

# SAMPLE DESIGN AND TECHNOLOGY

## GCSE EXAMINATION PAPER (SAMPLE 3)

**CENTRE NUMBER**

--	--	--	--	--

**CANDIDATE NUMBER**

--	--	--	--

**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.

The links to [www.technologystudent.com](http://www.technologystudent.com) cannot be removed.

The PDF file can be stored on school / college systems and distributed electronically (NO EDITING ALLOWED)

PLEASE RESPECT THE COPYRIGHT - report infringers to [techteacher@technologystudent.com](mailto:techteacher@technologystudent.com)  
Not be distributed at courses or by course instructors / consultants

# CORE TECHNICAL PRINCIPLES - SECTION A

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

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS <https://www.facebook.com/groups/254963448192823/> [www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

**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?**



- A. Dynamic
- B. Resting
- C. Static
- D. Shear

This link will help you answer this question

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

**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.

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS

<https://www.facebook.com/groups/254963448192823/>

[www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

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

[Link to potential answer](#)

[http://www.technologystudent.com/joints\\_fish/etching1.html](http://www.technologystudent.com/joints_fish/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**

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS

<https://www.facebook.com/groups/254963448192823/>

[www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

Reason 1:

*1 mark for each reason.*

**See link for detailed answers.**

*Flexi-ply 'is 'flexible' allowing easy manufacture of curved surfaces.*

*It does not splinter even when set to extreme curves.*

*It is strong when glued in position.*

Reason 2:

*Sometime does not need a jig OR a simple jig is suffice.*

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:

*1 mark for practical application and 1 mark for environmental benefit.*

Environmental Benefit:

*See diagram following links for practical application and environmental benefits.*

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:

*1 mark for each reason.*

*Follow link for arguments for and against fracking*

Reason 2:

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

Reason 1:

*1 mark for each reason.*

*Follow link for arguments for and against fracking*

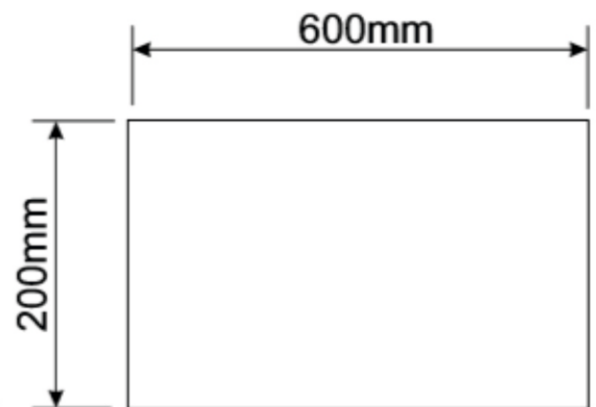
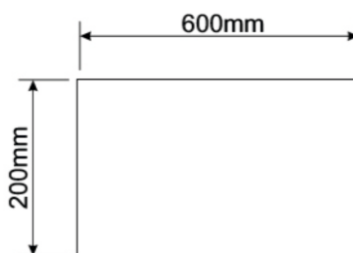
Reason 2:

**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**

The rectangle seen opposite has a height of 200mm and a length of 600

The ratio of the HEIGHT to the LENGTH is worked out by dividing the large number by the smaller number.



*Teacher discretion:*

*Full 4 marks for all working out and correct answer*

**HEIGHT : LENGTH**

$$\frac{600}{200} = 3$$

This means that the ratio is:

**1:3**

# SECTION B - Specialist Technical Principles

**POLYURETHANE FOAM**

**BIOPOL**

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

*For any marks the material must be named*

**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>

*1 mark for a basic diagram*

*1 mark for a basic written answer*

*2-4 marks for reasonable written answer and sketch*

*4 - 8 marks for good to detailed answers including text and sketch.*

*Teacher discretion required.*

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:

*1 mark for naming the process and 1 mark for description*

*follow links for detailed answers*

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS

<https://www.facebook.com/groups/254963448192823/>

[www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

Process 2:

