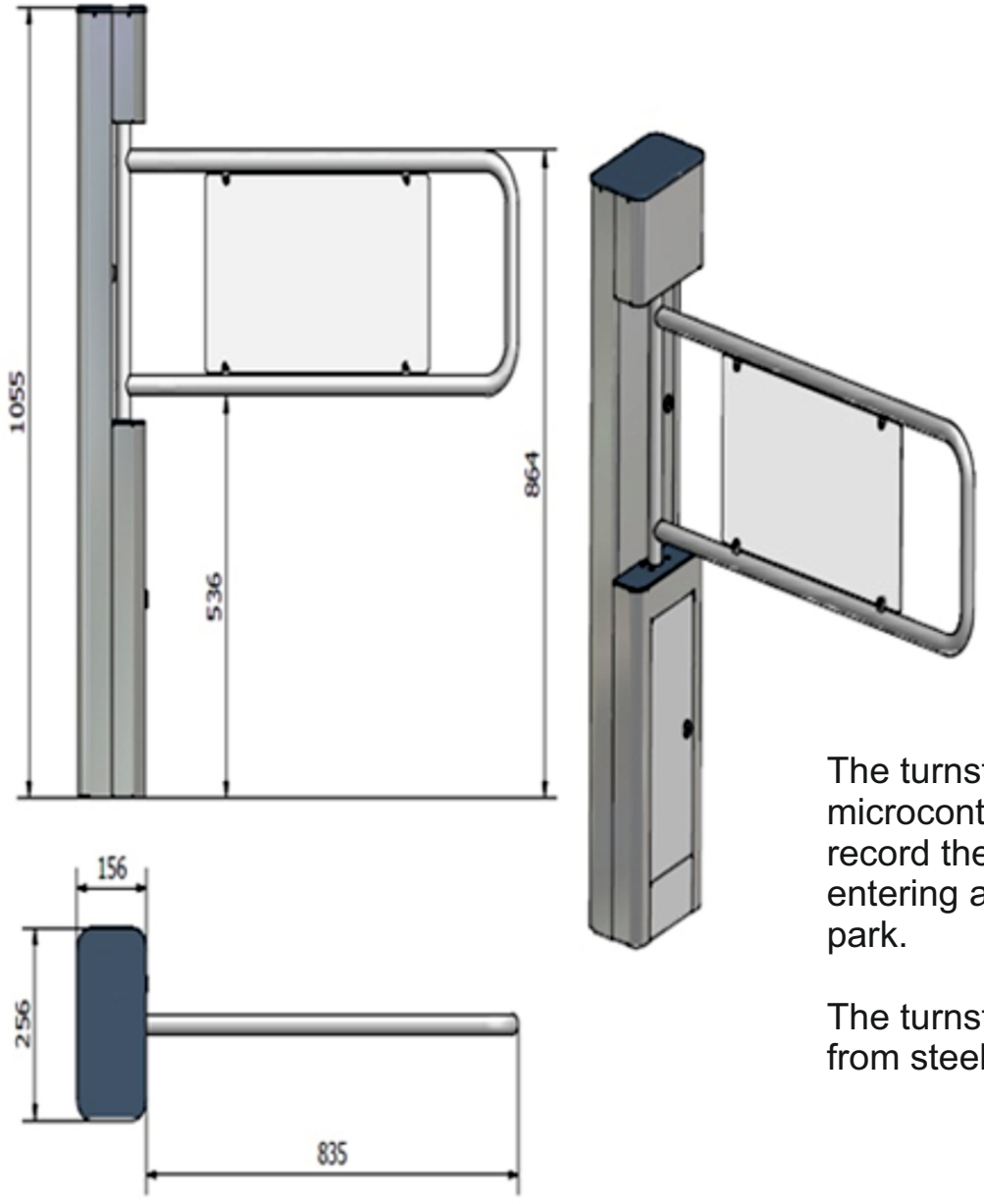
Product 2 - TEXTILES - Classic Insulated Unisex Jacket



A classic insulated unisex jacket, for winter. The waist and cuffs are to be elasticated. Available in a range of sizes and colours. Suitable for everyday wear.

