DESIGN AND TECHNOLOGY - GCSE SAMPLE PAPER 2

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

Section A

Answer all the questions in this section

1. The question is about alternative energy.

1a. The total amount of renewable energy produced in 2016 was 90 Terawatt hours (Twh).
The ratio of hydroelectricity compared to other renewable energy forms was 1:12.
What amount of energy was produced through hydroelectricity ?   *4 marks*

HYDROELECTRICITY   :   OTHER RENEWABLE FORMS

1 : 12

Add both numbers (1 and 12)
together. This gives us 13

Then, divide the total amount of renewable energy (90 terawatt hours) by 13

$$\frac{90}{13} = 6.92 \text{ terawatt hours}$$
2 marks   *2 marks*

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.

1d. Nuclear Power is regarded by some, as an alternative and environmentally friendly way of producing electricity. List one advantage and one disadvantage of nuclear power
2 marks

Follow the link for potential answers / points / facts

1 mark for a basic answer

2 marks for a more detailed answer.

2. This question is regarding smart materials.

2a. What is polymorph? Your answer must include a reference to a practical application of polymorph.   *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.

2b. Explain why carbon fibre is a suitable composite material for the airframe of this jet fighter. Include a description of the structure of carbon fibre in your answer. *2 marks*

Follow link for potential answers

The weave of carbon fibre must be included for one mark.

In addition - one further mark for describing the suitability of the material.

2c. When this greetings card is opened and the pigment inside scratched, it emits the scent of pine trees.

Explain how aroma pigments work. Include a diagram and a simple explanation   *2 marks*

NOTES: _____

_____

_____

_____

DIAGRAM

Follow link for potential answers

1 mark for accurate diagram

1 mark for basic explanation

2d. Describe another product that includes aroma pigments.   *3 marks*

Product: *1 mark*
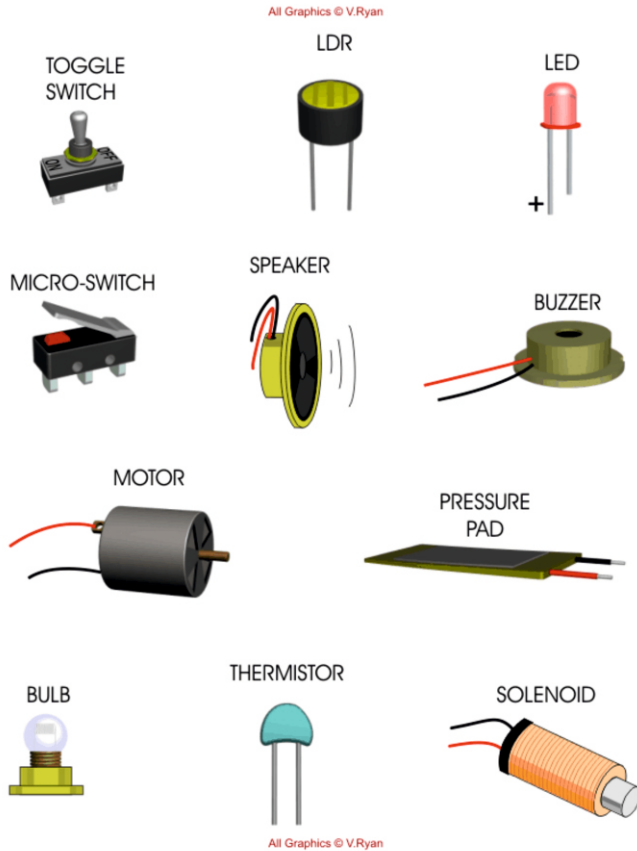
Description and explanation:

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, equilibrium and classes of lever.

3a. Study the components below. Using the blank the table, list four inputs that you have identified. *4 marks*

All Graphics © V.Ryan

TOGGLE SWITCH

LDR

LED

+

MICRO-SWITCH

SPEAKER

BUZZER

MOTOR

PRESSURE PAD

BULB

THERMISTOR

SOLENOID

All Graphics © V.Ryan

INPUTS
POTENTIAL ANSWERS: LDR, TOGGLE SWITCH, MICRO-SWITCH, PRESSURE PAD AND THERMISTOR

3b. The diagram below displays a state of equilibrium. In the space below. show the calculation that confirms this.   *4 marks*

1 TONNE

2 TONNE

6m   6m   6m
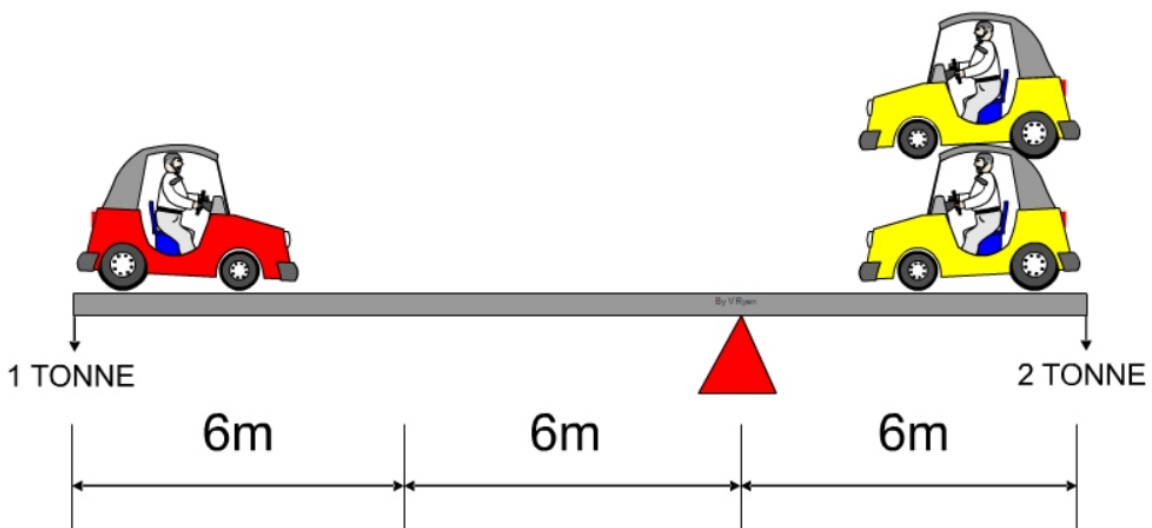
CLOCKWISE MOMENTS = ANTI-CLOCKWISE MOMENTS

1 TONNE X 12m = 2 TONNE x 6m   *2 marks*

12 = 12   *2 marks*

STATE OF EQUILIBRIUM

3c. What 'class' of lever is this? *1 mark*

EFFORT

LOAD

FULCRUM

Follow the link for the answer.

CLASS ONE

1 mark for correct answer.

