

# SAMPLE DESIGN AND TECHNOLOGY GCSE EXAMINATION PAPER (SAMPLE 3)

**CENTRE NUMBER**

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**CANDIDATE NUMBER**

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**SURNAME** \_\_\_\_\_

**FORENAME(S)** \_\_\_\_\_

**CANDIDATE SIGNATURE** \_\_\_\_\_

## 2 HOURS ALLOWED

### Materials required for this examination:

- normal writing and drawing instruments
- a calculator
- a protractor.

### Instructions to candidates:

- Use black ink or black ball-point pen. Use pencil only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

### Information

- The marks for questions are displayed.
- The maximum mark for this paper is 131.
- There are 22 marks for Section A, 37 marks for Section B and 72 marks for Section C.

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

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# CORE TECHNICAL PRINCIPLES - SECTION A

The questions to follow are multiple choice. Tick one answer for each question.

**1. Which one of the following energy production systems is a fossil fuel ?**

A. Wind Power

B. Hydraulic Fracturing

C. Nuclear Power

D. Hydroelectricity

This link will help you answer this question

<http://www.technologystudent.com/energy1/engex.htm>

**2. The character below is standing still. What is this type of load?**



This link will help you answer this question

<http://www.technologystudent.com/forcmom/force1.htm>

A. Dynamic

B. Resting

C. Static

D. Shear

**3. A thermosetting plastic is:**

Link to potential answer

<http://www.technologystudent.com/designpro/plastic1.htm>

A. Once 'set' these plastics cannot be reheated to soften, shape and mould.

B. These plastics can be reheated up to four times, but no more.

C. These plastics can be re-heated and therefore shaped in various ways.

D. This is a composite plastic, made up of several layers.

**4. From the list of materials, identify the material that includes chromium in its composition.**

A. Copper

B. Nylon

C. Stainless steel

D. Lead

[Link to potential answer](#)

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

**5. Which of the following names means, 'materials on a very small scale', on a scale of three atoms?**

A. Small scale.

B. Micro-material

C. mini-substance

D. Nano

[Link to potential answer](#)

[http://www.technologystudent.com/joints\\_fish/nanomats1.html](http://www.technologystudent.com/joints_fish/nanomats1.html)

**6. Which of the following statements describing 'torsion' is true?**

[Link to potential answer](#)

<http://www.technologystudent.com/forcmom/force1.htm>

A. Torsion is a 'twisting' force.

B. Torsion occurs when a material is stretched in a straight line.

C. Torsion is the 'impact' when two materials are knocked together.

D. Torsion is the term used to describe a rise in temperature of a material.

**7. Which of the statements below is the definition of the physical property 'Ductility'?**

[Link to potential answer](#)

<http://www.technologystudent.com/joints/conduct1.html>

A. A ability of a material to resist impact when dropped .

B. The ability of a material to resist a stretching force.

C. The ability of a material to return to its original shape.

D. The ability of a material to change shape (deform) usually by stretching along its length.

## 8. Which of the following statements is representative of crowd funding?

Link to potential answer

[http://www.technologystudent.com/prddes\\_2/crowd1.html](http://www.technologystudent.com/prddes_2/crowd1.html)

- A. A group of designers fund the manufacture of a new product
- B. The person / company seeking funding, sets up a 'page' on a website and asks for financial support.
- C. A number of companies directly sponsor a designer, in exchange for advertising.
- D. The Government funds a designer through taxes.

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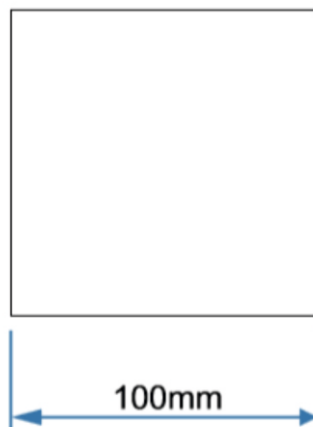
## 9. Which of the following is the process called 'etching'?