Product 3 – Turnstile (design engineering)

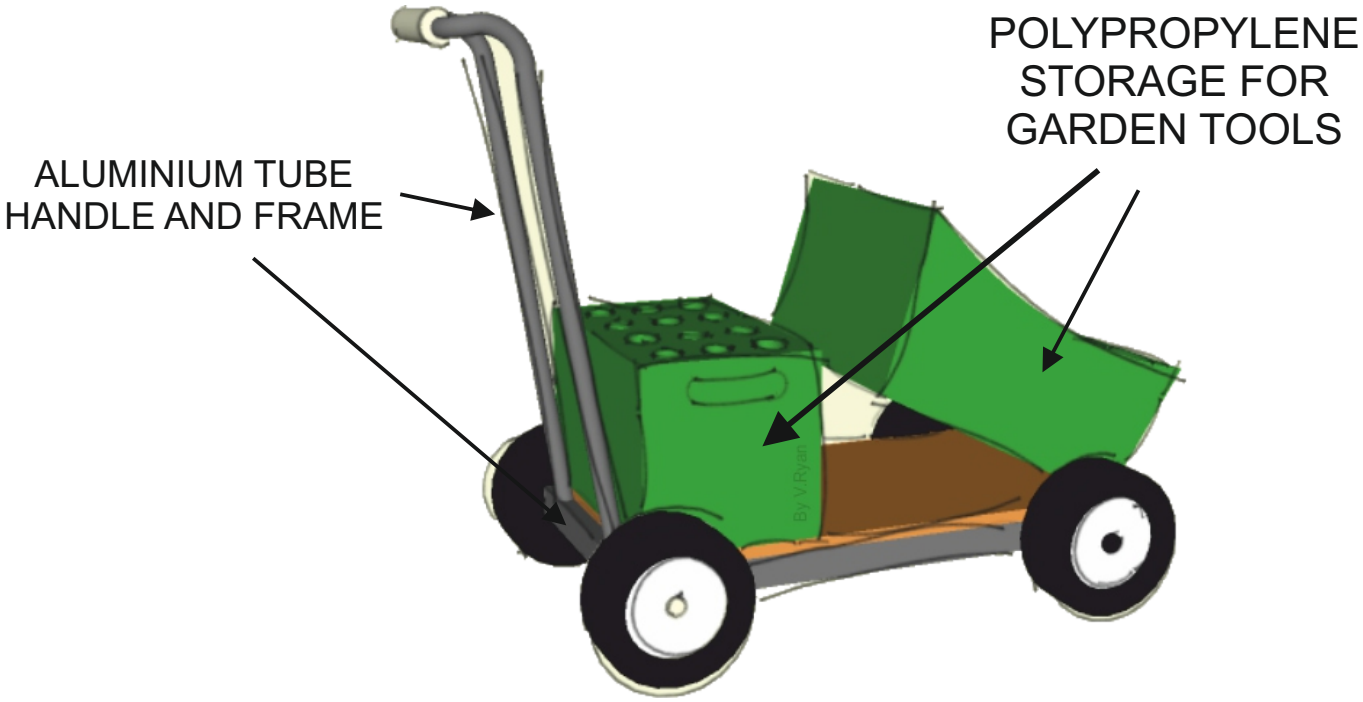


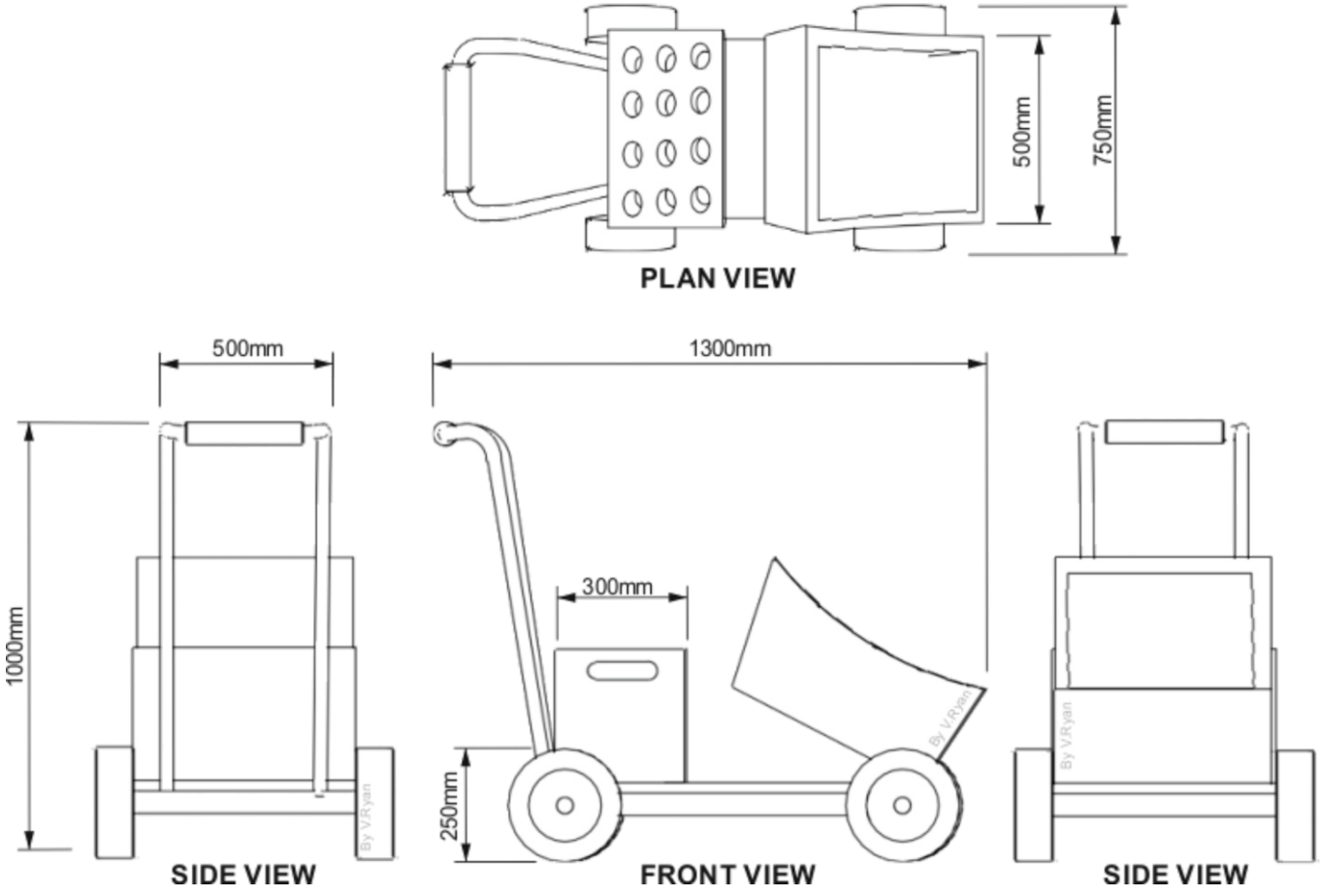


The turnstile is connected to a microcontroller, which helps record the number of people entering and exiting the theme park.

The turnstile is manufactured from steel tube.