What 'class' of lever is this? *1 mark*

LOAD

EFFORT

FULCRUM

Follow the link for the answer.

CLASS THREE

1 mark for correct answer.
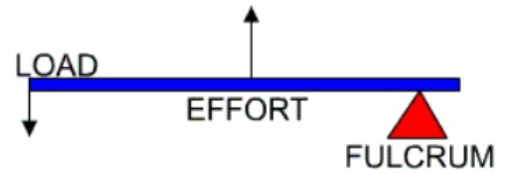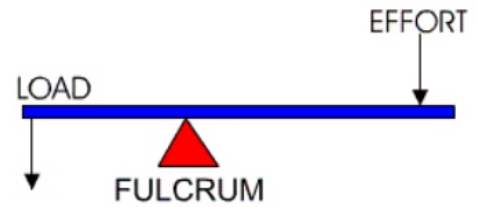
3d. What 'class' of lever does this diagram represent?
1 mark

LOAD

EFFORT

FULCRUM

CLASS TWO
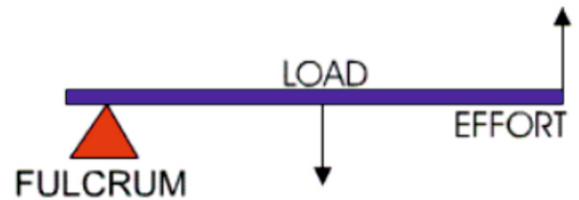
3e. In the space below, draw a practical application of the class of lever you identified in 3d (the previous question)*. 4 marks*
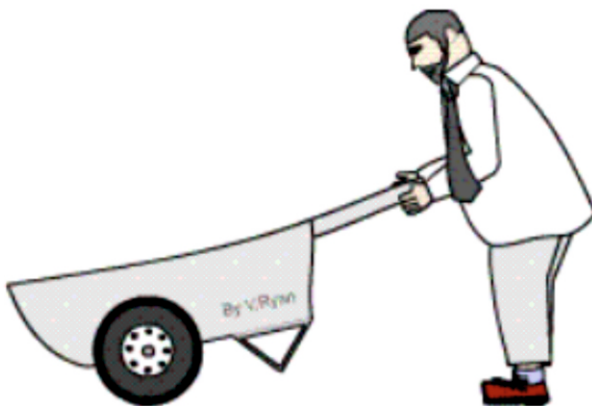
Up to 2 marks for a clear sketch.

1 additional mark for basic notes.
2 additional marks for detailed explanation.

The gardener uses a wheel barrow to lift tools and garden waste. The load is in the centre of the barrow

4. These questions are about materials

4a. The material seen below is CORRUGATED PLASTIC (POLYPROPYLENE). Draw the recycling symbol that represents this plastic.   **2 marks**

RECYCLING SYMBOL

4b. The charity collection box seen below, is manufactured from corrugated polypropylene. Why is this a suitable material?   *3 marks*

4c. What is duplex board? Include a practical use.   *2 marks*

Follow link for potential answer.

1 mark for each correct fact - up to 2 marks

4d. What is foil lined board ? Include a practical use.   *2 marks*

Follow link for potential answer.

1 mark for each correct fact - up to 2 marks

4. The products shown below have been manufactured from High Density Polyethylene (HDPE).

4e. Why is High Density Polyethylene (HDPE) 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.*

4f. Describe how the desk tidies can be manufactured by this equipment / process. Name the equipment / process in your answer.   *3 marks*

EQUIPMENT / PROCESS NAME: *INJECTION MOULDING*

DESCRIPTION:

Follow link for potential answer.

1 mark for a fact / correct statement - up to 3 marks but must include the correct name of the equipment / process.
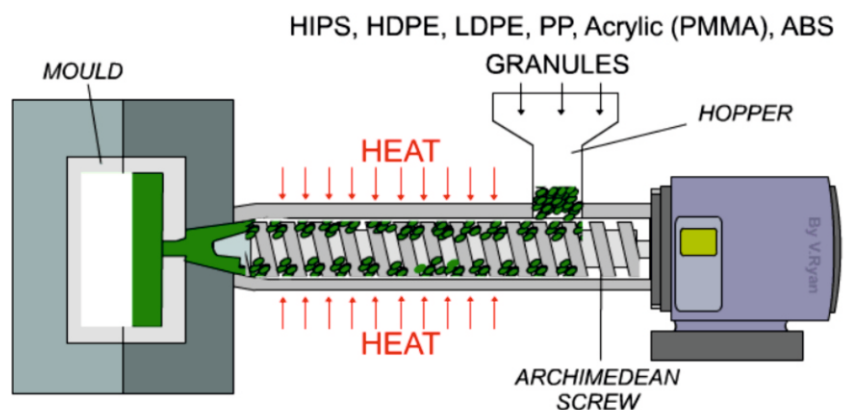
4g. A desk tidy of a similar design is to be manufactured from aluminium. The surface will have an anodised finish. Describe the anodising procedure.   *3 marks*
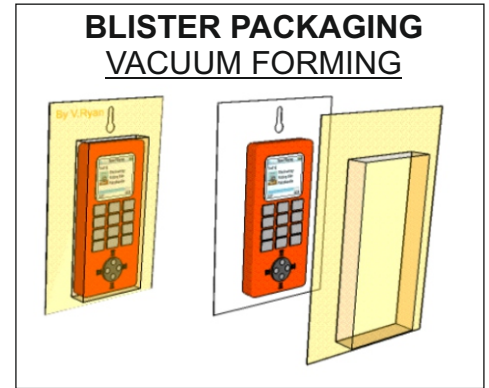
Follow link for potential answer.

1 mark per fact.

4h. The photograph shown opposite is of a typical disposable 'plastic' carrier bag. Why is polylactide a suitable material?   *3 marks*

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 INJECTION MOULDING	'PLASTIC' TROPHY ROTATIONAL MOULDING	BLISTER PACKAGING VACUUM FORMING
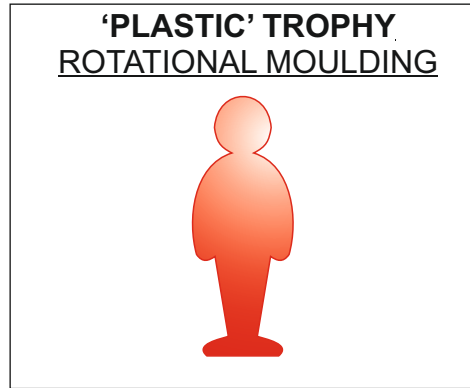
PRODUCT:

REASON 1:

up to 2 marks per reason.

Teacher discretion required.

REASON 2:

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

Follow link for potential answer / information

1 mark for a basic answer.