*1 mark for naming the process and 1 mark for description*

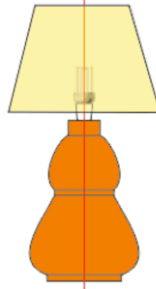
*follow links for detailed answers*

**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: \_\_\_\_\_  
*For any marks product must be named*

REASON 1:

*1 mark for basic answer  
2 marks for more detail.*

*Follow the link for detail*



REASON 2:

*1 mark for basic answer  
2 marks for more detail.*

*Follow the link for detail*

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS <https://www.facebook.com/groups/254963448192823/> [www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

**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)

*For any marks the industrial process must be named.*

*1 mark for basic sketch  
2 marks for basic sketch and basic description  
3-5 marks for increased detail.*

*Follow the links for sample answers.*

**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>

*Follow the link for sample explanation of each system*

*1 mark for very simplistic answer*

*for higher marks pupil must show an understanding of batch being a 'numbered' amount whilst continuous is 24 hours - every day of the week*

*Teacher discretion required.*

**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>

*Follow the links for two sample answers.*

*For any marks the product should be named / identified.*

*1-2 marks for basic description/explanation*

*3-4 marks - stages should be clearly described / explained.*

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**

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS <https://www.facebook.com/groups/254963448192823/> [www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

*Follow link for clear description.*

*I mark per characteristic of CIM*

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: *For any marks the product must be named. Teacher discretion required.*

DESCRIPTION:

