

DESIGN AND TECHNOLOGY - GCSE SAMPLE PAPER 1

COMPONENT 1 - MARK SCHEME

Candidate Name	Centre Number					Candidate Number				

TIME ALLOWED - 2 HOURS

For examiner's use only			
Section A	1		10
	2		10
	3		15
	4		20
	5		20
Section B	6 - 10		25
Total			100

EQUIPMENT REQUIRED

Drawing and writing equipment, coloured pencils and a calculator

INSTRUCTIONS

You are to answer all questions 1 to 5. Select ONE question from Section B

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Section A

Answer all the questions in this section

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

1. The question is about alternative energy.

1a. 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 ? **4 marks**

$$\begin{array}{ccc} \text{WIND FARM} & : & \text{SOLAR POWER} \\ 4 & : & 0.5 \end{array}$$

To ensure that final ratio is in whole numbers, divide the wind power total by the solar power total.

$$\frac{\text{WIND FARM}}{\text{SOLAR POWER}} = \frac{4}{0.5} = 8 \qquad 3 \text{ MARKS}$$

Then take the answer and place it on the wind power side of the ratio and the 1 on the solar power side.

$$\begin{array}{ccc} \text{WIND FARM} & : & \text{SOLAR POWER} \\ 8 & : & 1 \end{array} \qquad 1 \text{ MARK}$$

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

1b. Write two **advantages** of using wind power to produce electricity. **2 marks**

Follow the link for potential answers

1 mark awarded per correct point.

1c. Write two **disadvantages** of using wind power to produce electricity. **2 marks**

Follow the link for potential answers

1 mark awarded per correct point.

HELPFUL LINK <http://www.technologystudent.com/prddes1/carenviro5.html>

1d. Some car manufacturers regard the use of **carbon neutral** energy sources (alternative energy) as being important. Describe an example of this approach.
2 marks

Follow the link for potential answers / points / facts

1 mark for a basic answer

2 marks for a more detailed answer.

HELPFUL LINK <http://www.technologystudent.com/joints/photchrom1.html>

2. This question is regarding smart materials

2a. What are photochromic inks. Your answer must include a reference to a practical application of photochromic ink. **3 marks**

Follow link for potential answers.

1 mark for basic answer wit no reference to practical example.

2 -3 marks for detail and practical reference made.

HELPFUL LINK <http://www.technologystudent.com/joints/kevlar1.html>

2b. Explain why a composite material is the most suitable for the bodywork of this Formula One racing car. Name the a suitable composite material in your answer. **2 marks**



Follow link for potential answers

Kevlar / carbon fibre for one mark.

One further mark for describing the suitability of the material.

HELPFUL LINK http://www.technologystudent.com/joints_flash/phosphor1.html

2c. The digital sports watch / timer is typical of many similar devices today. The wrist band includes a phosphorescent pigment.



Explain the reason(s) for the inclusion of a phosphorescent pigment, in the wrist band material.
2 marks

Follow link for potential answers

1 mark awarded per correct reason given.

HELPFUL LINK http://www.technologystudent.com/joints_flash/phosphor1.html

2d. Describe another product that includes phosphorescent pigment and explain its inclusion. **3 marks**

Product: *1 mark*





Description and explanation:

Follow link for potential answers

*1 mark for basic explanation / reason
2 marks for more than 2 reasons / facts.*

3. This question is regarding electronics, programmable circuits and mechanisms.

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

$$\frac{\text{Distance moved by Effort}}{\text{Distance moved by Load}} = \frac{60T \text{ (GEAR A)}}{30T \text{ (GEAR B)}}$$

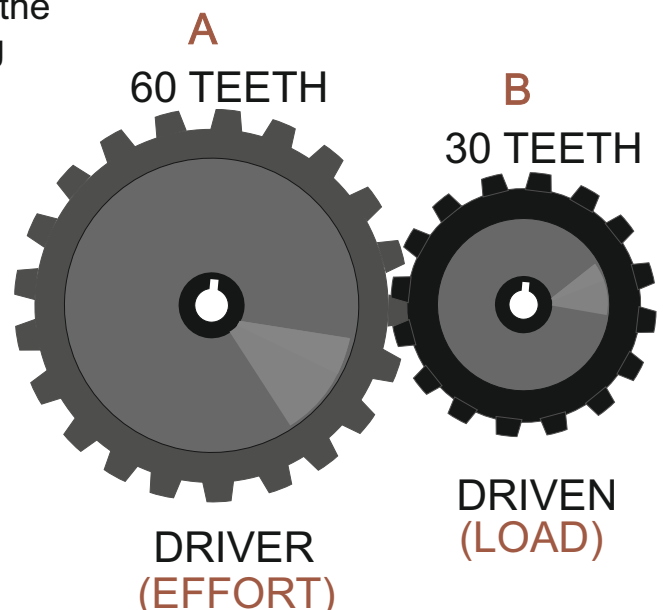
1 mark

$$= \frac{1}{2} = \frac{\text{Input movement}}{\text{Output movement}}$$

1 mark

$$= \text{Driver : Driven}$$

1 : 2 2 marks



HELPFUL LINK <http://www.technologystudent.com/gears1/gears1.htm>

3c. What is a **driver** gear wheel? **1 mark**

Follow the link for the answer.

1 mark for correct answer.

What is a **driven** gear wheel? **1 mark**

Follow the link for the answer.

1 mark for correct answer.

HELPFUL LINK <http://www.technologystudent.com/pics/picgen1.html>

3d. Name one piece of software that is used to programme a PIC microcontroller.
1 mark

*1 mark for naming appropriate software. e.g Genie Design Studio,
Circuit Wizard.....*

3e. How is a PIC circuit physically connected to a computer, for programming?
1 mark

1 mark for USB lead / cable

3f. What is a PIC microcontroller (Programmable Interface Controller?) and what can it do? **3 marks**

Follow the link for information / answer.

1 mark for a basic answer.

2 marks for greater understanding being shown.

3 marks for a detailed answer.

HELPFUL LINK http://www.technologystudent.com/despro_flsh/charity9.html

4. These questions are about materials

4a. Study the images of two different types of corrugated card. Name each type.
2 marks



SINGLE WALL



DOUBLE WALL

HELPFUL LINK http://www.technologystudent.com/despro_flsh/laminate2.html

4b. What is laminated card? **1 mark**

Follow link for potential answer.

1 mark for a correct description

4c. Name two products that have laminated card packaging? **2 marks**

Follow link for potential answer.

1 mark per correct product named.

HELPFUL LINK <http://www.technologystudent.com/despro2/crdpap2.htm>

4d. What is grid paper ? Include a practical use. **2 marks**

Follow link for potential answer.

1 mark for a correct description

4e. What is layout paper ? Include a practical use. **2 marks**

Follow link for potential answer.