2 marks for more detail.

5c. The chosen product will be manufactured through a system called Lean Manufacturing. What is Lean 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.

5d. A product such as a desk tidy may need advertising. What is the purpose of advertising?   *2 marks*

Follow link for potential answer.

1 mark for one correct fact.
*2 marks for an answer including 2 facts / correct statements.*

5e. Describe one method of advertising, that you think would be successful in promoting a desk tidy.   *3 marks.*

Follow link for potential answer.

1 mark for a correct form of advertising.
2 marks for an answer including 2 facts / correct statements.
3 marks for a detailed answer.

Teacher discretion required.

VERTEX
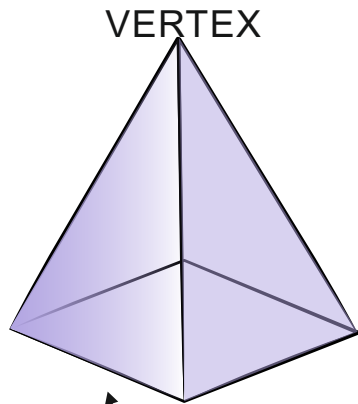
SQUARE
PYRAMID

Below is a model, typical village church.

The roof of the tower is a square pyramid.

5f. What is the area of one side of the square pyramid?

total of 4 marks

X

Y

h=300mm

b=250mm
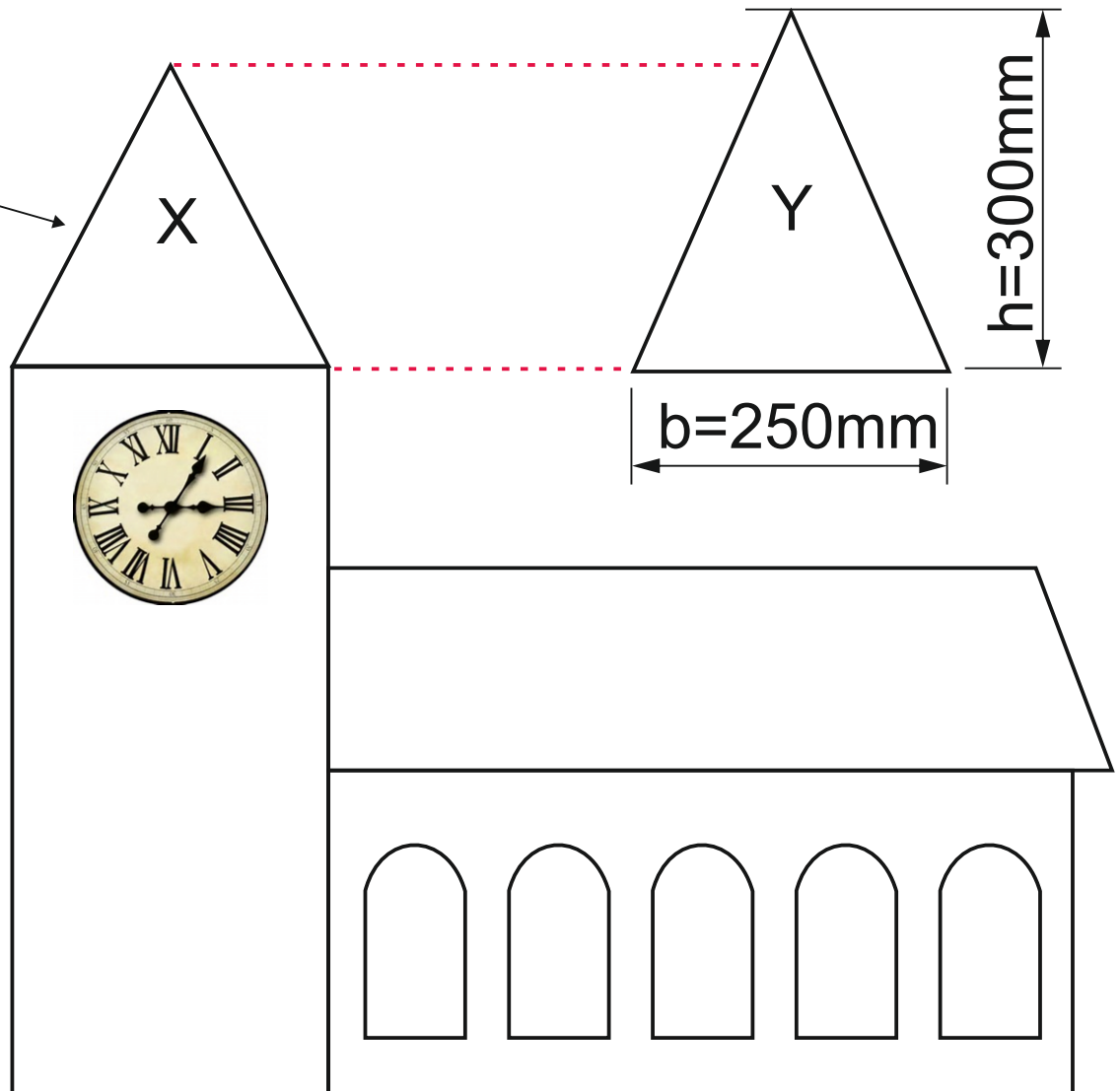
AREA = 1/2 X BASE X HEIGHT

1 mark

$$AREA = \frac{250 \times 300}{2}$$ *1 mark*

$$AREA = \frac{75000}{2}$$ *1 mark*

AREA = 37500mm²   *1 mark*

5g. The labels X and Y represent the same part, one side of the square pyramid. Why does Y appear taller than X ? *1 mark*

'Y' appears taller than 'X', because each side of the square pyramid is tilted towards the pyramid's VERTEX, giving the appearance of it being shorter than it actually is.

'Y' is the side of the pyramid held perfectly straight upwards, not inclined / tilted towards the vertex. This gives us the actual 'true' shape of the triangle.

Electronics and Systems

ANSWER ONLY **ONE** QUESTION

HELPFUL LINK   http://www.technologystudent.com/sysprp7/sysq8.html

6. A technology student has developed an automatic traffic control system for a level crossing.

A pressure sensor detects when a car passes over it. The sensor is connected to INPUT 1 of the control system.

A light sensor detects the presence of a train close to the crossing. The light sensor is connected to INPUT 2 of the control system.

When a car is detected the control system checks if a train has passed the light sensor. Then the traffic lights run through a sequence of changes, eventually changing the lights from red to green, raising the barrier and allowing the car to cross the railway line safely.

If a train is present the traffic light stays on red and the barrier remains lowered / closed.

