

DESIGN AND TECHNOLOGY - GCSE SAMPLE PAPER 2

COMPONENT 1

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 15

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

EXPLANATION: _____

HELPFUL LINK <http://www.technologystudent.com/energy1/hydr2.htm>

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

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

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

HELPFUL LINK <http://www.technologystudent.com/equip1/poly1.htm>

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**

HELPFUL LINK <http://www.technologystudent.com/joints/carfib1.html>

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**



HELPFUL LINK <http://www.technologystudent.com/joints/aroma1.html>

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

HELPFUL LINK <http://www.technologystudent.com/joints/aroma1.html>

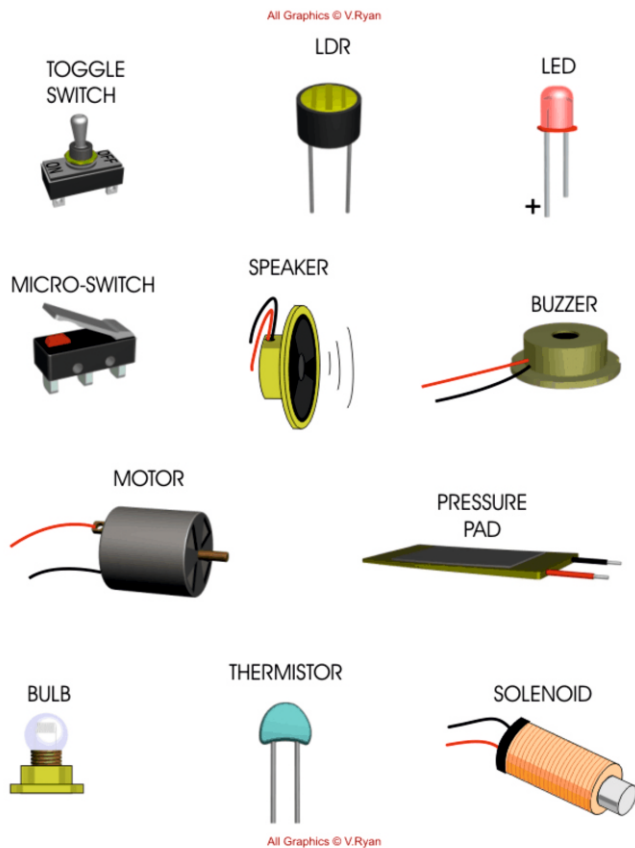
2d. Describe another product that includes aroma pigments. **3 marks**

Product: _____

Description and explanation: _____

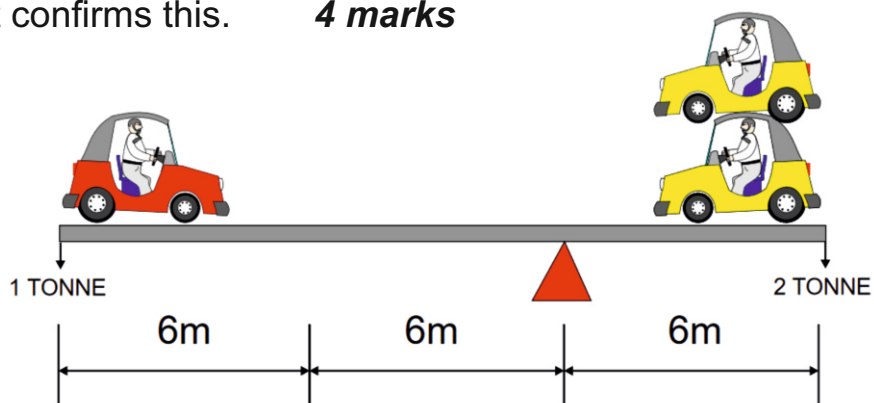
3. This question is regarding electronics, equilibrium and classes of lever.