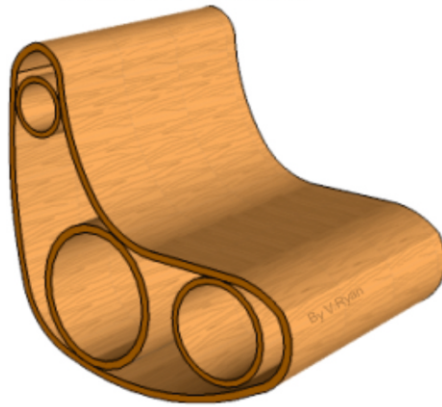
1 mark for a correct description

4. The products shown below have been manufactured from flexi-ply.

MP3 STATION



ROCKING CHAIR



BOOKCASE



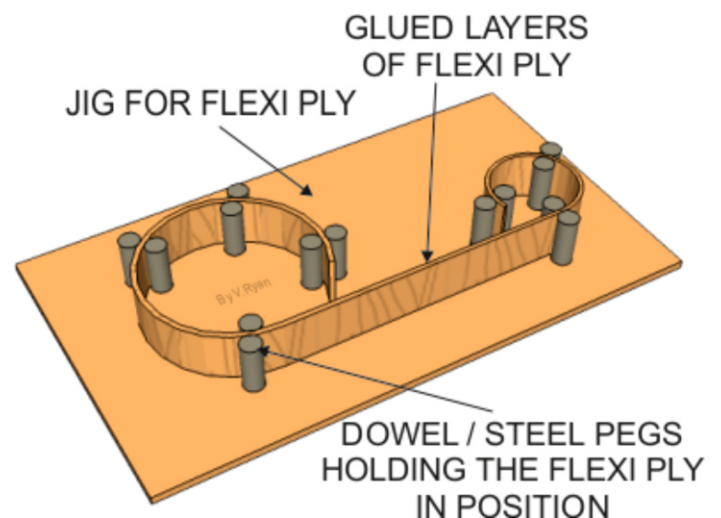
4f. Why is flexi-ply ideal for their manufacture of the products? **3 marks**

Follow link for potential answer.

1 mark for reasons / justification, up to 3 marks in total.

4g. Describe how a former similar to the one seen opposite, could be used to manufacture the sides of one the products displayed at the top of the page.

3 marks



Follow link for potential answer.

1 mark for a fact / correct statement.

HELPFUL LINK http://www.technologystudent.com/despro_flsh/finish2.html

4h. The surfaces of the three pieces of furniture shown in question 4, must be prepared carefully to receive a finish. This is achieved through sanding with glass paper. Describe the procedure. **3 marks**

Follow link for potential answer.

1 mark per fact.

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

4i. The photograph shown opposite is of waterproof clothing. Why is nylon a suitable material? **3 marks**



WATERPROOF
CLOTHING

Follow link for potential answer.

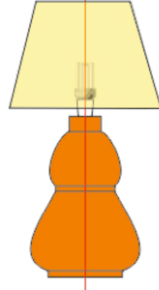
1 mark per material property.

5a. Select one of the products shown below. Then, describe two reasons, for it being suitable for manufacture in large numbers / mass production. **2 x 2 marks**

DESKTIDY
PEWTER CASTING



WOOD - LAMP
WOOD TURNING



POLYETHYLENE TEREPHTHALATE
VACUUM FORMED TRAY



TO HELP YOU ANSWER
THIS QUESTION

http://www.technologystudent.com/equip_flesh/pewtt1.html
http://www.technologystudent.com/equip_flesh/pewtt2.html
<http://www.technologystudent.com/equip1/woodturn1.html>
<http://www.technologystudent.com/equip1/woodturning2.html>
<http://www.technologystudent.com/equip1/wturning8.html>
<http://www.technologystudent.com/joints/pet1.html>
<http://www.technologystudent.com/joints/petevac1.html>

PRODUCT:

REASON 1:

1 mark per reason.

Teacher discretion required.

REASON 2:

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

5b. Your chosen product is to be financed through crowd funding. What is crowd funding? **2 marks**

Follow link for potential answer / information

1 mark for a basic answer.

2 marks for more detail.

HELPFUL LINK <http://www.technologystudent.com/prddes1/remote1.html>

5c. The chosen product will be remotely manufactured. What is remote manufacturing? **4 marks**

Follow link for potential answer.

1 mark for one correct fact.

2 marks for a basic answer including 2 facts / correct statements.

3 marks for detailed answer, including 3 facts / correct statements

4 marks for a detailed answer fully answering the question.

HELPFUL LINK <http://www.technologystudent.com/despro2/focgrp1.html>

5d. What role would a focus group play in evaluating the product, before it goes on sale in the shops and on the internet? **2 marks**

Follow link for potential answer.

1 mark for one correct fact.

2 marks for an answer including 2 facts / correct statements.

HELPFUL LINK <http://www.technologystudent.com/prddes1/markrs1.html>

5e. Before your selected product is manufactured, it would be wise to carry out market research.

What is market research? **2 marks**

Follow link for potential answer.

1 mark for one correct fact.

2 marks for an answer including 2 facts / correct statements.

Describe ONE aim of marketing. **1 mark**

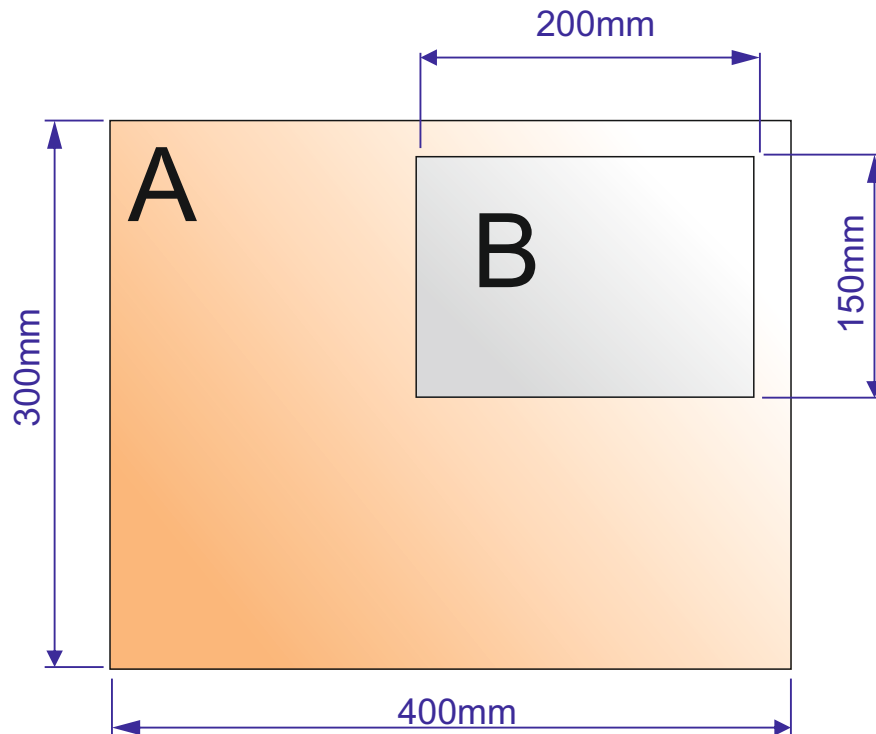
1 mark for 1 correct aim - follow the link of a list of aims.

A rectangular acrylic window for an Art project seen below, is composed of two rectangular pieces, accurately cut to size on a laser cutter. They fit perfectly together.