RED

AMBER

GREEN

LIGHT SENSOR

PRESSURE SENSOR
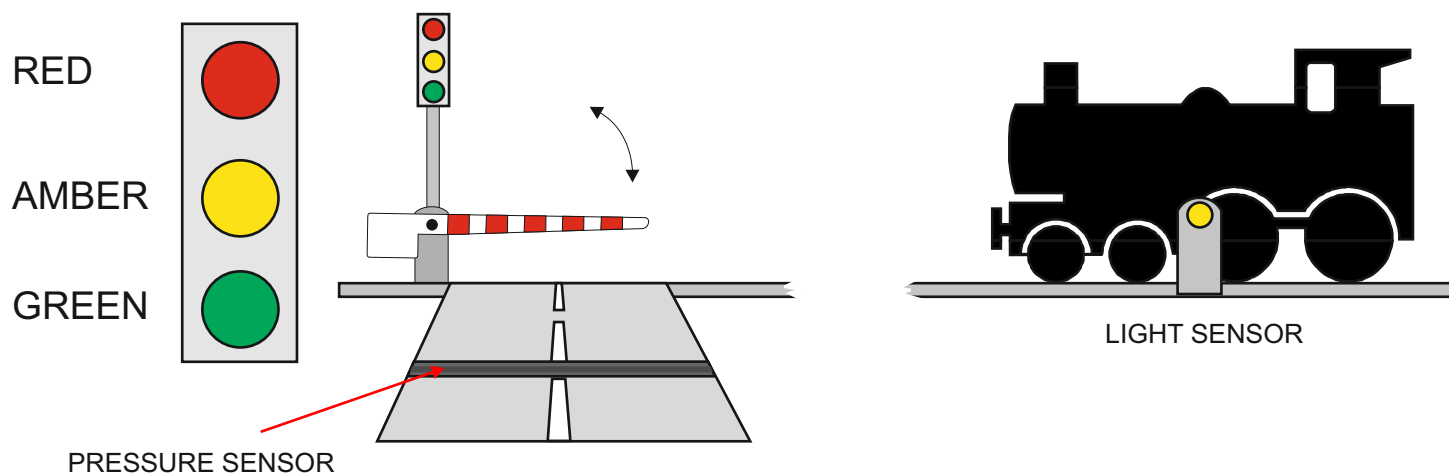
6a. The sequence of events are listed below. However, they are in the wrong order. Write the correct sequence of events in the available space. The first three stages have been completed. *4 marks*

TRAFFIC LIGHTS - AMBER OFF
BARRIER IN CLOSED POSITION
CHECK INPUT 2
TRAFFIC LIGHTS GREEN ON
TRAFFIC LIGHTS - AMBER AND RED ON
WAIT 5 SECONDS
TRAFFIC LIGHTS RED + AMBER ON
CHECK INPUT 1
BARRIER OPENS
WAIT 5 SECONDS
TRAFFIC LIGHTS - GREEN OFF
BARRIER LOWERED.
TRAFFIC LIGHTS - AMBER ON
WAIT FIVE SECONDS
WAIT 60 SECONDS
TRAFFIC LIGHTS - RED + AMBER OFF
TRAFFIC LIGHT - RED

Potential Answer - use teacher discretion

TRAFFIC LIGHT - RED

BARRIER IN CLOSED POSITION

CHECK INPUT 1

CHECK INPUT 2

TRAFFIC LIGHTS RED + AMBER ON

WAIT 5 SECONDS

TRAFFIC LIGHTS - RED + AMBER OFF

TRAFFIC LIGHTS GREEN ON

BARRIER OPENS

WAIT 60 SECONDS

TRAFFIC LIGHTS - GREEN OFF

TRAFFIC LIGHTS - AMBER ON

WAIT FIVE SECONDS

TRAFFIC LIGHTS - AMBER AND RED ON

WAIT 5 SECONDS

TRAFFIC LIGHTS - AMBER OFF

BARRIER LOWERED.

6b. Convert your sequence into a flow chart using the boxes also shown below. The first four stages have been completed for you.   *5 marks*

START/FINISH   PROCESS

INPUT / OUTPUT   DECISION
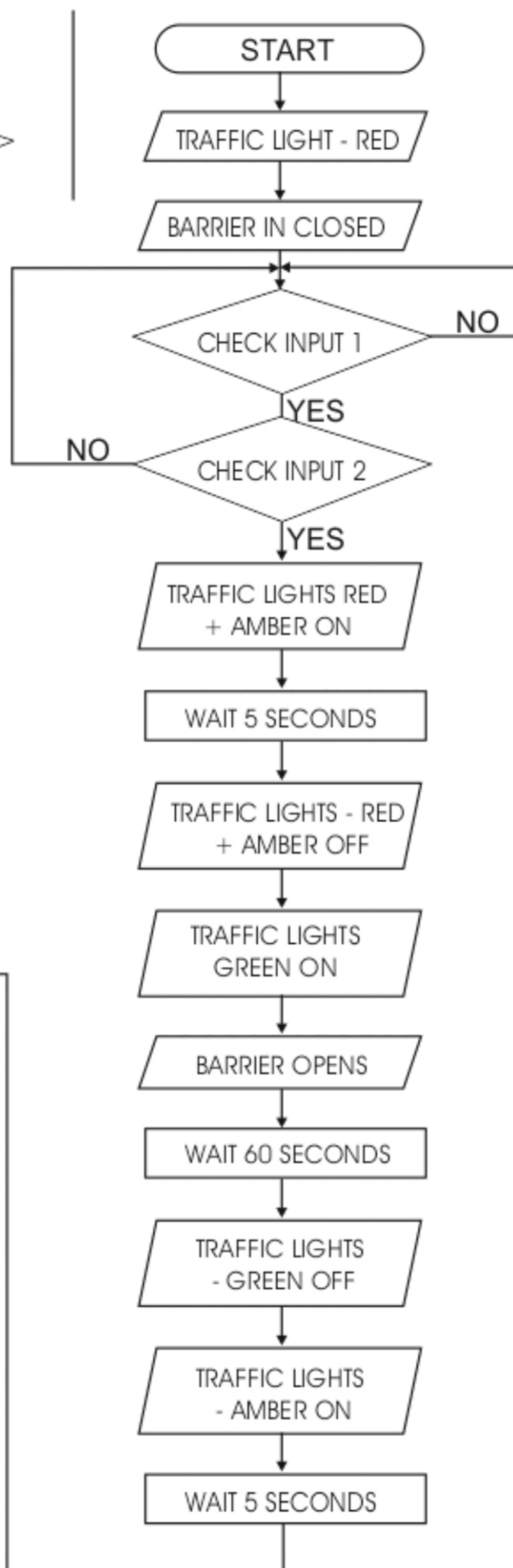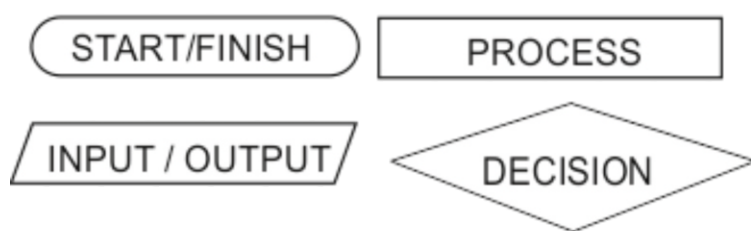
**POTENTIAL ANSWER
USE TEACHER DISCRETION**