Link to potential answer

[http://www.technologystudent.com/joints\\_flash/etching1.html](http://www.technologystudent.com/joints_flash/etching1.html)

- A. A process whereby paint is sprayed onto the surface of a material.
- B. A process that changes the colour of the surface of a metal.
- C. A process that creates a long-lasting protective coating on a metal.
- D. Acid is used to slowly remove the unprotected surface of a metal, for a decorative finish.

## 10. What is the area of the square shown below?



Follow the link to a potential answer.

<http://www.technologystudent.com/pdf14/maths2.pdf>

- A.  $1000\text{mm}^2$
- B.  $10000\text{mm}^2$
- C.  $1100\text{mm}^2$
- D.  $10100\text{mm}^2$

TO HELP YOU ANSWER  
THIS QUESTION

[http://www.technologystudent.com/despro\\_flsh/flexply1.html](http://www.technologystudent.com/despro_flsh/flexply1.html)

**11. Give two reasons why Flexi-ply is suitable for making 'curved' products such as furniture. 2 marks**

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Reason 1:

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Reason 2:

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TO HELP YOU ANSWER  
THIS QUESTION

<http://www.technologystudent.com/joints/pla1.html>

<http://www.technologystudent.com/joints/poly2.html>

**12. Describe one practical application of polylactide (PLA). Include in your answer, how the environment will benefit from the use of this material 2 marks**

Practical Application:

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Environmental Benefit:

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TO HELP YOU ANSWER  
THIS QUESTION

<http://www.technologystudent.com/energy1/frack1.html>

**13. Hydraulic Fracking is a method of extracting oil and gas from rocks below the earth's surface. Give two reasons why some people support this technique. 2 marks**

Reason 1:

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Reason 2:

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**14. Give two reasons why some people are not in favour of hydraulic fracking. 2 marks**

Reason 1: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

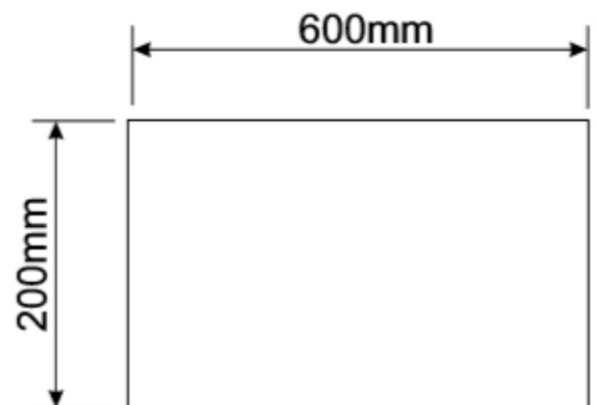
Reason 2: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**15. This question is about using ratios to scale drawings?  
What is the ratio of height to length of the rectangle?  
You will gain marks for the calculation and your written explanation of the calculation.**

**4 marks**

EXPLANATION: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# SECTION B - Specialist Technical Principles

**POLYURETHANE FOAM**

**BIOPOL**

**16. Select one of the materials listed above.**

**Name of Material** \_\_\_\_\_

**Describe your chosen materials manufacture. Include notes and a labelled sketch(s)**  
**8 marks**

TO HELP YOU ANSWER  
THIS QUESTION

<http://www.technologystudent.com/joints/polyurethane1.html>

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

<http://www.technologystudent.com/joints/poly2.html>

TO HELP YOU ANSWER  
THIS QUESTION

<http://www.technologystudent.com/equip1/hfile1.htm>  
<http://www.technologystudent.com/equip1/buff1.htm>

17. Describe two processes that help to smooth / enhance the edge of a piece of 6mm thick acrylic. *Use notes and a sketch.* 2 x 2 marks

Process 1: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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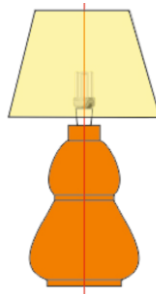
Process 2: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