5f. Calculate the total area of piece A, before 'B' is removed **2 marks**

5g. Calculate the area of piece B. **2 marks**

5h. Calculate the area of A, after 'B' is removed. **1 mark**



First, calculate the entire area of 'A', without the smaller piece being removed, by treating it as a rectangle 400mm x 300mm.

$$\begin{aligned} \text{AREA} &= \text{LENGTH} \times \text{HEIGHT} \\ \text{AREA} &= 400 \times 300 \\ \text{AREA} &= 120000\text{mm}^2 \end{aligned}$$

Now, calculate the area of the smaller rectangular piece 'B', which is also the size of the piece to be removed from 'A'.

$$\begin{aligned} \text{AREA} &= \text{LENGTH} \times \text{HEIGHT} \\ \text{AREA} &= 200 \times 150 \\ \text{AREA} &= 30000\text{mm}^2 \end{aligned}$$

Now subtract the smaller rectangular area 'B' from the total area of rectangle 'A'. The answer will be the area of 'A', with the smaller rectangle of waste acrylic being removed.

$$120000 - 30000 = 90000\text{mm}^2$$

AREA OF FINAL SHAPED PIECE 'A' WITHOUT THE SMALLER PIECE IS 90000mm²

AREA OF PIECE 'B' IS 30000mm²

SECTION B

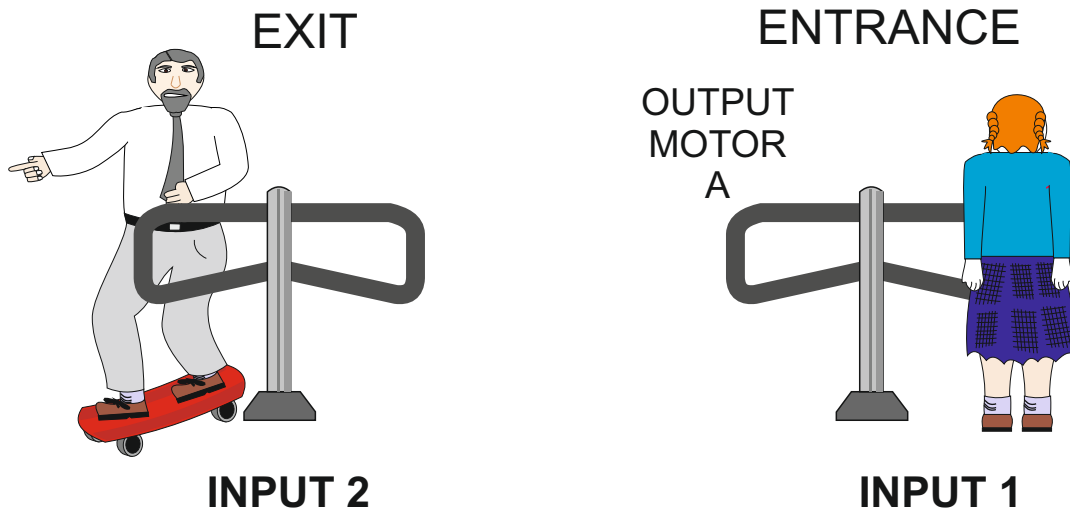
Electronics and Systems

ANSWER ONLY ONE QUESTION

HELPFUL LINK <http://www.technologystudent.com/sysprp08/quest15.html>

6. The turnstile system continually calculates the number of people who have entered the theme park and the number of people leaving. This is to ensure that the total never exceeds the legal limit.

A Technology pupil has devised a simple model to test his/her programming. The maximum number of people allowed through the entrance for the test run is ten. The program must calculate those entering the park and balance it with those leaving the park. The total number of those in the park must not exceed ten.



The sequence of events are as follows;

The system is switched on.

The total of people in the park is set at 0.

input 1 and 2 are continually checked.

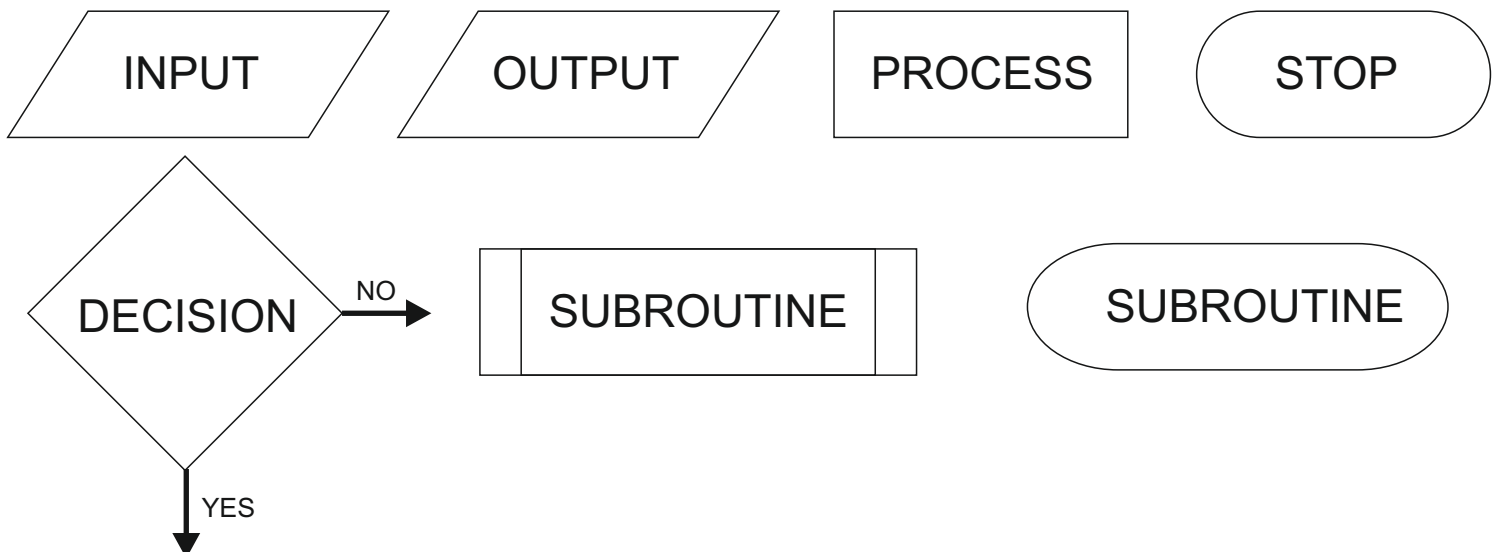
If input 1 detects a person entering the park then 1 is added to the total.

If input 2 detects a person leaving the park 1 is subtracted from the total.