1 TO 5 MARKS

START

TRAFFIC LIGHT - RED

BARRIER IN CLOSED

CHECK INPUT 1 — NO

YES

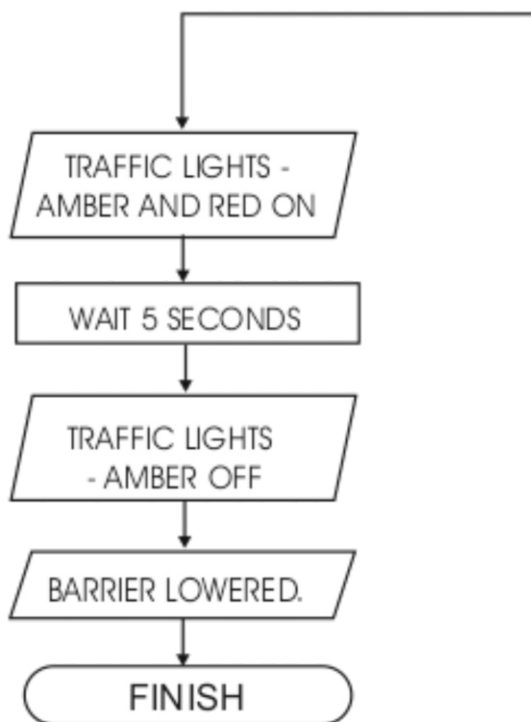CHECK INPUT 2   NO

YES

TRAFFIC LIGHTS RED + AMBER ON

WAIT 5 SECONDS

TRAFFIC LIGHTS - RED + AMBER OFF

TRAFFIC LIGHTS GREEN ON

BARRIER OPENS

WAIT 60 SECONDS

TRAFFIC LIGHTS - GREEN OFF

TRAFFIC LIGHTS - AMBER ON

WAIT 5 SECONDS

TRAFFIC LIGHTS - AMBER AND RED ON

WAIT 5 SECONDS

TRAFFIC LIGHTS - AMBER OFF

BARRIER LOWERED.

FINISH

6. The diagram below shows a gear train, composed of three gear wheels.

A
20T

B
60T

C
10T
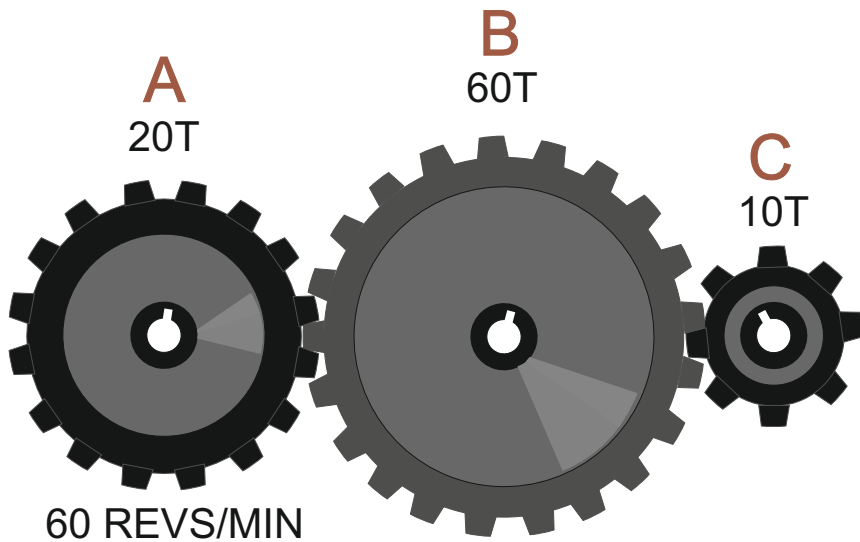
60 REVS/MIN

6c. Gear A revolves at 60 revs/min in a clockwise direction.

What is the output in revolutions per minute at Gear C?   *3 marks*

In what direction does Gear C revolve ?   *2 marks*

GEAR A	GEAR B	GEAR C
20 teeth	60 teeth	10 teeth
60 rpm	?	?

First work out the speed at Gear B. $\dfrac{60 \text{ teeth}}{20 \text{ teeth}} \dfrac{B}{A} = 3$ *1 mark*

$= \dfrac{60 \text{rpm}}{3} = 20$ revs/min at 'B'

(Remember B is larger than A therefore, B outputs less revs/min and is slower)

Next, take B and C. C is smaller, therefore, revs/minute will increase and rotation will be faster.

$\dfrac{60 \text{ teeth}}{10 \text{ teeth}} \dfrac{B}{C} = 6$ *2 marks*

20 REVS X 6 $=$ 120 revs/min at 'C'

What direction does C revolve ?
A is clockwise, B consequently is anti-clockwise and C is therefore clockwise.

2 mark

6d. With reference to a product of your choice, explain planned obsolescence.
5 marks

Follow the link to a potential answer / information.

A specific product must be mentioned for any marks to be awarded.

1 mark to be awarded per correct correct fact / point - maximum of 5 marks.

6e. Explain why planned obsolescence can be bad for the environment.   *3 marks*

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

6f. 'Planned obsolescence is sometimes deliberately and openly built into products for safety reasons'. Explain this statement, giving examples.   *3 marks*