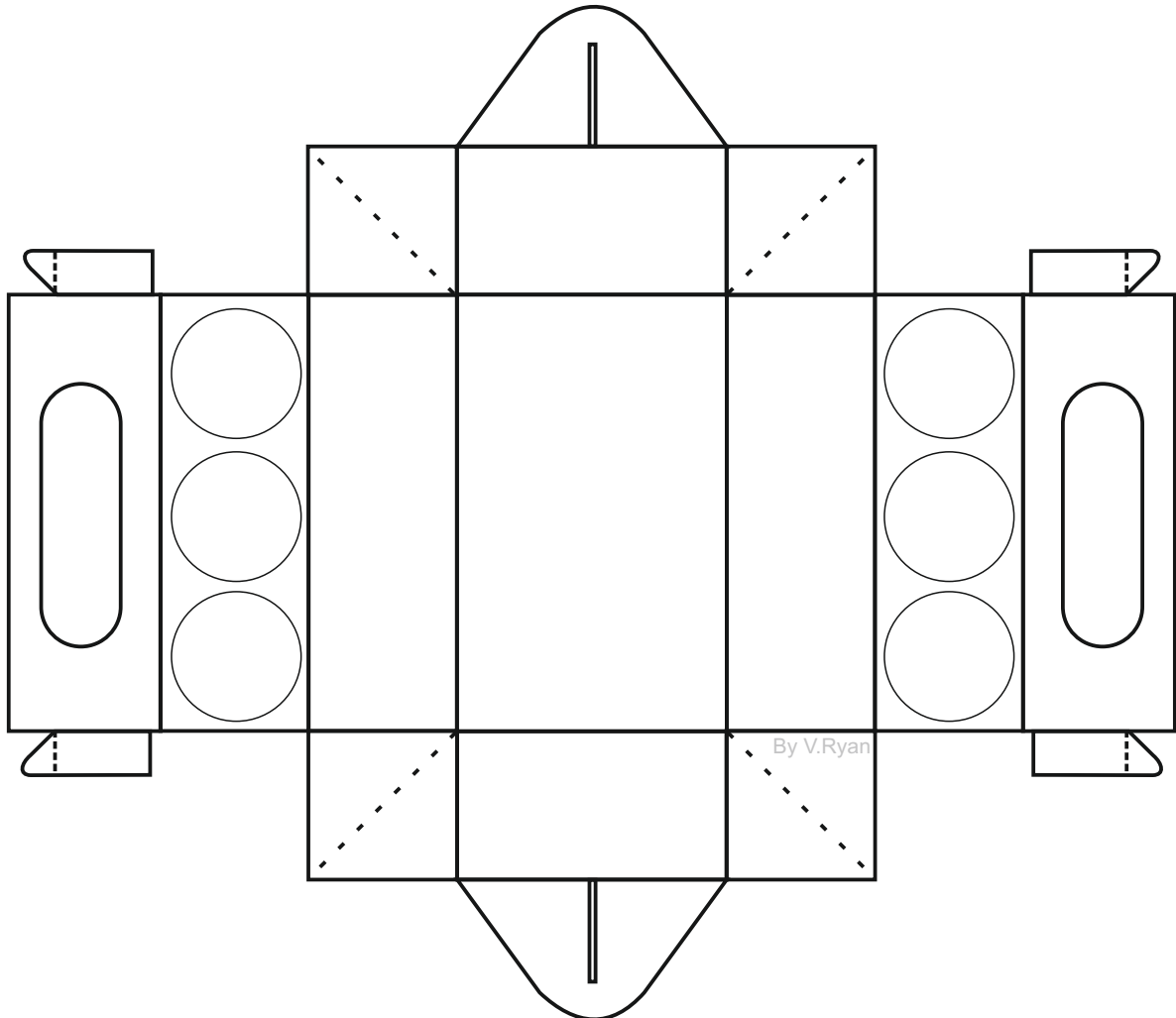
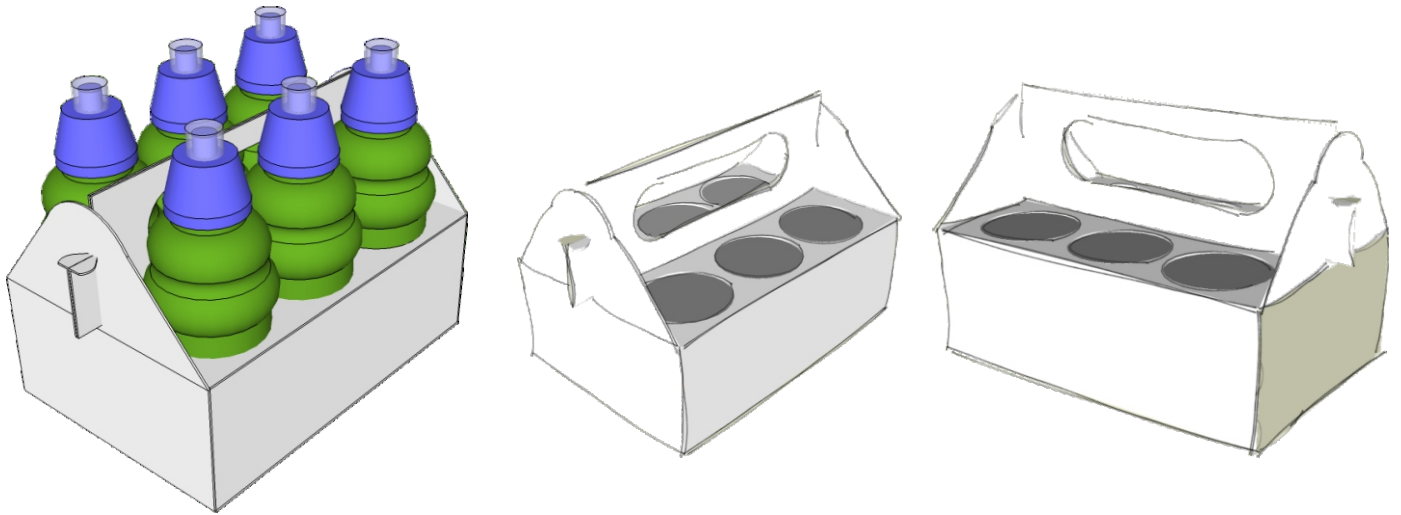
*Follow link for a sample product description.*

*I mark per stage of CIM*

# 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**

*Follow link for detailed answers.  
1 mark for one fact  
2 marks for two facts*