If the total number of people in the park reaches 10 a solenoid locks the entrance turnstile (this stops more people entering the park)

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS <https://www.facebook.com/groups/254963448192823/> www.technologystudent.com © 2017 V.Ryan © 2017

6a. Write flow chart to represent the programmed sequence of events. Use the following the process / systems boxes shown below. Complete your work on the following page **4 marks**



Describe how your flow chart works by explaining each stage on the right hand side

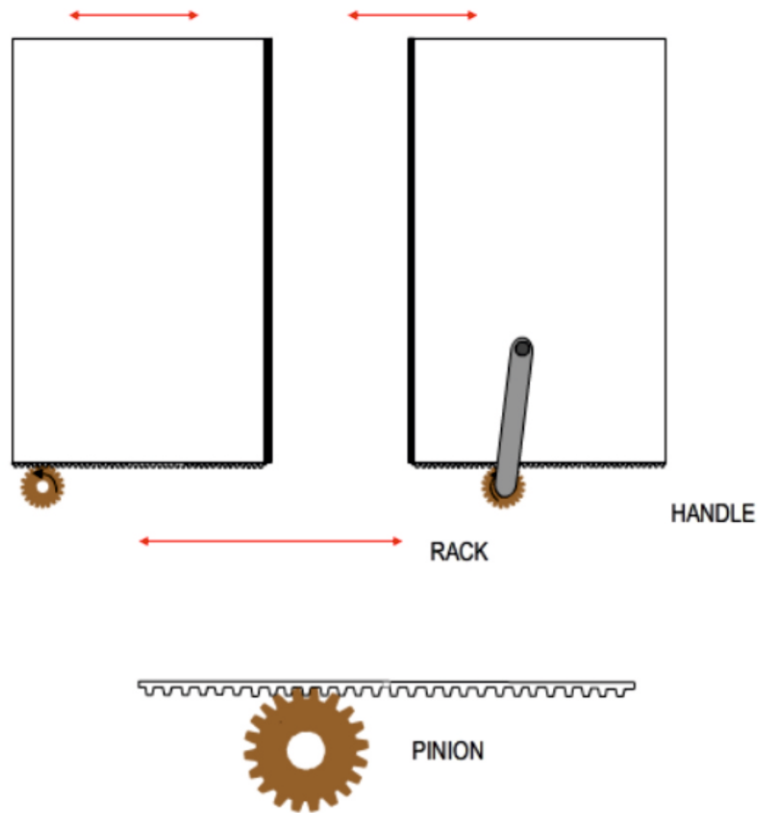
FLOW CHART

EXPLANATION

*Follow the link for a potential answer.
Up to 2 marks for the flow chart

Up to 2 further marks of the explanation.
Teacher discretion required.*

6b. The turnstile system is to be updated to sliding doors. 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**



NOTES

Follow the link for a potential answer

Up to 3 marks awarded for the quality of the sketch.

Basic sketch - 1 mark

A little more detailed sketch - 2 marks

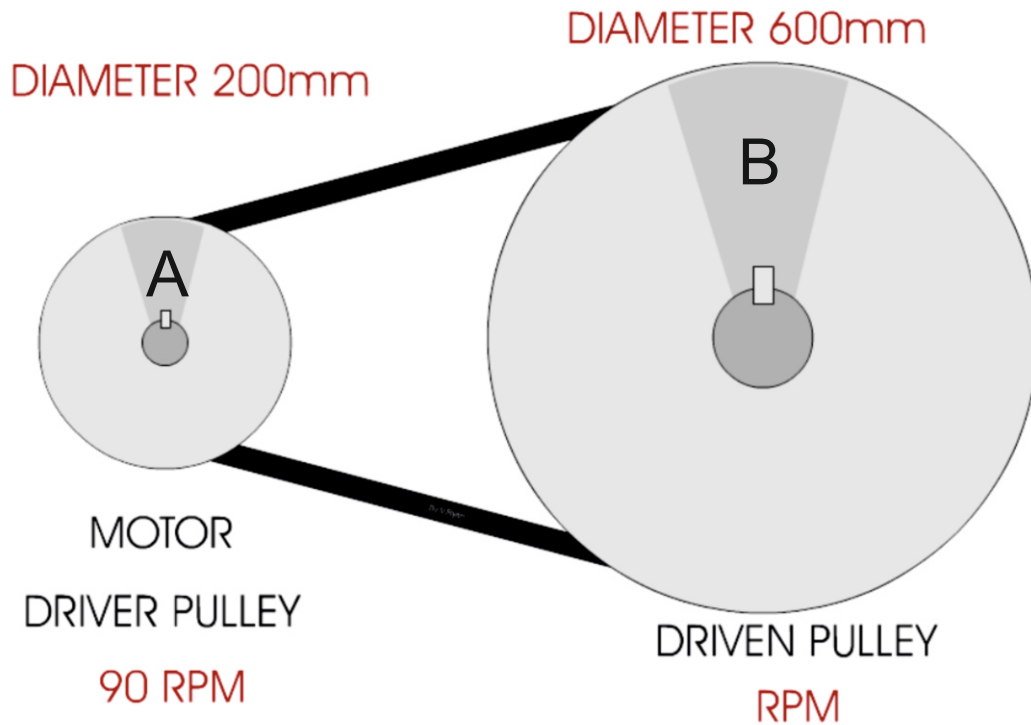
Detailed sketch - 3 marks

Up to 2 marks awarded for the notes

1 mark - basic explanation

2 marks - detailed explanation.

6. The turnstile system is to be updated again, so that it works automatically through a system of pulleys (shown in the diagram below).



6c. Calculate the Velocity Ratio of the pulley system. Include all your working out **2 marks**

METHOD ONE:

$$\frac{\text{DISTANCE MOVED BY DRIVEN PULLEY}}{\text{DISTANCE MOVED BY DRIVER PULLEY}} = \frac{600\text{mm}}{200\text{mm}} = 3 \quad \text{OR} \quad \begin{matrix} 3:1 \\ \text{DRIVER : DRIVEN} \end{matrix}$$

1 mark for each stage of the calculation

METHOD TWO:

$$\text{VELOCITY RATIO} = \frac{\text{DRIVER PULLEY MOVES 3 REVOLUTIONS}}{\text{DRIVEN PULLEY MOVES 1 REVOLUTION}} = \frac{3}{1} \quad \text{OR} \quad \begin{matrix} 3:1 \\ \text{DRIVER : DRIVEN} \end{matrix}$$

6d. Calculate the RPM of pulley 'B'. Include all your working out. **3 marks**

1 mark

1 mark

1 mark

$$\text{VELOCITY / SPEED OF ROTATION OF DRIVEN PULLEY WHEEL} = \frac{\text{RPM OF DRIVER PULLEY}}{3} = \frac{90 \text{ rpm}}{3} = 30 \text{ rpm at Driven pulley wheel}$$

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

6e. The turnstile system is to be manufactured so that it is repairable, rather than having to be replaced each time a fault develops. What are the advantages of designing products that are repairable, compared to those that need replacing? **5 marks**

Follow the link to a potential answer / information.

1 mark to be awarded per correct advantage

HELPFUL LINKS <http://www.technologystudent.com/prddes1/closetloop1.html>
<http://www.technologystudent.com/prddes1/closetloop2.html>

6. Designers need to consider environmental issues when designing products. Consequently, many of the products sold in the theme park have been designed to be recycled, as part of a 'Closed Loop System'.

6f. What is Closed Loop Recycling? Include reference to how 'plastic' drinks bottles are recycled through this system. **6 marks**

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation of closed loop recycling.

1 mark - basic answer

2 - marks reasonable detail

3 - marks good / full detail

Further 3 marks for reference to drinking bottles.