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



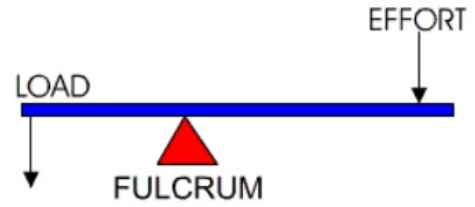
INPUTS

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

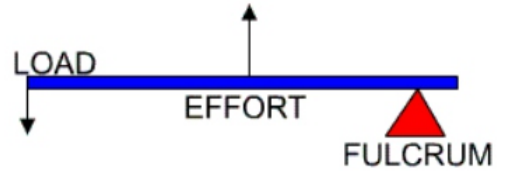


HELPFUL LINK <http://www.technologystudent.com/forcmom/lever1.htm>

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



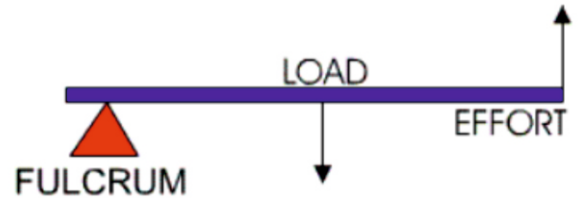
What 'class' of lever is this? **1 mark**



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

3d. What 'class' of lever does this diagram represent?

1 mark



3e. In the space below, draw a practical application of the class of lever you identified in 3d (the previous question). **4 marks**

NOTES

SKETCH

HELPFUL LINK http://www.technologystudent.com/despro_f1sh/charity10.html

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**



HELPFUL LINK http://www.technologystudent.com/despro_f1sh/charity10.html

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



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

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

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

HELPFUL LINK <http://www.technologystudent.com/joints/petevac4.html>

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



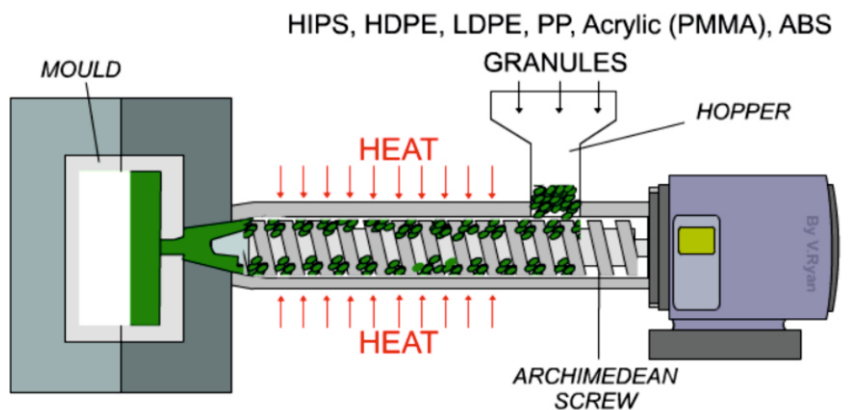
4e. Why is High Density Polyethylene (HDPE) ideal for their manufacture of the products? **3 marks**

HELPFUL LINK <http://www.technologystudent.com/equip1/inject1.htm>

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: _____

DESCRIPTION:



HELPFUL LINK http://www.technologystudent.com/joints_flsh/metal2.html

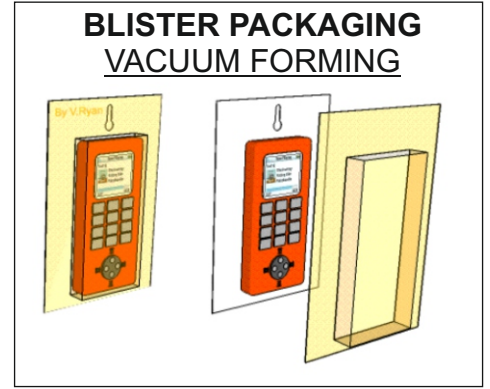
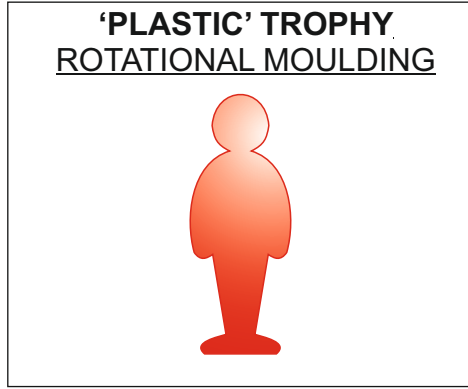
4g. A desk tidy of a similar design is to be manufactured from aluminium. The surface will have an anodised finish. Describe the anodising procedure. **3 marks**

