

# SAMPLE DESIGN AND TECHNOLOGY GCSE EXAMINATION PAPER

**CENTRE NUMBER**

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**CANDIDATE NUMBER**

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**(SAMPLE 5)**

**SURNAME**

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**FORENAME(S)**

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**CANDIDATE SIGNATURE**

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## **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 130.
- There are 22 marks for Section A, 37 marks for Section B and 71 marks for Section C.

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# CORE TECHNICAL PRINCIPLES - SECTION A

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

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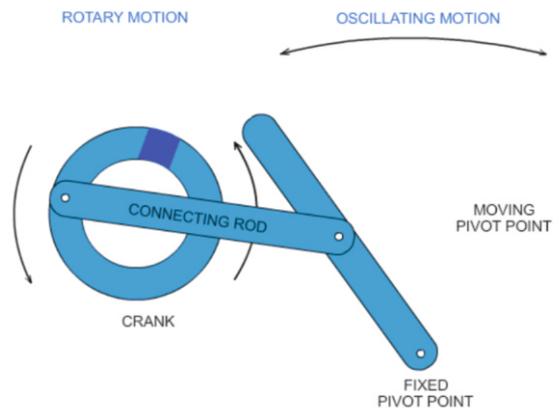
**1. Which one of the following manufacturers, initially concentrated on designing and manufacturing 'metal' kitchenware ?**

- A. Apple
- B. Alessi
- C. Raleigh
- D. Tesla

This link will help you answer this question

[http://www.technologystudent.com/prddes\\_2/alessi1.html](http://www.technologystudent.com/prddes_2/alessi1.html)

**2. Which type of mechanism does the diagram opposite represent?**



- A. Cam
- B. Spring
- C. Treadle
- D. Worm Gear

This link will help you answer this question

[http://www.technologystudent.com/despro\\_flish/treadle1.html](http://www.technologystudent.com/despro_flish/treadle1.html)

**3. Linear Motion is:**

[Link to potential answer](#)

<http://www.technologystudent.com/forcmom/motion1.html>

- A. Movement in a straight line and in one direction.
- B. Movement following a circular path, around a fixed point
- C. When an object swings left and then right (or vise-versa), from a fixed point.
- D. A repetitive movement left to right OR up and down.

#### 4. Identify the material that is a thin sheet/layer of natural wood

- A. Flexiply
- B. MDF
- C. Veneer
- D. Plywood

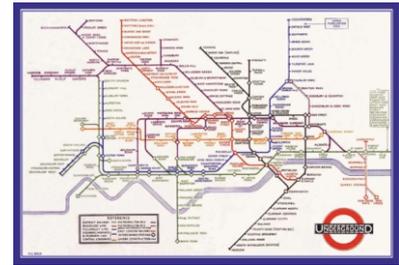
  
  
  

Link to potential answer

<http://www.technologystudent.com/joints/timber4.html>

#### 5. Which of the following designers, designed the London Underground Map?

- A. Philippe Starck
- B. Marcel Breuer
- C. Jorn Utzon
- D. Harry Beck

Link to potential answer

[http://www.technologystudent.com/prddes\\_2/beck1.html](http://www.technologystudent.com/prddes_2/beck1.html)

#### 6. Which of the following statements describing 'POLYESTER' is FALSE?

Link to potential answer

<http://www.technologystudent.com/joints/pet1.html>

- A. It is also called 'polyethylene terephthalate'.
- B. It is a thermoplastic polymer.
- C. It cannot be manufactured as a fibre / textile material.
- D. It is 100% recyclable.

#### 7. Which of the statements about Graphene is FALSE?

Link to potential answer

[http://www.technologystudent.com/despro\\_fish/graphene1.html](http://www.technologystudent.com/despro_fish/graphene1.html)

- A. Graphene is a nonmetal.
- B. Graphene has high resistance to the flow of electricity.
- C. Graphene has the potential to radically change our consumer world.
- D. Graphene exhibits amazing potential, especially in the electrical and electronics industries.

## 8. Which of the following statements about nano materials is TRUE?

[Link to potential answer](#)

[http://www.technologystudent.com/joints\\_flash/revcard\\_nano1.html](http://www.technologystudent.com/joints_flash/revcard_nano1.html)

- A. Nanos are used by the Food Processing industry, to add flavour and taste.
- B. Nano materials are widely used in the construction industry, because of their resistance to corrosion.
- C. A single particle of a nanomaterial, has an average size between 1 to 100 nanometres (nm), which is extremely small.
- D. Nano materials are derived from natural wood.