Follow the link to a potential answer / information.
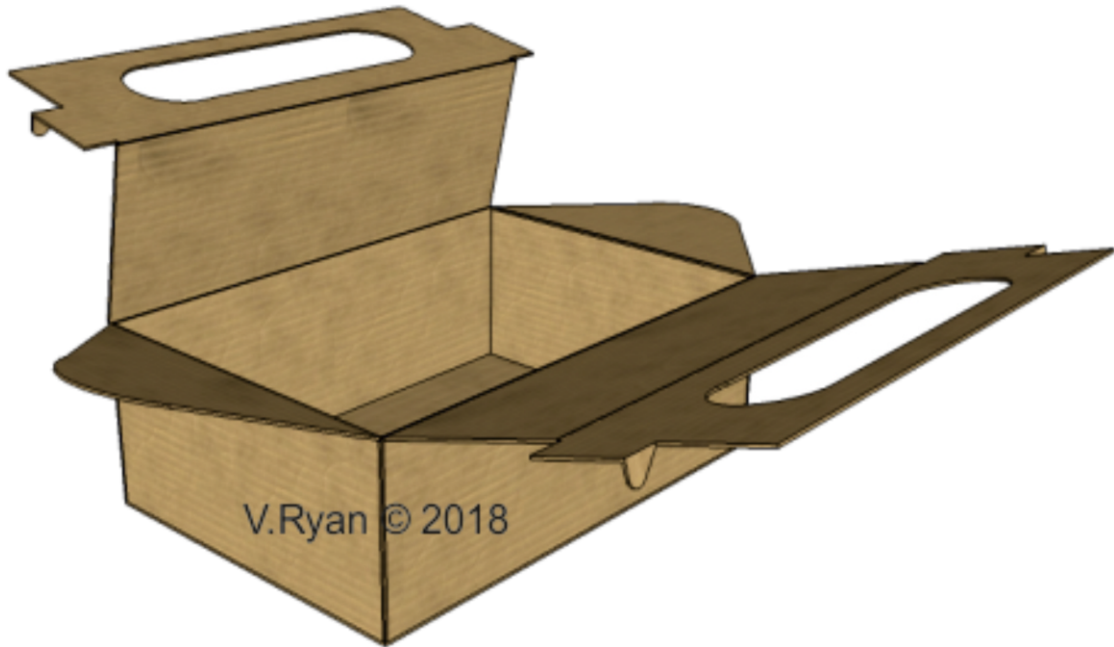
Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

Paper and Boards

7. The photograph shows a disposable food carrier / lunch box.

V.Ryan © 2018

HELPFUL LINK   http://www.technologystudent.com/prddes_2/carrier17.html

7a. Corrugated card has been used for the manufacture of the food carrier shown above. Explain why this material has been used. *2 marks*

Follow link for potential answer / information.

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

7b. Sketch the recycling symbol for card *1 mark*

Follow link for potential answer / information.

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

20 PAP

7c. The lunch carrier is to have quality graphics, applied to a quality card lid, which will be UV varnished. What is UV varnishing?   *2 marks*

Follow link for potential answer / information.

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

7d. The product will be sold with a free gift, a coffee cup (shown below). Sublimation printing has been used to apply graphics to the cup's surface. What is sublimation printing. Use notes and a sketch(s) in your answer.   *4 marks*

NOTES   SKETCHES
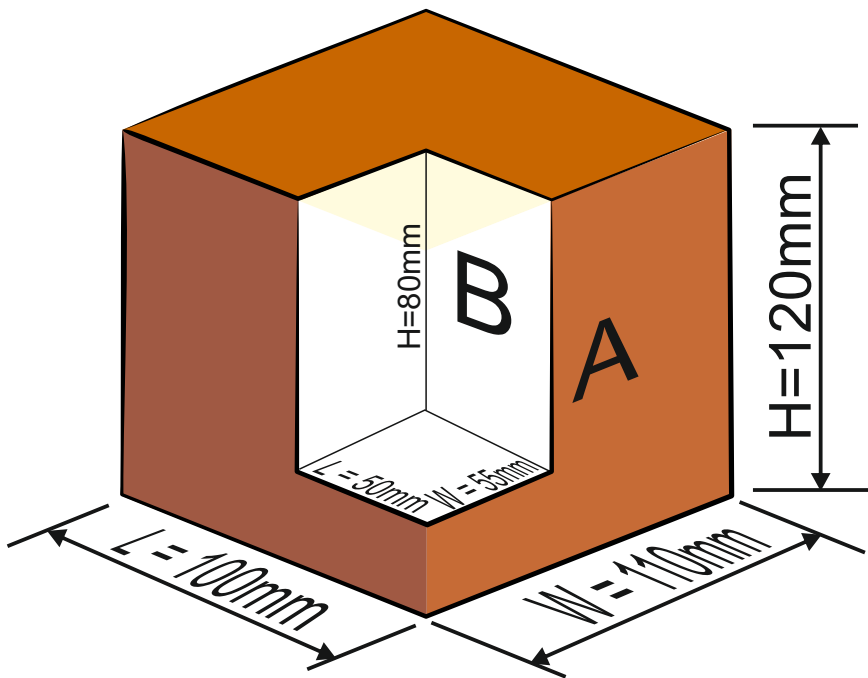
_____

_____

_____   *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.

7e. It is based on a rectangular prism, with a small section folded internally, given the impression that a smaller rectangular prism has been removed.

What is the volume of the finished 3D shape? Explain your working out.

5 marks

To answer this question, the best approach is to treat the rectangular prism as two separate rectangular prisms, A and B. The length, width and height of each of the prisms can be clearly seen on the diagram above.

How to work out the answer:

Start by treating both A and B as solid rectangular prisms.
Work out the volume of each rectangular A and B

'A' *2 marks*

V=L x W x H

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

'B' *2 marks*

V=L x W x H

VOLUME = 50mm x 55mm x 80mm
VOLUME = 220000mm³ or 220cm³

Then, subtract the volume of B from the volume of A, to find the final overall volume of the geometrical shape.

FINAL VOLUME = A - B

FINAL VOLUME = 1320000mm³ - 220000mm³

FINAL VOLUME = 1100000mm³ or 1100cm³

1 mark

7f. With reference to a product of your choice, explain planned obsolescence.
5 marks

Follow the link to a potential answer / information.

A specific product must be mentioned for any marks to be awarded.

1 mark to be awarded per correct correct fact / point - maximum of 5 marks.

7g. Explain why planned obsolescence can be bad for the environment.   *3 marks*

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

7h. 'Planned obsolescence is sometimes deliberately and openly built into products for safety reasons'. Explain this statement, giving examples.   *3 marks*

Follow the link to a potential answer / information.
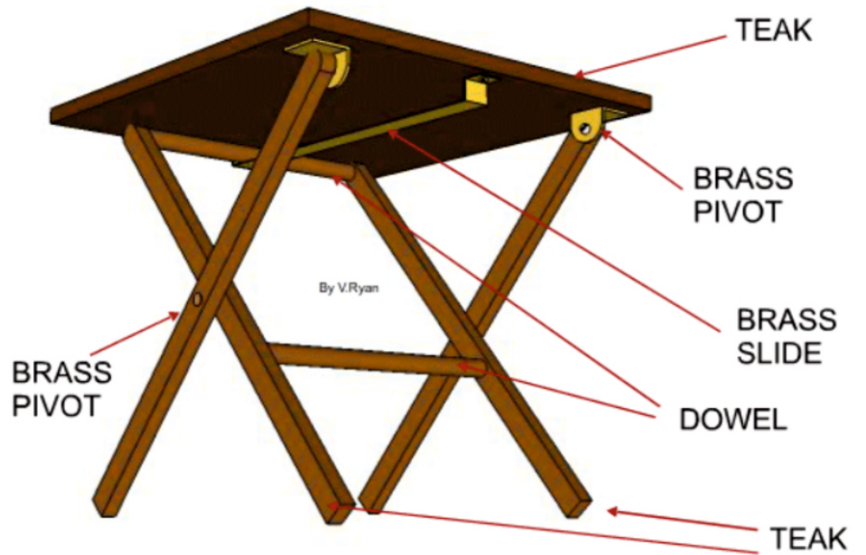
Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