HELPFUL LINK <http://www.technologystudent.com/joints/poly3.html>



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

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**



TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/joints/desk8.htm>
<http://www.technologystudent.com/prddes1/rotate2.html>
<http://www.technologystudent.com/gprep07/vac2.html>

PRODUCT: _____

REASON 1: _____

REASON 2: _____

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

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

HELPFUL LINKS http://www.technologystudent.com/despro_3/lean1.html
http://www.technologystudent.com/despro_3/lean2.html

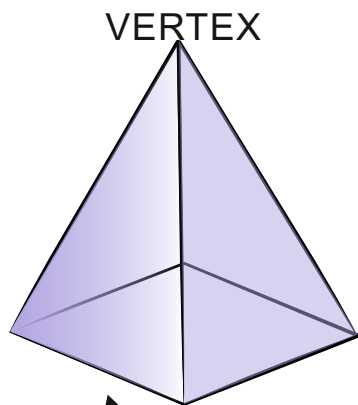
5c. The chosen product will be manufactured through a system called Lean Manufacturing. What is Lean Manufacturing? **4 marks**

HELPFUL LINK <http://www.technologystudent.com/prddes1/advert2.html>

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

HELPFUL LINKS <http://www.technologystudent.com/prddes1/advert1.html>
<http://www.technologystudent.com/prddes1/advert2.html>