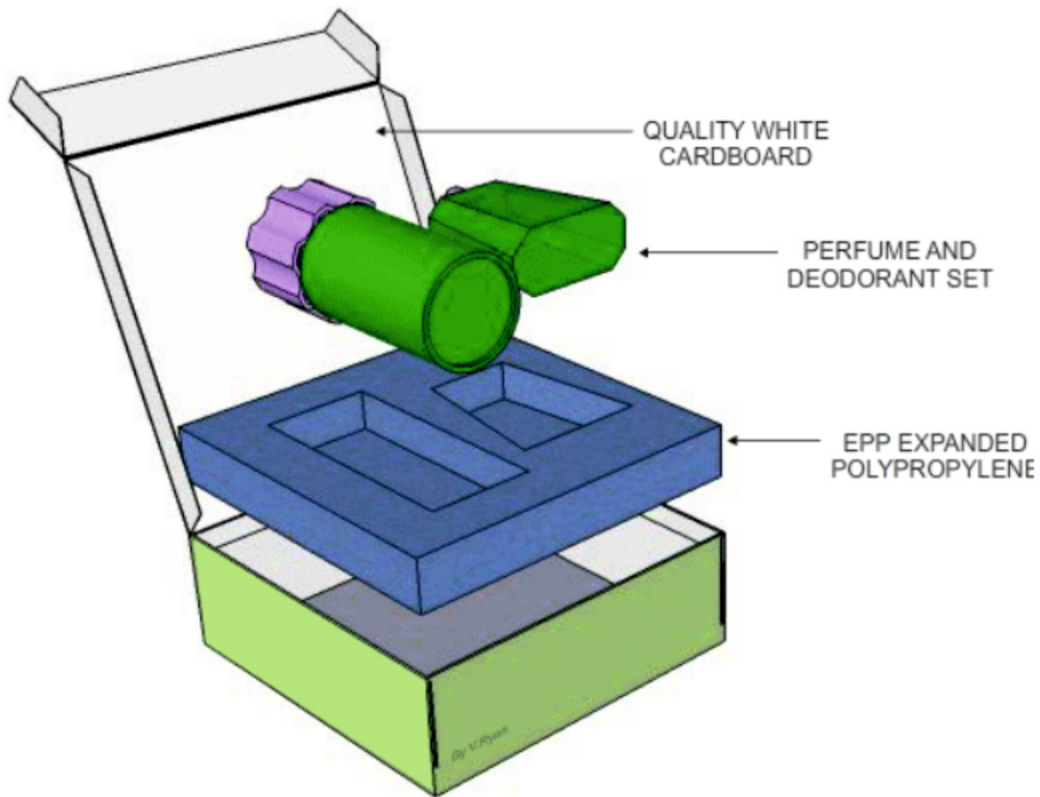
1 mark - basic answer

2 - marks reasonable detail

3 - marks good / full detail

Paper and Boards

7. The photograph shows the packaging for a perfume product.



HELPFUL LINK <http://www.technologystudent.com/prddes1/perfpk4.html>

7a. Quality white card has been used for the manufacture of the box / package shown above. Explain why card has been used. **2 marks**

Follow link for potential answer / information.

1 mark per fact (up to 2 marks in total)

7b. Why do you think the packaging is 'cuboid' in shape? **1 mark**

Follow link for potential answer / information.

1 mark per fact (up to 2 marks in total)

7c. Why has Expanded Polystyrene (EPS) been used to manufacture the insert, that holds the product in position? **2 marks**

Follow link for potential answer / information.

1 mark per fact (up to 2 marks in total)

7d. The manufacturer intends to use the **foil blocking** technique, to produce quality gold printing on the top surface. Explain how foiling blocking could be used to produce the required finish. Include notes and sketches in your answer. **4 marks**



NOTES

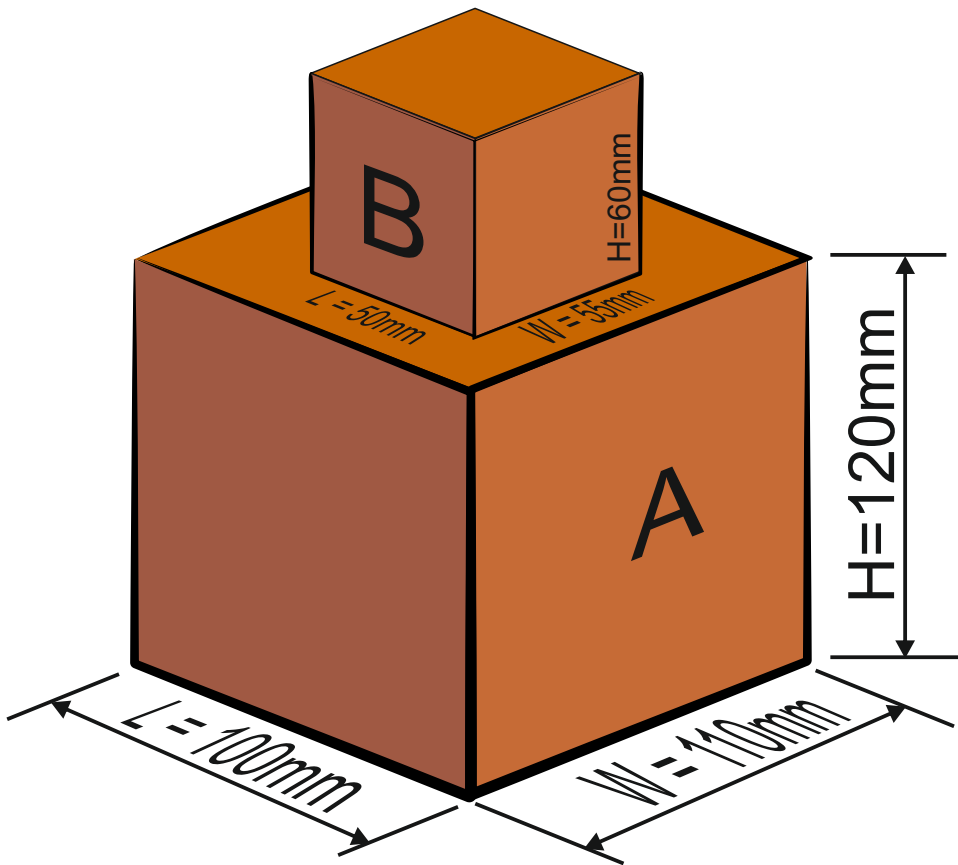
SKETCHES

Follow the link to detailed answer / information.

Up to 2 marks for the quality f the sketch / sketches

Up to 2 marks for the quality and detail of the notes.

7. The shape and form of the packaging is to be changed, to the one shown below.



The unusual solid geometrical shape shown opposite, can be treated as two rectangular prisms, A and B.

7e. Calculate the entire volume of the shape/form

Explain your working out.

5 marks

VOLUME OF 'A'
 $V = L \times W \times H$

VOLUME = 100mm x 110mm x 120mm
 VOLUME = 1320000mm³ or 1320cm³

2 marks

VOLUME OF 'B'
 $V = L \times W \times H$

VOLUME = 50mm x 55mm x 60mm
 VOLUME = 165000mm³ or 165cm³

2 marks

Then, add the volume of rectangular prism A and the volume of rectangular prism B, to find the final overall volume.