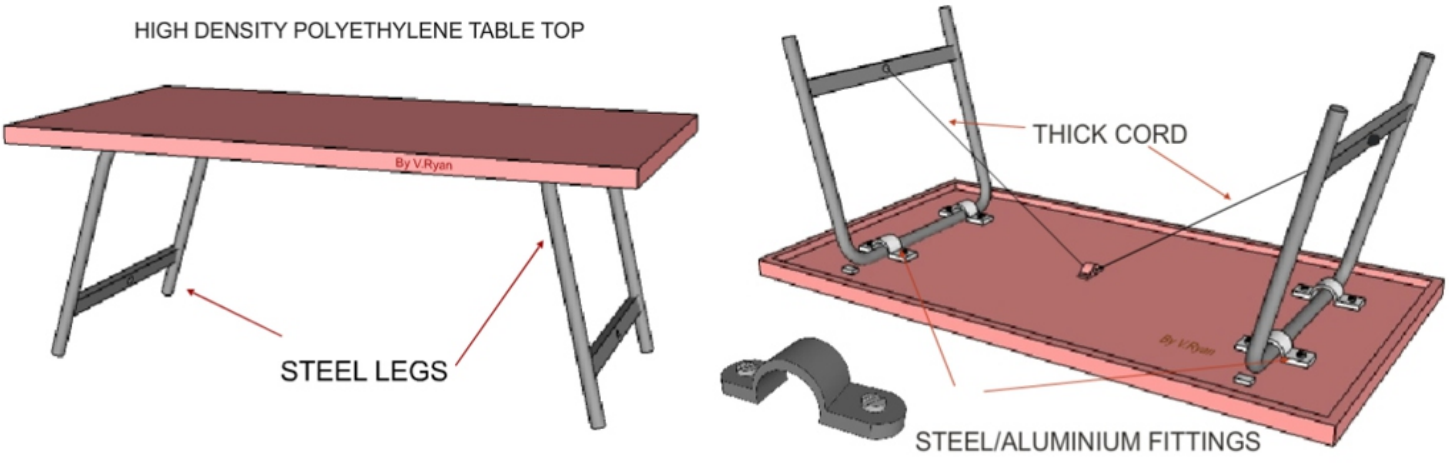
Product 4 - Transportable Storage for Garden Tools (polymers)