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



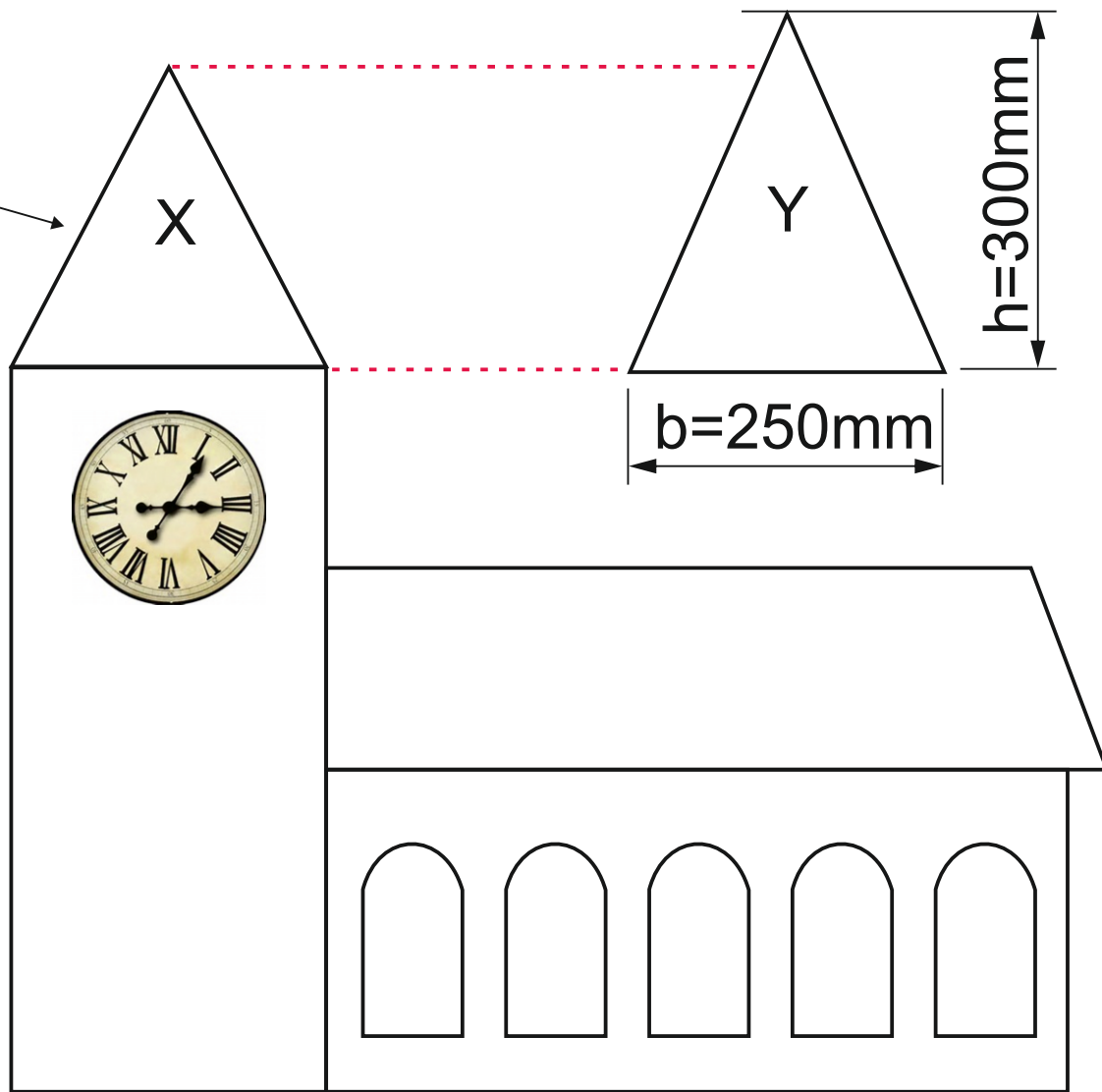
SQUARE
PYRAMID

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?