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

*Follow link for detailed answers.  
1 mark for one fact  
2 marks for two facts*

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

*Follow link for detailed answers.  
1 mark for one fact  
2 marks for two facts*

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

*Follow link for detailed answers.  
1 mark for one fact  
2 marks for two facts*

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

*Follow link for detailed answers.  
1 mark for one fact  
2 marks for two facts*

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)

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS

<https://www.facebook.com/groups/254963448192823/>

[www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

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

**4 marks**

*1 mark per fact / point*

*Follow link for sample answers*

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**

*1 mark per fact / point*

*Follow link for sample answers*

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

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

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS <https://www.facebook.com/groups/254963448192823/> [www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

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

*1 mark for basic sketch and 1 mark for basic explanation  
2 - 3marks for reasonable sketch and basic explanation  
4-5 marks for detailed sketch and explanation*

*Follow the link for sample answer.*

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:

*Follow link for detailed information.*

*1 mark per reason.*

REASON 2:

REASON 3:

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

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

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS <https://www.facebook.com/groups/254963448192823/> [www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

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

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

*Follow link for detailed information*

*1 mark per fact / point.*

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

*Follow link for detailed information*

*1 mark per fact for explanation and 1 mark for sketch.*

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

*Follow link for detailed information*

*1 mark for description and 1 mark for sketch*

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

*Follow link for detailed information*

*1 mark per fact / point.*



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>

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS <https://www.facebook.com/groups/254963448192823/> [www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

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

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

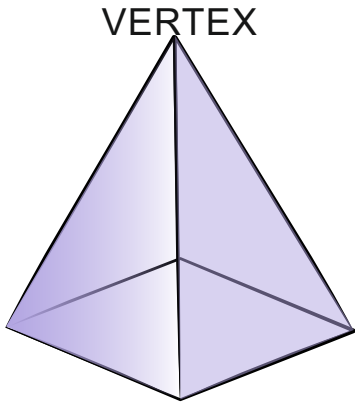
Follow links for detailed information.

! mark per correct fact / point

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

Follow links for detailed information.