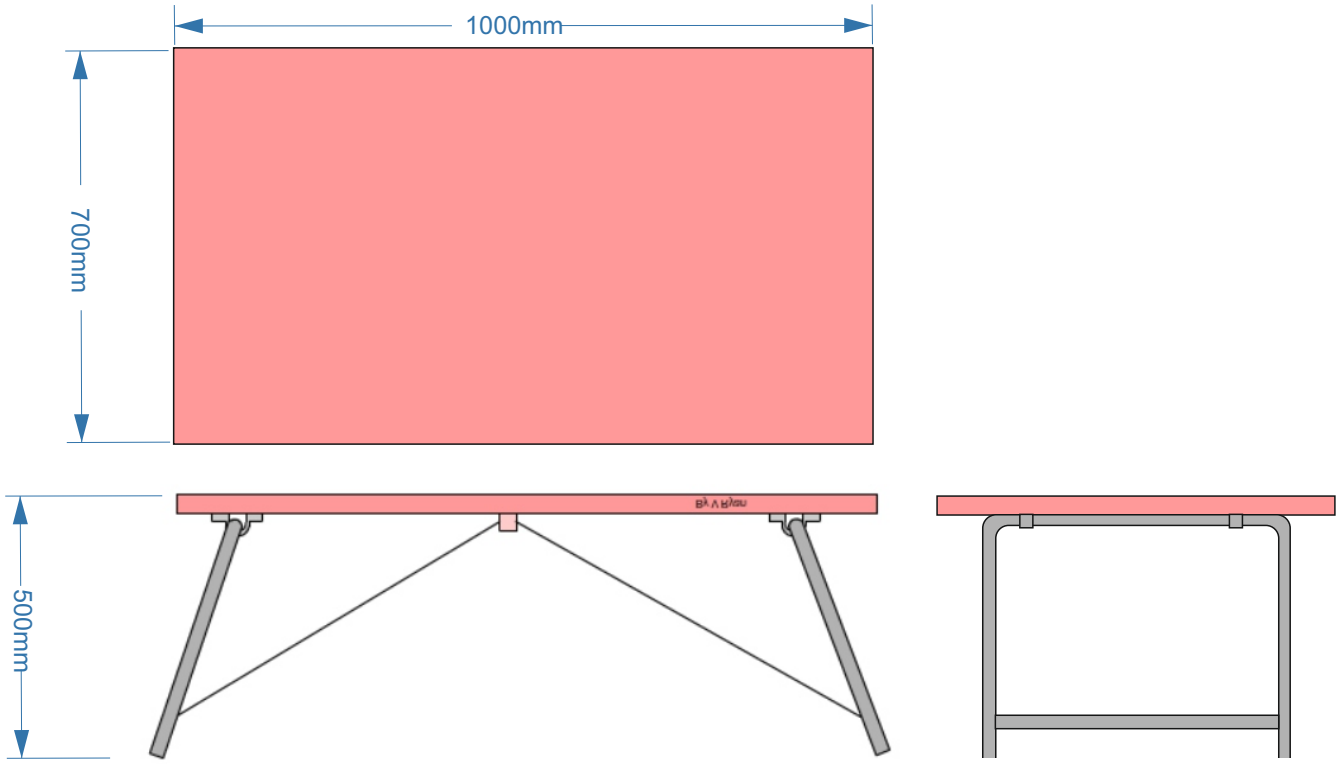




The mobile storage unit is used to transport tools around a garden. The frame is aluminium tube and the storage units / boxes are manufactured from a polymer. The wheels are supplied ready made, as a standard component.

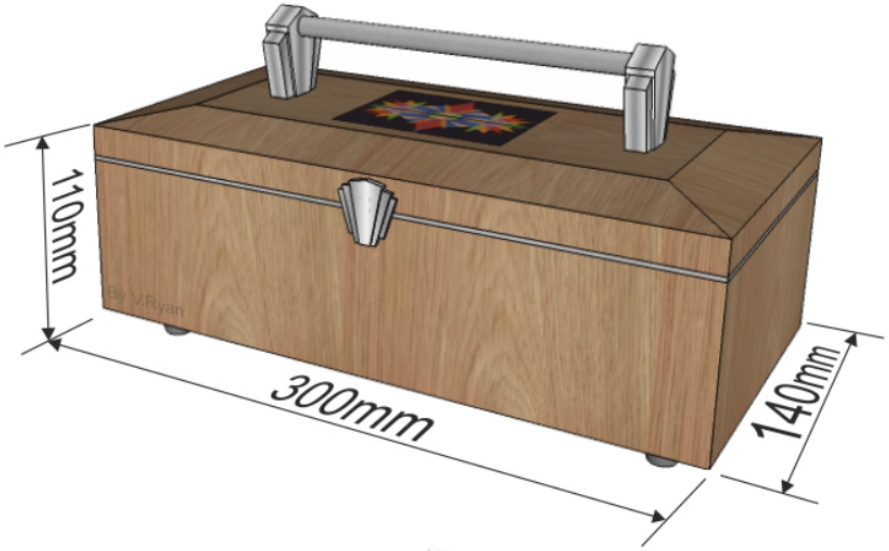
Product 5 – Folding Table with tubular legs (metals)