18. 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\\_fish/pewtt1.html](http://www.technologystudent.com/equip_fish/pewtt1.html)  
[http://www.technologystudent.com/equip\\_fish/pewtt2.html](http://www.technologystudent.com/equip_fish/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: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



REASON 2: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**19. For the product you selected in question 18 - describe / explain the industrial process used in it's manufacture. *The industrial process is listed under the product name.* 5 marks**

TO HELP YOU ANSWER THIS QUESTION USE THE SAME LINKS AS QUESTION 18

INDUSTRIAL PROCESS: \_\_\_\_\_

DESCRIPTION OF MANUFACTURING PROCESS  
INCLUDE NOTES AND A SKETCH(S)

**20a. What is the difference between batch production and continuous production? 4 marks**

TO HELP YOU ANSWER  
THIS QUESTION

Follow the links below.

<http://www.technologystudent.com/joints/scalep1.htm>

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**20b. Briefly describe the stages involved in the batch manufacture of a product of your choice 4 marks**

TO HELP YOU ANSWER  
THIS QUESTION

Follow the links below.

<http://www.technologystudent.com/joints/bat1.htm>

<http://www.technologystudent.com/joints/batch1.htm>

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TO HELP YOU ANSWER  
THIS QUESTION

Follow the links below.  
<http://www.technologystudent.com/rmprp07/intman1.html>

**21a. What is Computer Integrated Manufacture (CIM)? 4 marks**

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TO HELP YOU ANSWER  
THIS QUESTION

Follow the links below.  
<http://www.technologystudent.com/rmprp07/injec1.html>

**21b. Select a product that could be manufactured through Computer Aided Manufacture (CIM) and describe the stages involved in it's manufacture 4 marks**

PRODUCT:

DESCRIPTION:

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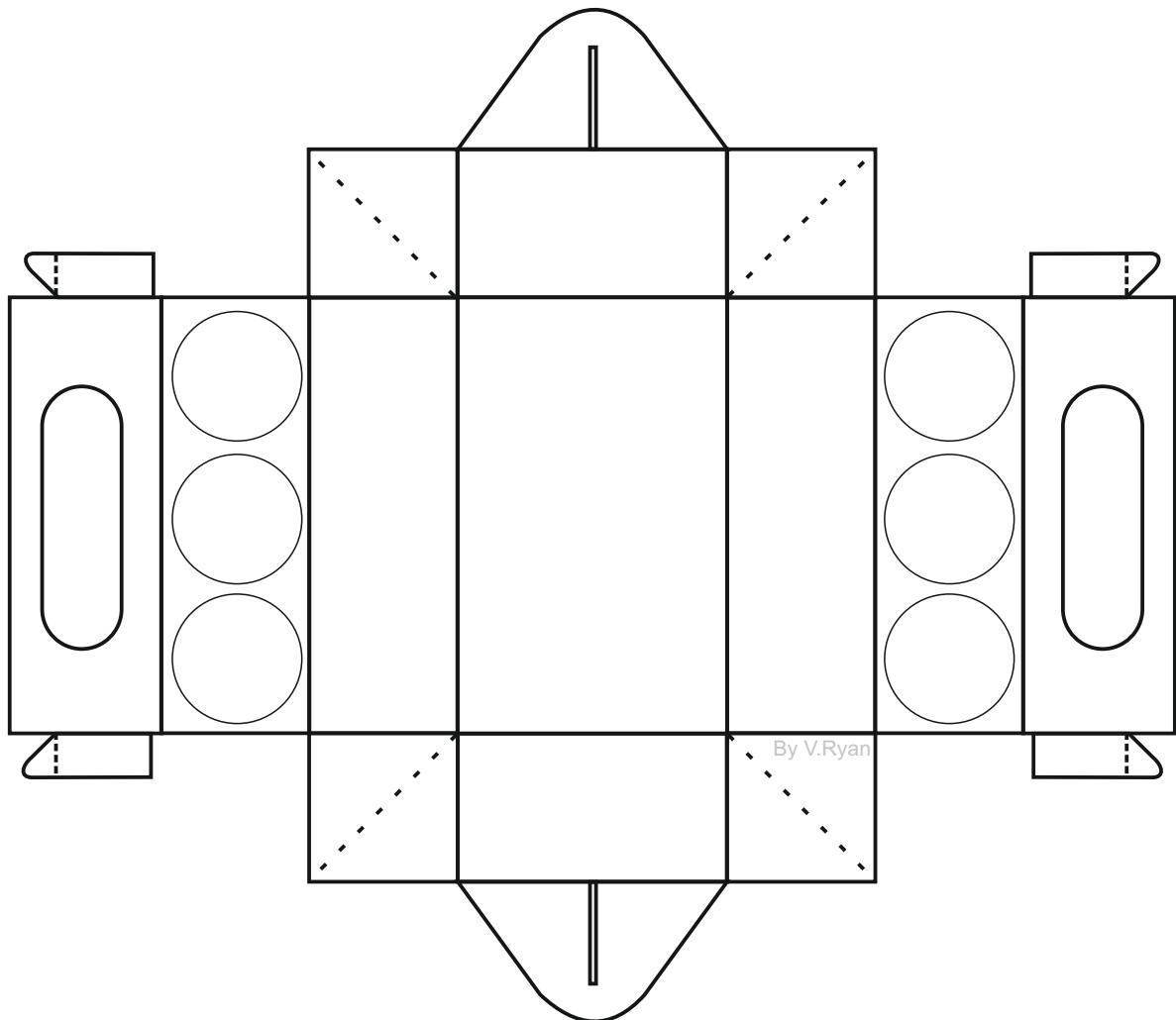
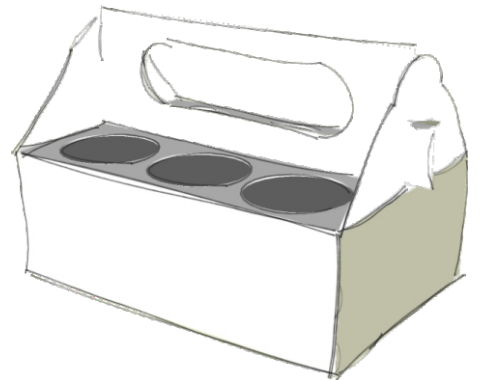
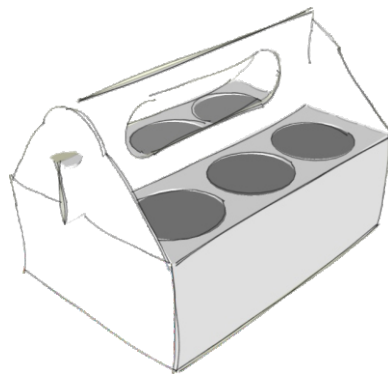
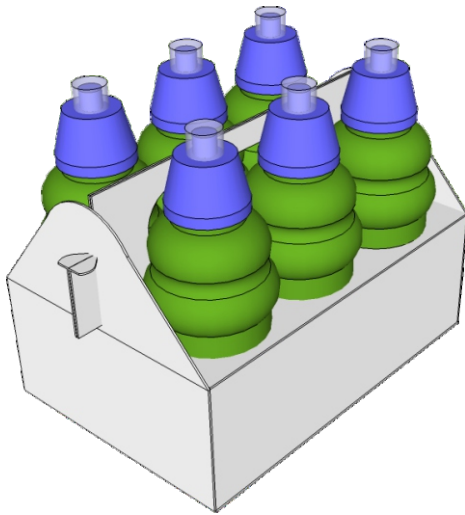
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# SECTION C - DESIGNING AND MAKING PRINCIPLES

## DRINKS CONTAINER - PROMOTIONAL PACKAGING DESIGN FEATURES

The packaging seen below, has been designed to hold / store six 'plastic' bottles containing a natural fruit soft drink.