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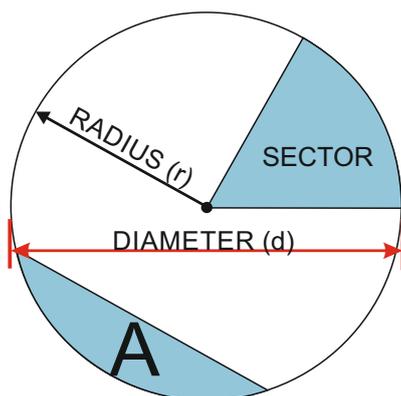
## 9. Which of the statements below is accurate regarding 'wood turning'?

[Link to potential answer](#)

<http://www.technologystudent.com/equip1/woodturn1.html>

- A. Is a method of bending thin layers of wood, forming complicated shapes.
- B. Is a technique whereby wood is turned around, during the seasoning process.
- C. A process that creates a 'reflective' coating on a range of woods.
- D. Wood is 'turned' on a woodworking lathe, producing items such as lamps, table legs and bowls.

## 10. What is the name of the area of the circle labelled 'A', seen below?



[Follow the link to a potential answer.](#)

<http://www.technologystudent.com/pdf14/maths4.pdf>

- A. Segment
- B. Chord
- C. Tangent
- D. Aspect

TO HELP YOU ANSWER  
THIS QUESTION

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

**11. Describe two ways, in which sustainable forests can contribute to the local economy. 2 marks**

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

\_\_\_\_\_

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

\_\_\_\_\_

TO HELP YOU ANSWER  
THIS QUESTION

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

**12. The logo shown opposite, is sometimes printed on timber and packaging. Explain the meaning of this logo. 2 marks**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



TO HELP YOU ANSWER  
THIS QUESTION

<http://www.technologystudent.com/enerflsh/coal3.html>

**13. A number of Power Stations, produce electricity from coal. Give two reasons why some people are against this method of energy production. 2 marks**

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

14. Give two reasons why some people are in favour of electricity produce by coal fuelled power stations . **2 marks**

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

15. What is the area of the triangle seen in the diagram.

You will gain marks for each stage of the calculation, written in the space below.

**4 marks**

CALCULATION:

\_\_\_\_\_

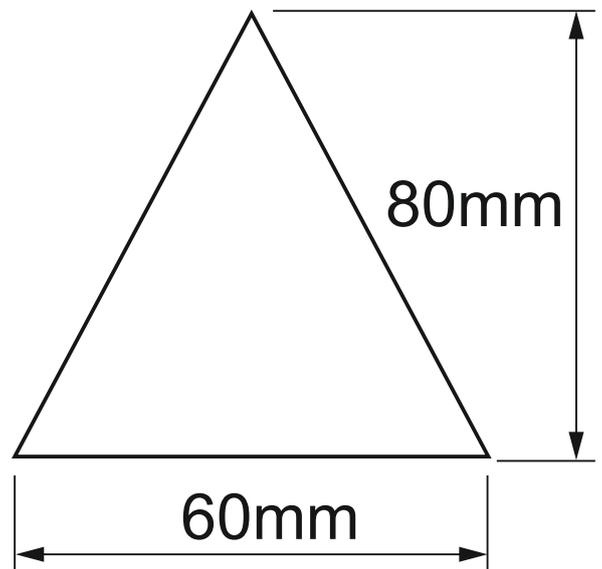
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**FORMULA**

$$\text{AREA} = 1/2 \times \text{BASE} \times \text{HEIGHT}$$

$$\text{AREA} = 1/2 b \times h$$

$$\text{AREA} = \frac{b \times h}{2}$$

# SECTION B - Specialist Technical Principles

## 16. Nylon is one of the most useful of all plastics

Describe the manufacture of nylon. Include notes and a labelled sketch(s)

**8 marks**

TO HELP YOU ANSWER  
THIS QUESTION

[http://www.technologystudent.com/joints\\_fish/nylon2.html](http://www.technologystudent.com/joints_fish/nylon2.html)

TO HELP YOU ANSWER  
THIS QUESTION

[http://www.technologystudent.com/joints\\_fish/nylon1.html](http://www.technologystudent.com/joints_fish/nylon1.html)

**17a. List two properties of nylon? 2 marks**

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**17b. Name two products manufactured from nylon? 2 marks**

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**18. Name a product manufactured from kevlar® and explain why this is a suitable material for its production. 4 marks**

TO HELP YOU ANSWER  
THIS QUESTION

<http://www.technologystudent.com/joints/kevlar1.html>  
<http://www.technologystudent.com/joints/kevlar2.html>  
<http://www.technologystudent.com/joints/kevlar3.html>  
<http://www.technologystudent.com/joints/kevlar4.html>

PRODUCT: \_\_\_\_\_

REASONS 1: \_\_\_\_\_

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**19. Steel is a very important material, found all around us in buildings, bridges, cars and many other products. Iron is 'converted' into steel. In the space below, name and describe the process of conversion, using notes and diagrams.**

**5 marks**

TO HELP YOU ANSWER  
THIS QUESTION

<http://www.technologystudent.com/joints/iron5.html>

PROCESS NAME: \_\_\_\_\_

**20a. Some products are manufactured through a process called ‘compression moulding’. Using notes and a diagram(s), explain this process. 4 marks**

TO HELP YOU ANSWER  
THIS QUESTION

Follow the links below.