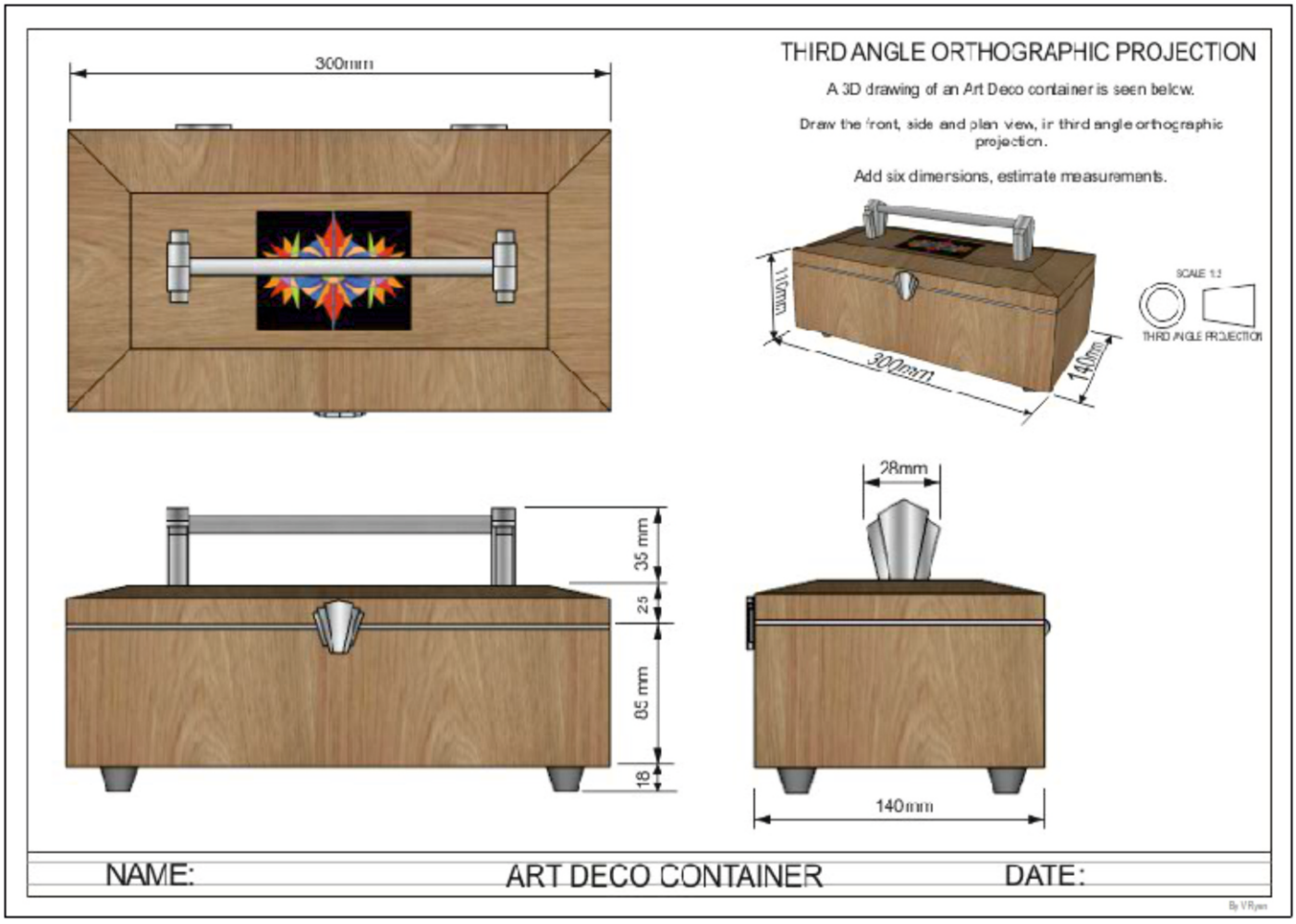




The picnic table is lightweight and foldable. It can be transported and also stored. The legs are aluminium tube, although a version with steel legs is also available.
The product is designed to be completely recyclable, at the end of its life cycle.

Product 6 – Jewellery Storage (timbers)





This storage box is available in a variety of natural woods. Traditional jointing methods have be used during its manufacture. It has a quality finish and can be locked for security. It is designed in an Art Deco style.

Page 8

Information on this page is required to answer Questions 4 and 5 (c).

IMAGE A

IMAGE B

IMAGE C

IMAGE D

SECTION B

Answer all the questions in this section

The inserts must be used to help you answer all the questions in Section B. These are products that you would find in a department store, as a fixture or as a product for sale.

4. Study page 8 of the insert Booklet.

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

4a. The magazines shown in Image A, are composed of paper that has been UV Varnished.

Give two reasons why this printing process is suitable for this product. ***2 marks***

(I) _____

_____

(ii) _____

_____

4b. List one disadvantage of UV Varnishing, as a printing process. ***1 mark***

_____

_____

HELPFUL LINK http://www.technologystudent.com/joints_flsh/nylon1.html

4c. Image B shows a popular T Shirt manufactured from a synthetic material. Name a suitable synthetic material. ***1 mark***

(I) _____

Give two reasons why the material you have named is suitable. ***2 marks***

(ii) _____

_____

(iii) _____

_____

4d. Image C shows a typical latch for a garden gate.