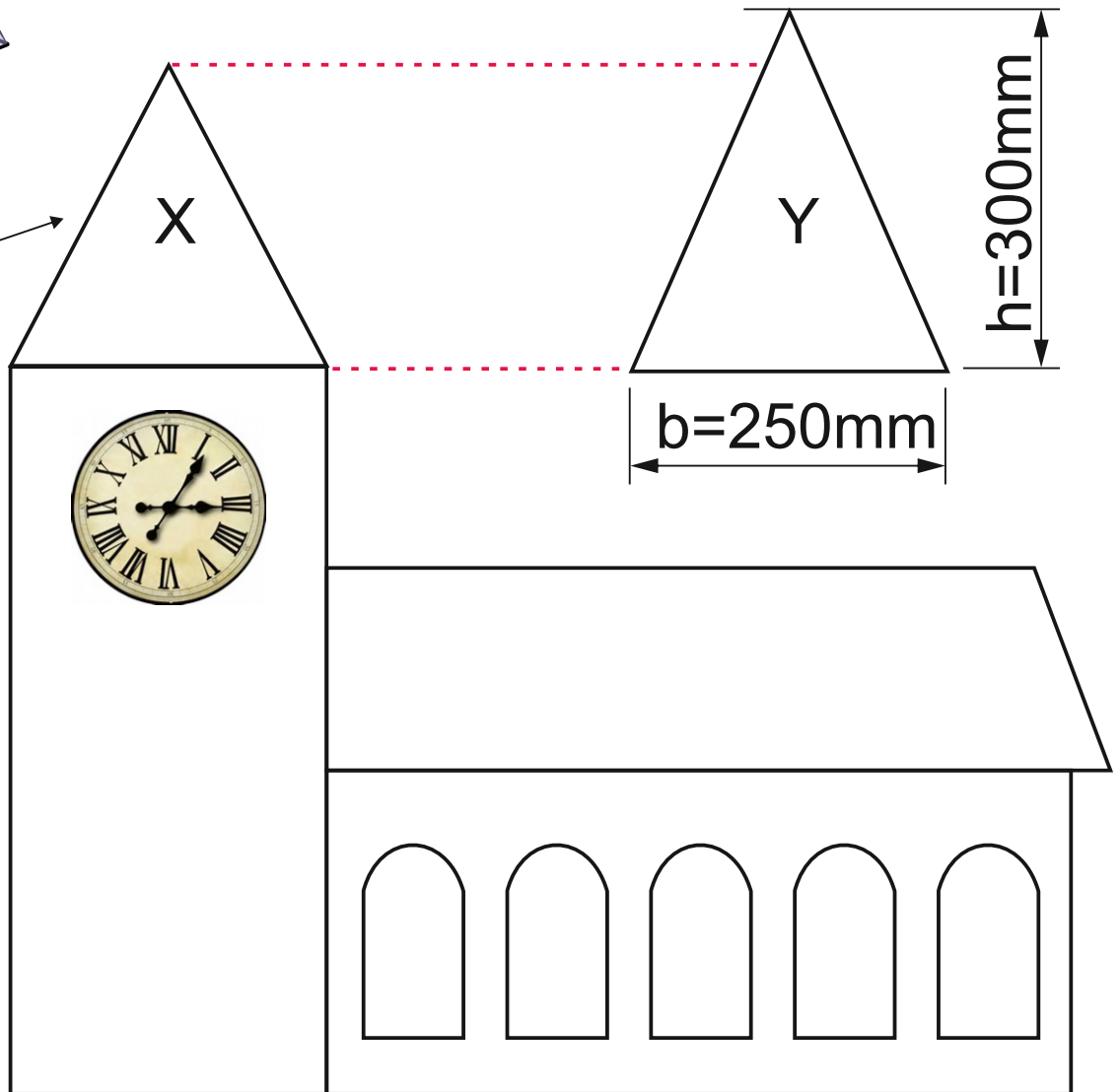
! mark per correct fact / point



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

AREA = 1/2 X BASE X HEIGHT

$$\text{AREA} = \frac{250 \times 300}{2}$$

$$\text{AREA} = \frac{75000}{2}$$

$$\text{AREA} = 37500\text{mm}^2$$

Up to 4 marks for the working out.  
 in addition 2 marks for correct answer

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

*'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.*

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

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

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS

<https://www.facebook.com/groups/254963448192823/>

[www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

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

*Follow link for full explanation.*

*1 mark for basic explanation 2 marks for full explanation*

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

PRACTICAL APPLICATION 1:

*1 mark for basic description*

*2 marks for reasonable description (two points included)*

*3 marks for detailed answer (three points included)*

*Follow the link for sample answers.*

PRACTICAL APPLICATION 1:

*1 mark for basic description*

*2 marks for reasonable description (two points included)*

*3 marks for detailed answer (three points included)*

*Follow the link for sample answers.*

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)

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS <https://www.facebook.com/groups/254963448192823/> [www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

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

*Follow link for sample answers / detail.*

*1 mark for basic answer  
2 marks for full answer*

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

Feature/aspect 1:

*Follow the link for detailed information.*

*1 mark for one fact / point  
2 marks for two facts / points  
3 marks for three facts / points*

Feature/aspect 2:

*Follow the link for detailed information.*

*1 mark for one fact / point  
2 marks for two facts / points  
3 marks for three facts / points*

TO HELP YOU ANSWER THIS QUESTION Follow the links below.