**22. The packaging should have the following design features:**

TO HELP YOU ANSWER  
THIS QUESTION

Follow the link below.

<http://www.technologystudent.com/prddes1/prodpack3.html>

**22a. Explain why the packaging should be sustainable. 2 marks**

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**22b. Explain why it would be an advantage for the packaging to be educational.  
2 marks**

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**22c. Explain why the use of colour and images on promotional packaging, is an important design feature. 2 marks**

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**22d. The packaging should allow ease of stacking on a supermarket shelf and during transport. 2 marks**

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**22e. The packaging should promote a healthy diet. 2 marks**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

[http://www.technologystudent.com/despro\\_3/promopk2.html](http://www.technologystudent.com/despro_3/promopk2.html)

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**23a. How is packaging used to promote products?**

**4 marks**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

[http://www.technologystudent.com/despro\\_3/promopk2.html](http://www.technologystudent.com/despro_3/promopk2.html)

**23b. How could a QR code (Quick Response Code) be used to promote a product?**

**4 marks**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

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

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**24a. With the aid of a diagram, explain how packaging can be printed through the process of lithography? 5 marks**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/grp08/biodr1.html>

**24b. Give three reasons why the use of biodegradable ink, is beneficial when printing on packaging. 3 marks**

REASON 1:

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REASON 2:

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REASON 3:

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/prddes1/kite1.html>

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**25a. These questions are related to British Standards and European Standards (8 marks in total)**

**What is the British Standards Institute? 2 marks**

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**25b. What is the British Standards Institute Kite Mark? Include a sketch. 2 marks**

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**25c. What is the Conformance European Symbol? Include a sketch of the symbol. 2 marks**

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**25d. How do the two standards differ? 2 marks**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/prddes1/qual1.html>  
<http://www.technologystudent.com/prddes1/qual2.html>  
<http://www.technologystudent.com/prddes1/quality1.html>

## Designers need an understanding of Quality Control and Quality Assurance

**26a. What is meant by the term Quality Assurance? 4 marks**

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**26b. What is meant by the term Quality Control? 4 marks**