HELPFUL LINK http://www.technologystudent.com/forcmom/lever1.htm

Name the type of mechanism that is represented by the latch. ***1 mark***

(I) _____

Why is the mechanism you have named, suitable for this product? ***1 mark***

(ii) _____

_____

HELPFUL LINK http://www.technologystudent.com/rmflsh1/teak1.html

4e. Image D shows a garden bench manufactured from teak. Explain why teak is a suitable natural wood for this product. ***2 marks***

_____

_____

_____

_____

You will need to answer both questions 5 and 6, in relation to ONE product selected from below. Keep in mind that you have been studying a specialist area in detail, throughout the course.

It is important that you read questions 5 and 6 before selected the product.

- ☐ **Product 1 - Disposable Food Carrier (papers and boards)**
- ☐ **Product 2 - Classic Insulated Unisex Jacket (Textiles)**
- ☐ **Product 3 – Turnstile (design engineering)**
- ☐ **Product 4 - Transportable Storage for Garden Tools (polymers)**
- ☐ **Product 5 – Folding Table with tubular legs (metals)**
- ☐ **Product 6 – Jewellery Storage (timbers)**

USEFUL LINKS FOR QUESTIONS 5 AND 6

Joining Materials
http://www.technologystudent.com/despro_flsh/mats_join1.html

Wood Based Product
http://www.technologystudent.com/despro_3/trolmanf.html

Metal Based Product
http://www.technologystudent.com/despro_3/altrolley1.html

Polymer Based Product
http://www.technologystudent.com/rmprep09/reman1.html

Design Engineering / Microcontrollers
http://www.technologystudent.com/pics/picdex1.htm

Finishes for Woods and Metals
http://www.technologystudent.com/despro_flsh/mats_finish1.html

Manufacturing a Card Product by Hand
http://www.technologystudent.com/despro2/develp4.htm

Manufacturing a Card Product - Small Scale Production
http://www.technologystudent.com/despro2/devman1.htm

Manufacturing a Card Product - Die Cutting
http://www.technologystudent.com/despro2/devman2.htm

Spend no more than 20 minutes on this question

5a. After a detailed design process, a final product / design is manufactured. In the space below and on the next page, explain / describe how your chosen product is manufactured. Use sketches, labels and notes. ***12 marks***

Include the following details:

The manufacturing processes.
Tools and equipment required.
Quality and safety checks.
Finish(s) applied to the completed product.

HELPFUL LINKS http://www.technologystudent.com/prddes1/closeloop1.html
http://www.technologystudent.com/prddes1/closeloop2.html

5b. Designers need to consider environmental issues when designing products. Consequently, many products are designed to be recycled, as part of a 'Closed Loop System'.

6f. What is Closed Loop Recycling? Include reference to how a product of your choice, could be recycled through this system. ***5 marks***

HELPFUL LINK http://www.technologystudent.com/prddes_2/crowd1.html

5c. The design and manufacture of a product is sometimes financed through Crowd Funding. What is Crowd Funding? ***6 marks***

HELPFUL LINKS

http://www.technologystudent.com/joints/htest1.html
http://www.technologystudent.com/joints/tensile1.html
http://www.technologystudent.com/joints/conduct1.html
http://www.technologystudent.com/joints/toughness1.html

6. Considering the product you chose for question 5:

(a) Before and during manufacture, materials need testing.

Select just ONE material, followed by how the material could be tested to ensure quality. Include sketches if required. ***4 marks***

Material: _____

HELPFUL LINK http://www.technologystudent.com/despro_flsh/mats_compos1.html

6b. Composite materials are in wide use, in the modern world around us.

Name a composite material, explain why it is regarded as a composite material and give practical examples of its use.

8 marks