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

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS

<https://www.facebook.com/groups/254963448192823/>

[www.technologystudent.com](http://www.technologystudent.com) © 2018 V.Ryan © 2018

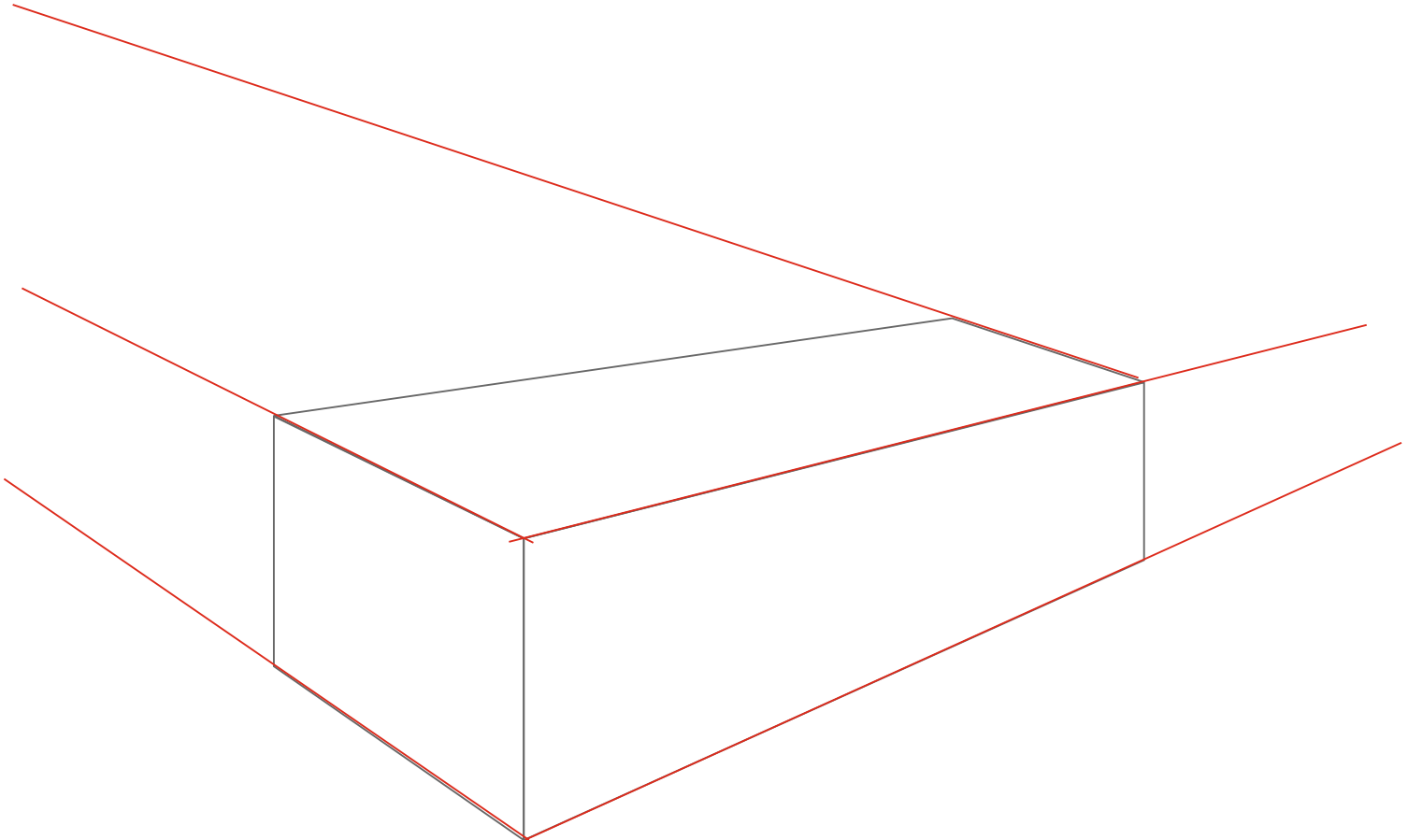


**30. This is a simple pencil sharpener.**

**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**



*Follow the link for a sample answer.*

*Up to 3 marks for the drawing (1 mark for basic drawing, 2-3 marks according to detail)*

*In addition - Up to 3 marks for shading (1 mark for basic shading, 2-3 marks according to detail / level of shading)*