FINAL VOLUME = A + B

FINAL VOLUME = 1320000mm³ + 165000mm³

FINAL VOLUME = 1485000mm³ or 1485cm³

1 mark

HELPFUL LINK <http://www.technologystudent.com/prddes1/packenv1.html>

7f. A large amount of packaging, used to protect food products, is discarded everyday, having a harmful impact on the environment. How can this harmful impact be reduced? **5 marks**

Follow the link to a potential answer / information

1 mark awarded per fact / statement - maximum of 5 marks

HELPFUL LINKS <http://www.technologystudent.com/prddes1/closetloop1.html>
<http://www.technologystudent.com/prddes1/closetloop2.html>

7. Designers need to consider environmental issues when designing products. Consequently, packaging is often designed to be recycled as part of a 'Closed Loop System'.

7g. What is Closed Loop Recycling? Include reference to how 'plastic' drinks bottles are recycled through this system. **6 marks**

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation of closed loop recycling.

1 mark - basic answer

2 - marks reasonable detail

3 - marks good / full detail

Further 3 marks for reference to drinking bottles.

1 mark - basic answer

2 - marks reasonable detail

3 - marks good / full detail

Natural and manufactured timber

8. Study the mahogany desk tidy shown opposite.



HELPFUL LINK <http://www.technologystudent.com/rmflsh1/remote5.html>

8a. Why is mahogany a suitable material for the desk tidy? **2 marks**

*Follow the link to a potential answer / information.
1 mark awarded per material property, up to 2 marks in total.*

HELPFUL LINK http://www.technologystudent.com/despro_flnh/finish3.html

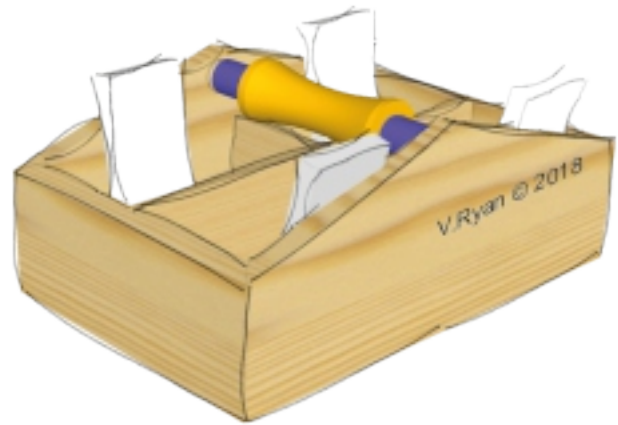
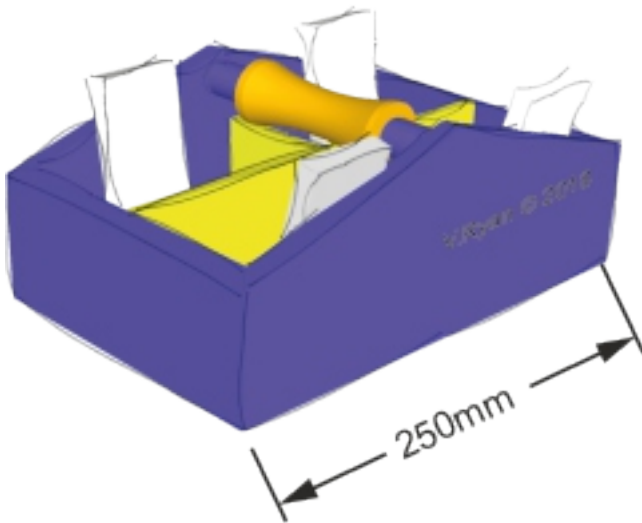
8b. The desk tidy has been 'finished' with water-based varnish. Why can this be considered a suitable choice? **2 marks**

*Follow the link to a potential answer / information.
1 mark awarded per correct reason, up to 2 marks in total.*

8c. Name one alternative finish, that could be applied to the desk tidy. **1 mark**

1 mark for an alternative - teacher discretion required.

The desk organiser seen below, is an updated design.



HELPFUL LINK <http://www.technologystudent.com/rmflash1/remote15.html>

8d. Name and sketch a suitable joint for the corners. **4 marks**

NAME:

1 mark for a correct joint type.

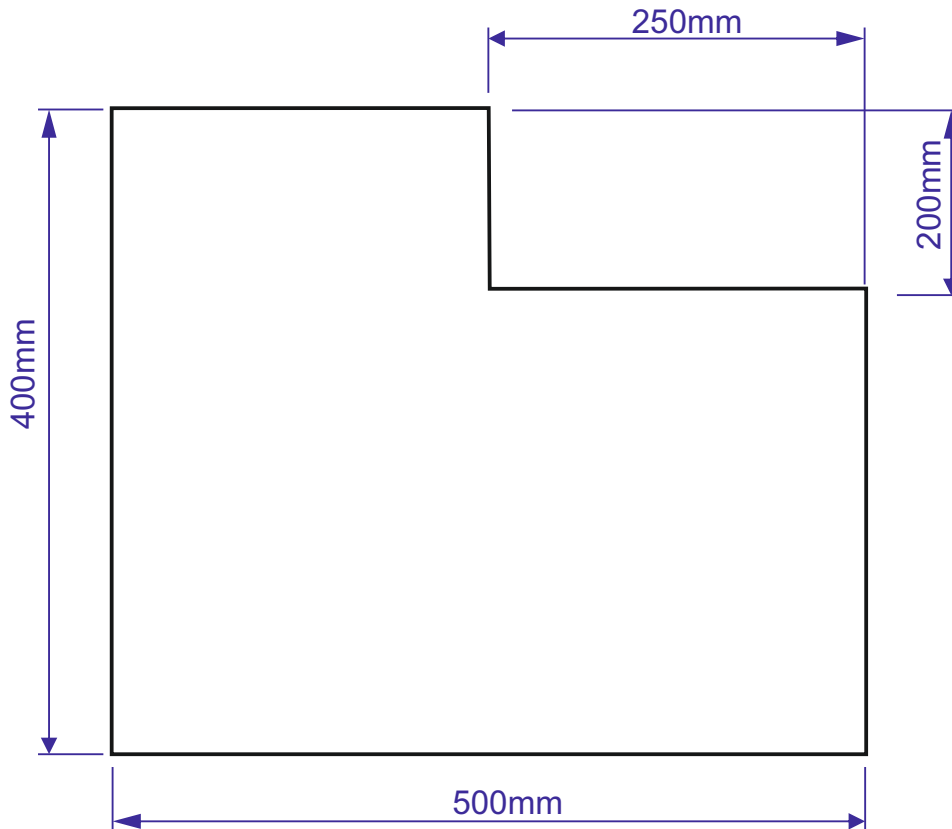
SKETCH

*1 mark for a basic recognisable sketch .
2 marks for a clear sketch.
3 marks for a detailed sketch accurately
presented.*

A new side has been designed for the desk tidy (see below).