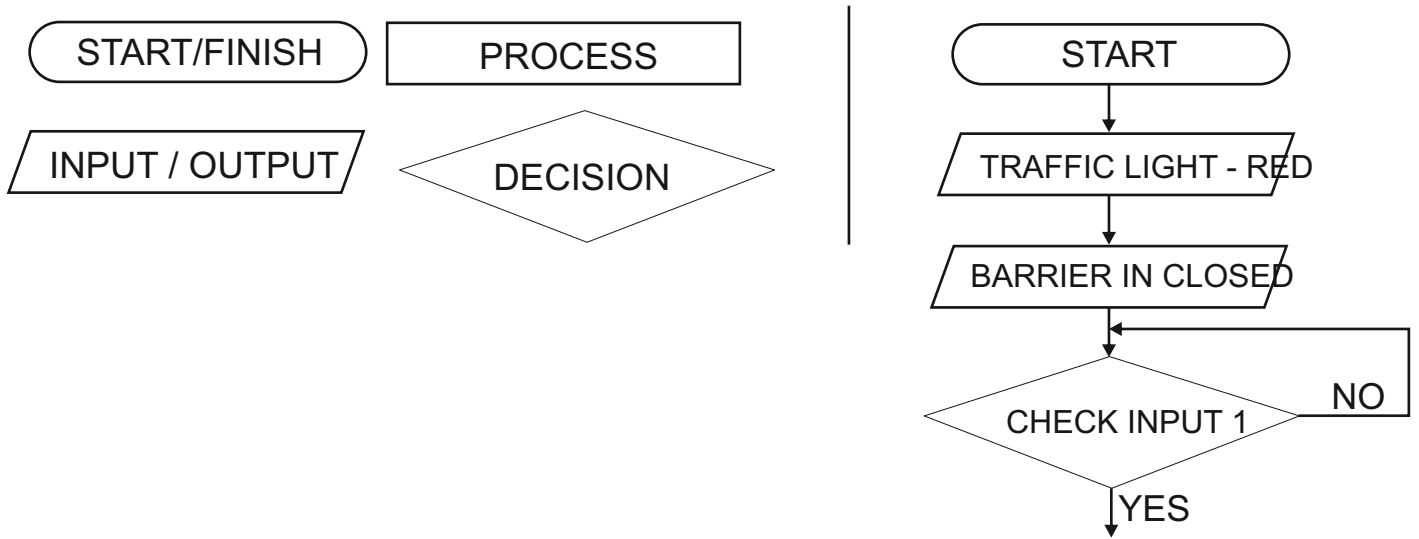
4 marks



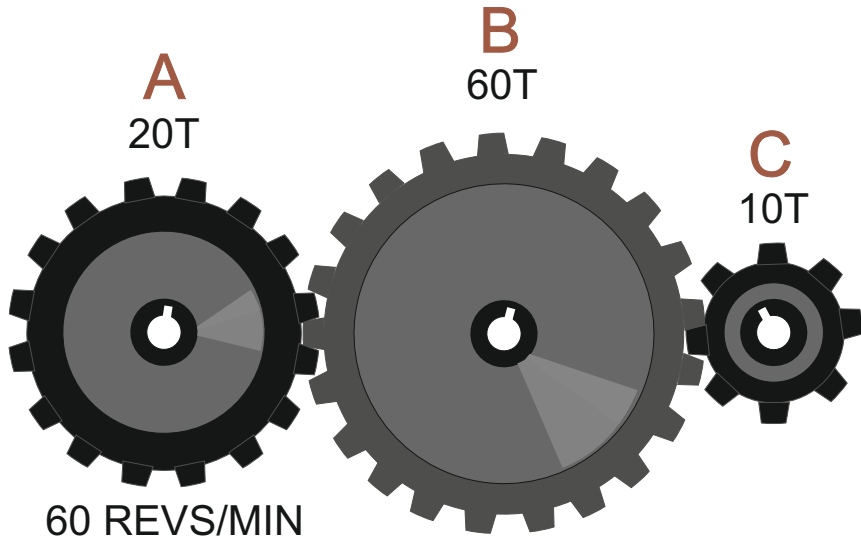
CALCULATION

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**

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**



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



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

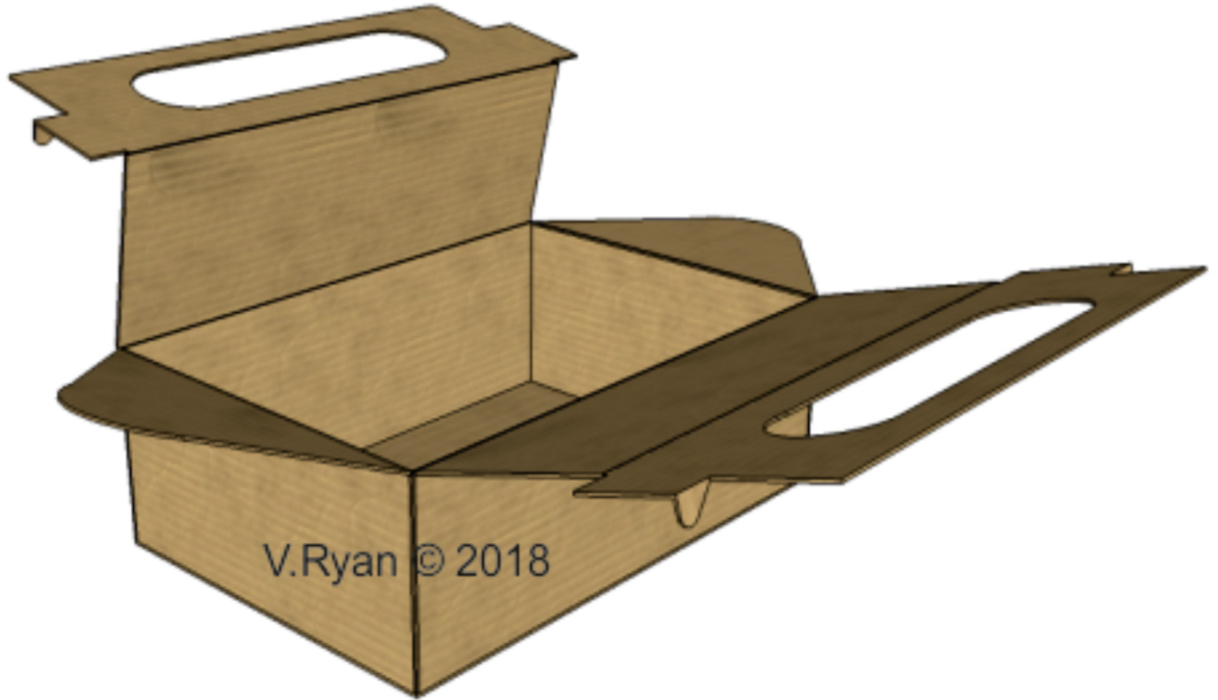
What is the output in revolutions per minute at Gear C? **3 marks**