Natural and manufactured timber

8. Study the teak, folding outdoor table / picnic table shown opposite.

TEAK

BRASS PIVOT

BRASS SLIDE

DOWEL

BRASS PIVOT

TEAK

By V.Ryan

HELPFUL LINK   http://www.technologystudent.com/rmprep08/prod1.html

8a. Why is teak a suitable material for the outdoor table?   *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_flsh/finish6.html

8b. The outdoor table has been 'finished' with teak oil. 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.

HELPFUL LINK   http://www.technologystudent.com/despro_flsh/finish6.html

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

1 mark for an alternative - teacher discretion required.

The table design has been updated to a 'knock-down' piece of furniture (seen below).
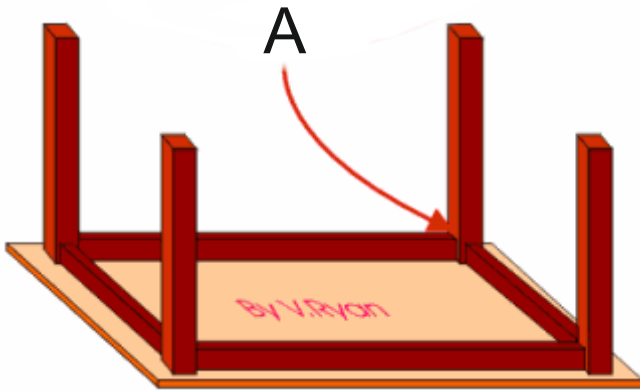
3D VIEW - SHOWING UNDERNEATH

SIDE VIEW

8d. Name and sketch a suitable KNOCK-DOWN joint for 'A', as shown on the drawing above. *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.

8e. The table top is to be updated. An acrylic insert, is to be set into the table top. The table top is composed of two rectangular pieces, accurately cut to size on a laser cutter. They fit perfectly together.

1. Calculate the area of piece A.   *2 marks*

2. Calculate the area of piece B.   *3 marks*
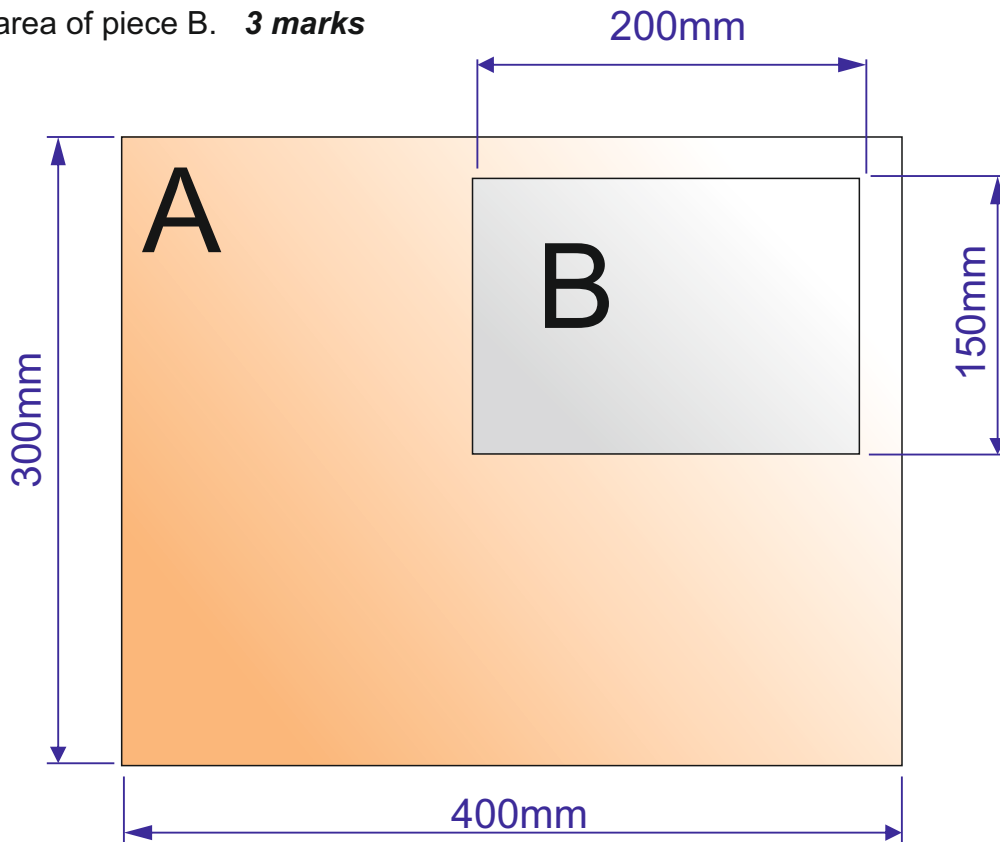
First, calculate the entire area of 'A', without the smaller piece being removed, by treating it as a rectangle 400mm x 300mm.

AREA = LENGTH X HEIGHT
AREA = 400 X 300
AREA = 120000mm²

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

AREA = LENGTH X HEIGHT
AREA = 200 X 150
AREA = 30000mm²

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 = 90000mm²

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

AREA OF PIECE 'B' IS 30000mm²

8f. With reference to a product of your choice, explain planned obsolescence.
5 marks

Follow the link to a potential answer / information.

A specific product must be mentioned for any marks to be awarded.

1 mark to be awarded per correct correct fact / point - maximum of 5 marks.