8e. Calculate the area of the material required, before it is cut to shape (the overall rectangle of material required, before it is cut to an L shape). **2 marks**

8f. Calculate the area of the final L shape. **3 marks**



First, calculate the area of the uncut acrylic, by treating it as a rectangle 500mm x 400mm.

$$\begin{aligned} \text{AREA} &= \text{LENGTH} \times \text{HEIGHT} \\ \text{AREA} &= 500 \times 400 \\ \text{AREA} &= 200000\text{mm}^2 \end{aligned}$$

Now, calculate the area of the smaller rectangular piece to be cut away, during the shaping of the panel

$$\begin{aligned} \text{AREA} &= \text{LENGTH} \times \text{HEIGHT} \\ \text{AREA} &= 250 \times 200 \\ \text{AREA} &= 50000\text{mm}^2 \end{aligned}$$

Now subtract the smaller area from the area of the uncut plywood.

$$200000 - 50000 = 150000$$

AREA OF FINAL SHAPED PIECE IS 150000mm²

HELPFUL LINKS

<http://www.technologystudent.com/prddes1/susenv1.html>

<http://www.technologystudent.com/joints/sustain1.html>

8g. Manufacturers of natural wood products are encouraged to source their materials from sustainable forests.

What is a sustainable forest and why are sustainable forests important? **5 marks**

Follow the links for potential answers and information.

up to 2 marks for correct description of a sustainable forest.

up to a further 3 marks for reason for them being important.

HELPFUL LINK

<http://www.technologystudent.com/joints/sustain1.html>

8h. The logo shown opposite is sometimes printed on timber and packaging.

Explain the meaning of this logo. **3 marks**

Follow the link for the answer / information.

1 mark - basic understanding

2 marks reasonable understanding displayed.

3 marks good / detailed understanding displayed.



8i. The logo shown opposite is sometimes printed on timber and packaging.

Explain the meaning of this logo. **3 marks**

Follow the link for the answer / information.

1 mark - basic understanding

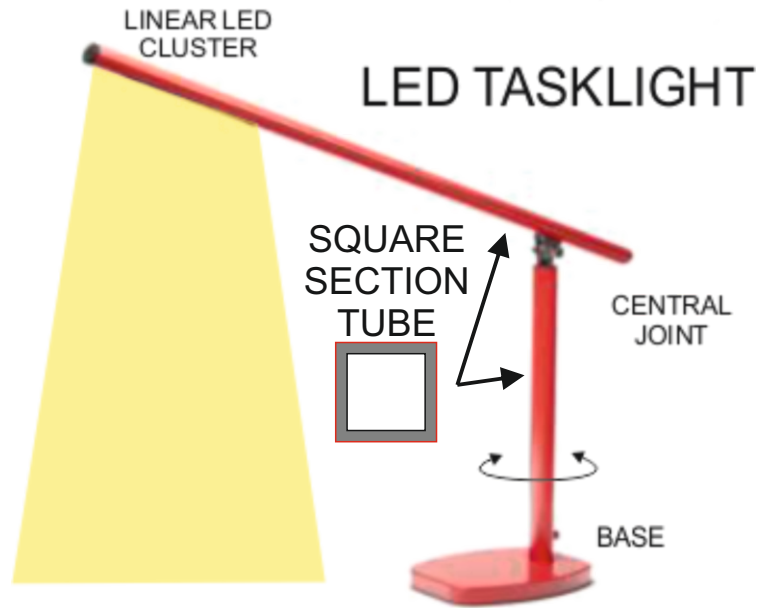
2 marks reasonable understanding displayed.

3 marks good / detailed understanding displayed.



Ferrous and non-ferrous metals

9. This aluminium task light is supplied in a range of colours. It is adjustable and an LED cluster supplies the light. The base is manufactured from steel.



HELPFUL LINKS

http://www.technologystudent.com/joints_flesh/office4.html
<http://www.technologystudent.com/designpro/metals1.htm>

9a. Why is aluminium tube suitable for the 'arms' of the task light? **1 mark**

Follow the link for the answer / information.

1 mark - for a suitable reason.

HELPFUL LINK

http://www.technologystudent.com/joints_flesh/metal2.html

9b. The aluminium has been anodised. What is anodising of aluminium? **2 marks**

Follow the link for the answer / information.

1 mark - basic understanding / one correct fact.

2 marks good / detailed understanding displayed.

HELPFUL LINK

http://www.technologystudent.com/joints_flesh/office4.html

9c. Give two reasons for using steel for the base of the task light. **2 marks**

Follow the link for the answer / information.

1 mark - basic understanding / one correct fact.

2 marks good / detailed understanding displayed.

Teacher discretion required.

9d. Describe how the square section aluminium tube, would be cut to length, using tools commonly found in a school workshop. Use notes and sketches.

4 marks

Follow the link for the answer / information.

1 mark - basic sketch and / or notes

2 marks - sketch and notes - although still basic.

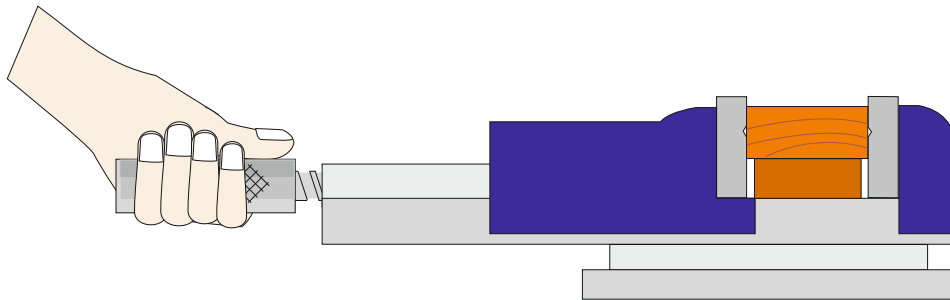
3 marks - good understanding displayed through notes and sketch.

4 marks - detailed understanding - notes and accurate sketch.

9. 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.

9e. What is the circumference of the handle? **3 marks**

9f. What is the area of the end of the handle? **2 marks**



FORMULA

$$\text{AREA} = \pi r^2$$

$$\pi (\text{pi}) = 3.14$$

$$\text{AREA} = 3.14 \times (25 \times 25)$$

$$\text{AREA} = 3.14 \times (625)$$

$$\text{AREA} = 1962.5\text{mm}^2$$

FORMULA

$$\text{CIRCUMFERENCE} = 2 \times \pi \times r$$

$$\pi (\text{pi}) = 3.14$$

$$C = 2 \times \pi \times r$$

$$C = 2 \times 3.14 \times 25$$

$$C = 157\text{mm}$$

HELPFUL LINK

<http://www.technologystudent.com/joints/alloys1.html>

9g. The base of the task light is manufactured from the alloy, steel. What is an alloy?
2 marks

Follow the link for a potential answer / information.

1 mark per basic 'definition'.

2 marks for more detailed 'definition'.

HELPFUL LINK

<http://www.technologystudent.com/joints/alloys1.html>

9h. Many bridges around the world are manufactured from steel, although during Victorian times, iron was used in bridge building. Why is steel used today?
3 marks

Follow the link for a potential answer / information.