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

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

Paper and Boards

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



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**

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

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**

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

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

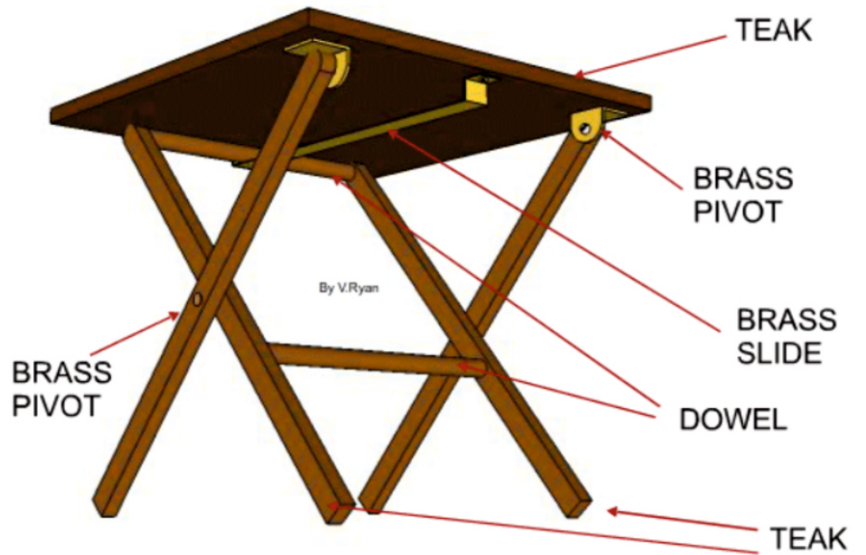
5 marks

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

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

Natural and manufactured timber

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



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

8a. Why is teak a suitable material for the outdoor table? **2 marks**

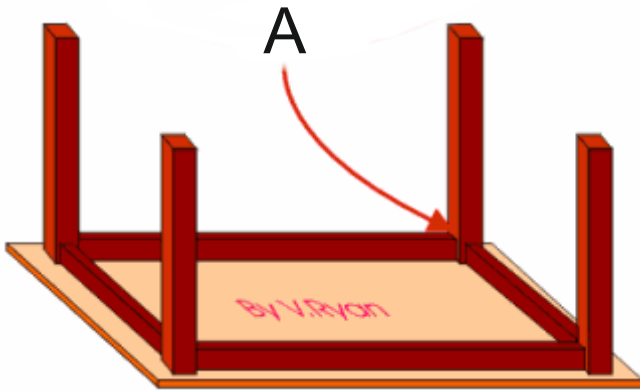
HELPFUL LINK http://www.technologystudent.com/despro_flesh/finish6.html

8b. The outdoor table has been 'finished' with teak oil. Why can this be considered a suitable choice? **2 marks**

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

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

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



3D VIEW - SHOWING UNDERNEATH



SIDE VIEW

HELPFUL LINK <http://www.technologystudent.com/joints/tableft1.htm>

8d. Name and sketch a suitable KNOCK-DOWN joint for 'A', as shown on the drawing above. **4 marks**

NAME: _____

SKETCH

HELPFUL LINK

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

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

4 marks

Thermosetting and thermoforming plastics

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



HELPFUL LINK <http://www.technologystudent.com/prddes1/rotate2.html>

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

1 mark

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

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



NUTS AND BOLTS



CLIPS



BAGS / HOLDALLS



WATERPROOF CLOTHING



BEARINGS



GEARS / PULLEYS



YARN / STRING

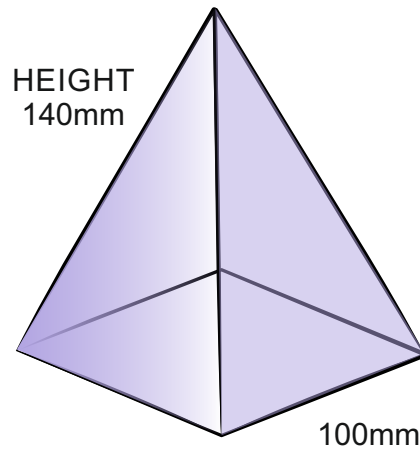
HELPFUL LINK http://www.technologystudent.com/joints_flsh/nylon2.html

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

SKETCH

NOTES

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

**ADD YOUR OWN TEXTILES
SPECIFIC EXAMINATION
QUESTIONS**