8g. Explain why planned obsolescence can be bad for the environment.   *3 marks*

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

8h. 'Planned obsolescence is sometimes deliberately and openly built into products for safety reasons'. Explain this statement, giving examples.   *3 marks*

Follow the link to a potential answer / information.
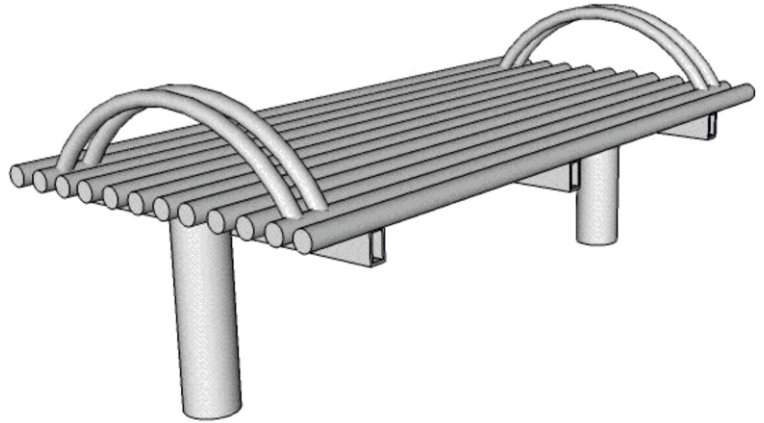
Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

Ferrous and non-ferrous metals

9. This steel bench is manufactured from steel round section tube.

| HELPFUL LINK | http://www.technologystudent.com/joints/steelbnch1.html |

9a. Why is steel tube suitable for the manufacture of the bench?   *5 marks*

Follow the link for the answer / information.

1 mark - very basic understanding / one correct fact.

2 - 3 marks good / detailed understanding displayed.

4 - 5 marks detailed understanding displayed.

Teacher discretion required.

9b. Describe how the steel bench could be dry powder coated, producing a coloured, protective finish. 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.

9e. The solid steel object seen below, has been manufactured on an engineering centre lathe. It is one solid piece. Calculate the total volume. *5 marks*

HEIGHT= 30mm ← A

RADIUS= 20mm

HEIGHT= 90mm ← B

RADIUS= 40mm
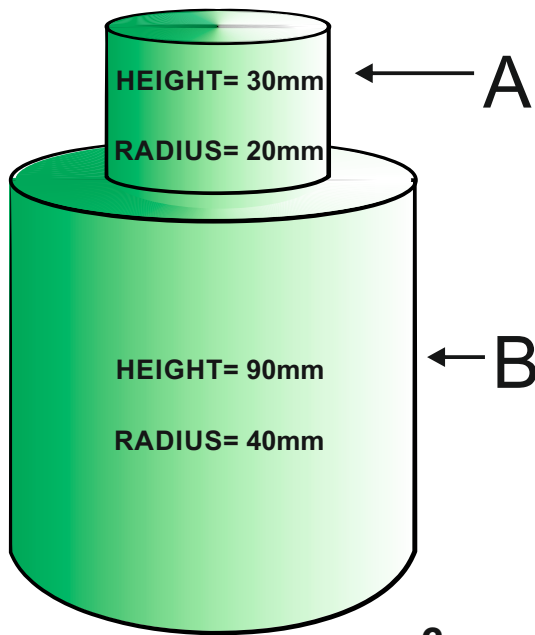
In order to calculate the entire volume of the engineered solid, it is treated as two separate parts. Part A is the smaller cylinder and part B is the larger cylinder.

2 marks

PART A

$v = \pi r^2 h$

volume = 3.14 x 20mm x 20mm x 30mm

volume = 37680mm³

or

volume = 37.680cm³

2 marks

PART B

$v = \pi r^2 h$

volume = 3.14 x 40mm x 40mm x 90mm

volume = 452160mm³

or

volume = 452.160cm³

Then add both volumes together, to find the overall volume of the engineered object.

1 mark

FINAL VOLUME = A + B

FINAL VOLUME = 37680mm³ + 452160mm³

FINAL VOLUME = 489840mm³ or 489.84cm³

9f. With reference to a product of your choice, explain planned obsolescence.
5 marks

Follow the link to a potential answer / information.

A specific product must be mentioned for any marks to be awarded.

1 mark to be awarded per correct correct fact / point - maximum of 5 marks.

9g. Explain why planned obsolescence can be bad for the environment.   *3 marks*

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

9h. 'Planned obsolescence is sometimes deliberately and openly built into products for safety reasons'. Explain this statement, giving examples. *3 marks*

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

Thermosetting and thermoforming plastics

10. The product seen opposite, is a 'plastic'
trophy, manufactured through the process called
rotational moulding'

10a. Name a material suitable for this industrial process?
1 mark

polyethylene or polypropylene

10b. In the space below, explain the process of rotational moulding. Include a sketch and
notes. *3 marks*

Follow the link for a potential answer / information.

1 mark for a simple sketch

Up to 2 marks for a simple diagram

10. The products shown below have been manufactured from nylon.

NUTS AND BOLTS   CLIPS   BAGS / HOLDALLS

BEARINGS   GEARS / PULLEYS   YARN / STRING   WATERPROOF CLOTHING

HELPFUL LINK	http://www.technologystudent.com/joints_flsh/nylon2.html

10c. Using notes and a sketch, explain how nylon is manuafctured.   **5 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.

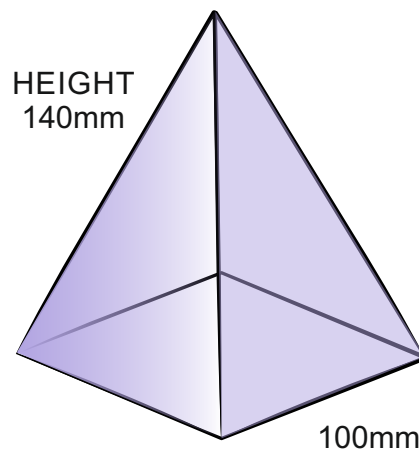*4 to 5 marks - detailed understanding - notes and accurate sketch.*

NOTES

10d. A solid polyethylene square pyramid has been manufactured by rotational moulding. What is the volume of the shape ?   *5 marks*

HEIGHT
140mm

100mm

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 = 100mm X 100mm = 10000mm²   2 marks

THEN APPLY THE FOLLOWING FORMULA

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

$V = \frac{1}{3}$ x 10000mm x 140mm   3 marks

$V = \frac{1}{3}$ x 1400000mm

$V = \frac{1400000mm}{3} = 466666.66mm³$

10e. With reference to a product of your choice, explain planned obsolescence.
5 marks

Follow the link to a potential answer / information.

A specific product must be mentioned for any marks to be awarded.

1 mark to be awarded per correct correct fact / point - maximum of 5 marks.

10f. Explain why planned obsolescence can be bad for the environment.   *3 marks*

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

10g. 'Planned obsolescence is sometimes deliberately and openly built into products for safety reasons'. Explain this statement, giving examples. *3 marks*

Follow the link to a potential answer / information.

Up to 3 marks for the correct explanation.

1 mark - basic answer
2 - marks reasonable detail
3 - marks good / full detail

ADD YOUR OWN TEXTILES SPECIFIC EXAMINATION QUESTIONS