1 mark per correct fact / statement.

HELPFUL LINK

http://www.technologystudent.com/equip_flesh/galv1.html

One way of ensuring metal products have a reduced impact on the environment, is to prevent / reduce corrosion, lengthening their working life.

9i. Galvanising steel helps to prevent corrosion and rust. What is the galvanising process and how does it prevent corrosion?

3 marks

Follow the link for a potential answer / information.

1 mark per a basic explanation OR how it prevents corrosion.

2 -3 marks - for both the 'what is' and 'how does' aspects being answered correctly. 2 marks - reasonable understanding. 3 marks - good / detailed understanding.

HELPFUL LINK

http://www.technologystudent.com/joints_fish/metal6.html

9j. Powder Coating is an alternative finish to metals. What is powder coating?
3 marks

Follow the link for a potential answer / information.

1 mark per a basic understanding.

2 - 3 marks - for more detail.

Thermosetting and thermoforming plastics

10. 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.

HELPFUL LINK <http://www.technologystudent.com/gprep07/vac2.html>

10a. What thermoplastic material, is most suitable for the manufacture of the casing?
1 mark

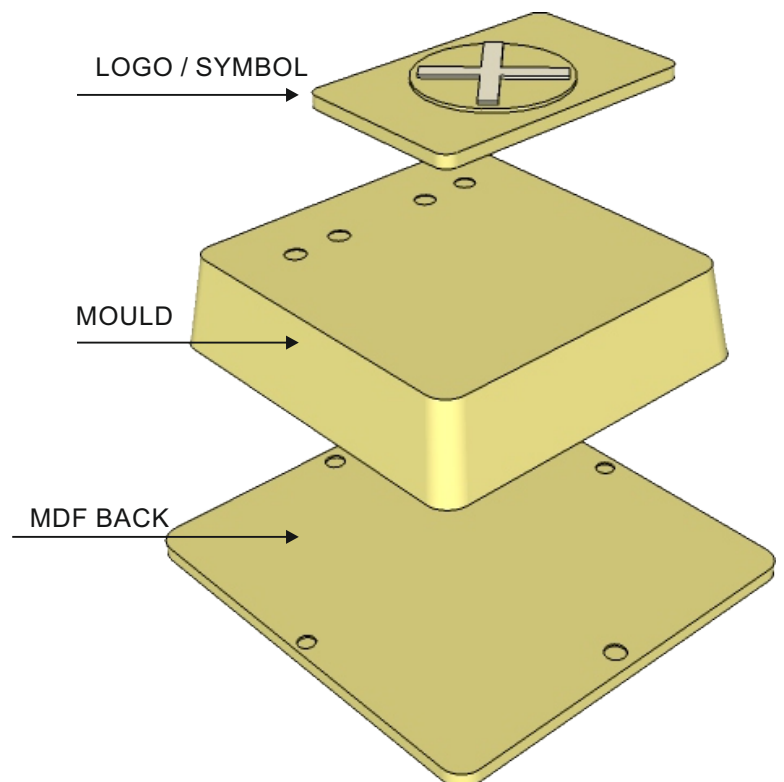
*Follow the link for a potential answer / information.
1 mark for a correctly named material such as HIPS, ABS etc...*

HELPFUL LINK <http://www.technologystudent.com/equip1/vacform1.htm>

10b. What is the name of the process, that results in the base being manufactured?
1 mark

1 mark for vacuum forming.

10c. 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**



Follow the link for a potential answer / information.

1 mark per correct point / fact.

Includes reference to 'angle' / draft / smooth surface / use of parting powder / talcum powder.

10d. A process called **extrusion** has been used to manufacture the profiles seen in the photograph opposite.



Why is extrusion a suitable process?
1 mark

Follow the link for a potential answer / information.

1 mark per a clear explanation.

10e. Using notes and a sketch, explain the extrusion process. **4 marks**

SKETCH

Follow the link for the answer / information.

1 mark - basic sketch and / or notes

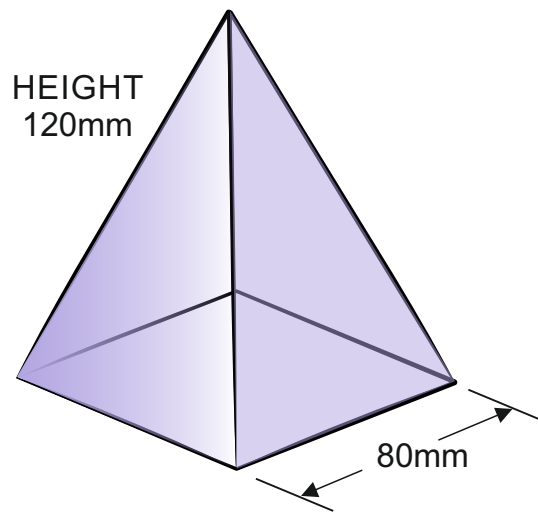
2 marks - sketch and notes - although still basic.

3 marks - good understanding displayed through notes and sketch.

4 marks - detailed understanding - notes and accurate sketch.

NOTES

10f. A 3D Printer has been used to manufacture a special casing for an electronic circuit. What is the volume of the shape (a square pyramid)? **5 marks**



FORMULAS

AREA OF BASE = LENGTH²

Volume = $\frac{1}{3}$ x Base x Height

$V = \frac{1}{3}$ x B x H

Using the formulas opposite, calculate the volume of the square pyramid.

CALCULATE THE AREA OF BASE FIRST

AREA OF BASE = LENGTH²

AREA OF BASE = 80mm X 80mm = 6400mm²

2 marks

THEN APPLY THE FOLLOWING FORMULA

Volume = $\frac{1}{3}$ x Base x Height

$V = \frac{1}{3}$ x 6400mm x 120mm

$V = \frac{1}{3}$ x 768000mm

$V = \frac{768000\text{mm}}{3} = 256000\text{mm}^3$

3 marks

HELPFUL LINKS

http://www.technologystudent.com/prddes_2/global1.html
http://www.technologystudent.com/prddes_2/global2.html

10g. Numerous 'plastic' products, such as the casings for electronic pdevices, are manufactured cheaply because of 'Globalisation'. What is Globalisation?

5 marks

Follow the links for potential answers and information.

1 mark a basic understanding displayed.

2 -3 marks more detail - a reasonable understanding.

4 - 5 Detailed understanding.

Teacher discretion required.

HELPFUL LINKS

<http://www.technologystudent.com/prddes1/closedloop1.html>
<http://www.technologystudent.com/prddes1/closedloop2.html>

9h. Designers need to consider environmental issues when designing products. Consequently, packaging is often designed to be recycled as part of a 'Closed Loop System'.

What is Closed Loop Recycling? Include reference to how 'plastic' drinks bottles are recycled through this system. **6 marks**

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation of closed loop recycling.

1 mark - basic answer

2 - marks reasonable detail

3 - marks good / full detail

Further 3 marks for reference to drinking bottles.

1 mark - basic answer

2 - marks reasonable detail

3 - marks good / full detail

**ADD YOUR OWN TEXTILES
SPECIFIC EXAMINATION
QUESTIONS**