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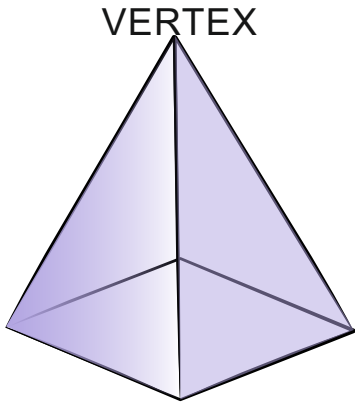
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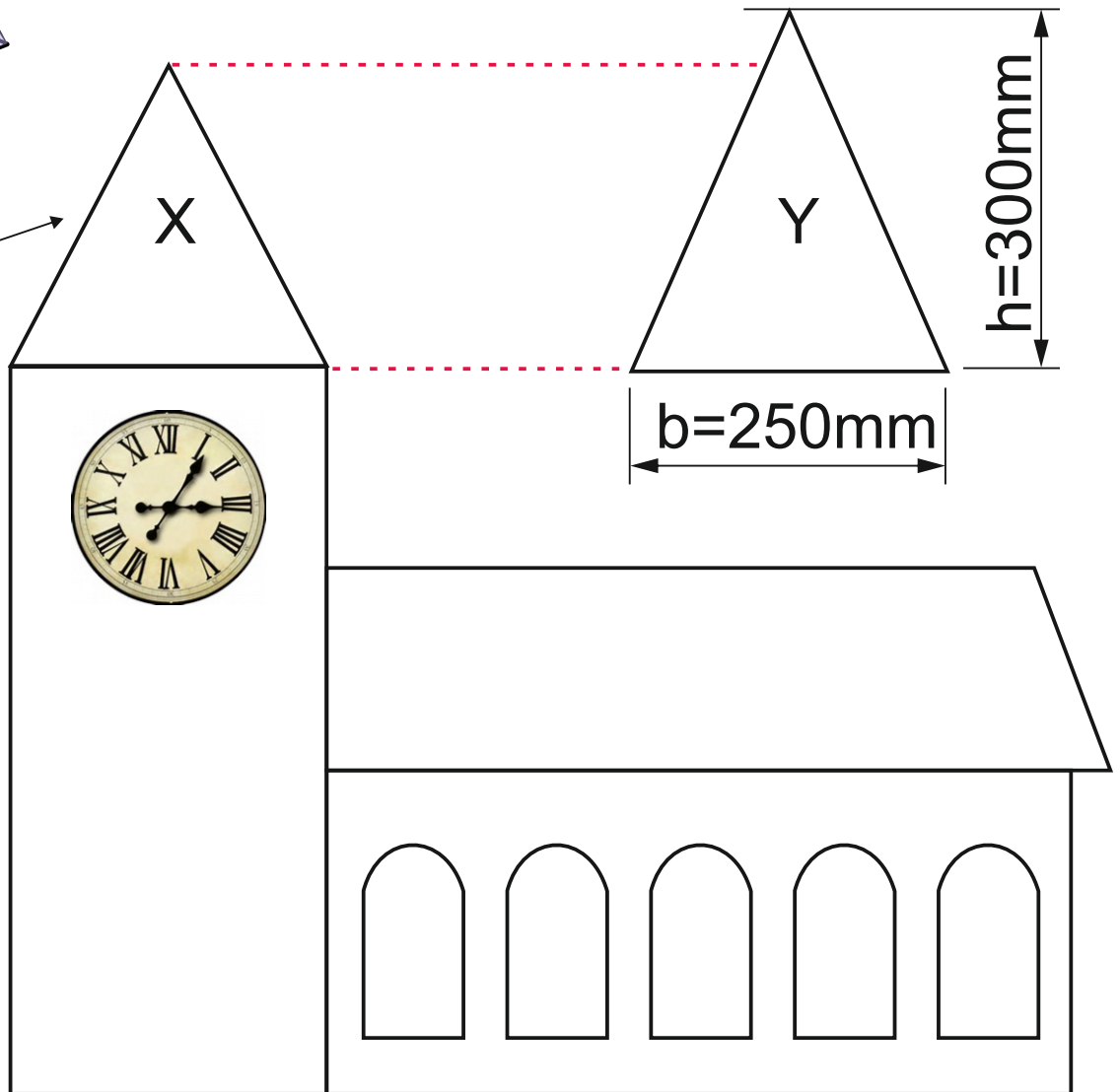
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SQUARE PYRAMID

27. Below is a model a typical village church. The roof of the tower is a square pyramid.

A. What is the area of one side of the square pyramid?



**AREA = 1/2 X BASE X HEIGHT**  
 6 marks

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

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

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

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**28a. Designers need an understanding of smart materials. Aroma Pigments have many practical applications. What are aroma pigments? 2 marks**

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**28b. Describe two practical applications of aroma pigments. 2 x 3 marks**

PRACTICAL APPLICATION 1:

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PRACTICAL APPLICATION 1:

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

[http://www.technologystudent.com/despro\\_flsh/evalintegr1.html](http://www.technologystudent.com/despro_flsh/evalintegr1.html)

**29a. Designers invest time and effort, testing and evaluating a prototype. Why do designers test and evaluate? 2 marks**

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**29a. Describe two features / aspects of a design, that designers evaluate. 2 x 3 marks**

Feature/aspect 1:

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Feature/aspect 2:

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TO HELP YOU ANSWER THIS QUESTION Follow the links below.

<http://www.technologystudent.com/despro2/estper1.htm>

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**30. This is a simple pencil sharpener.**

**An two point perspective drawing of the sharpener has been started below.**

**Complete the outline of the sharpener.  
3 marks**

**Add appropriate pencil shading, to enhance the final finish. 3 marks**