<http://www.technologystudent.com/equip1/hypress1.htm.htm>

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**20b. List four products manufactured through compression moulding. 4 marks**

TO HELP YOU ANSWER  
THIS QUESTION

Follow the links below.

<https://www.youtube.com/watch?v=-FxiWMnY4aQ&t=7s>

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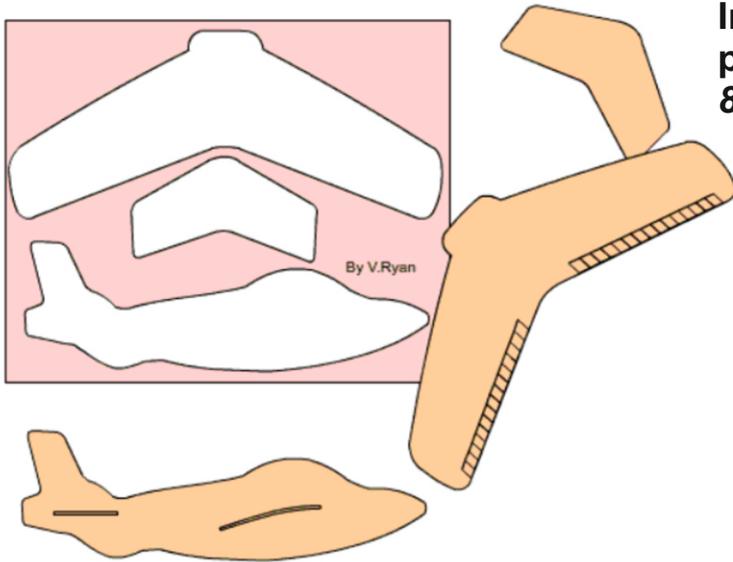
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TO HELP YOU ANSWER  
THIS QUESTION

Follow the links below.

<http://www.technologystudent.com/rmprp07/glider2.html>

**21a. The toy glider shown below, is 'batch' manufactured, through a process called dye cutting. It arrives to the customer on a flat sheet of polystyrene and the three parts are pressed out of the sheet, to form the lightweight glider.**



**In the space below, explain the process, using notes and a diagram(s).  
8 marks**

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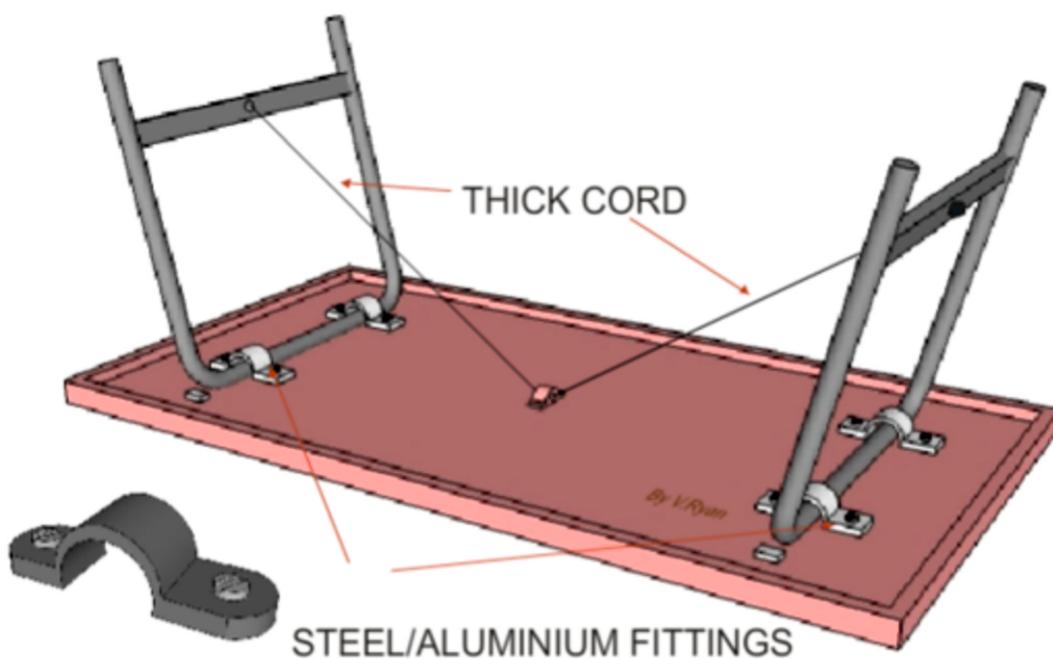
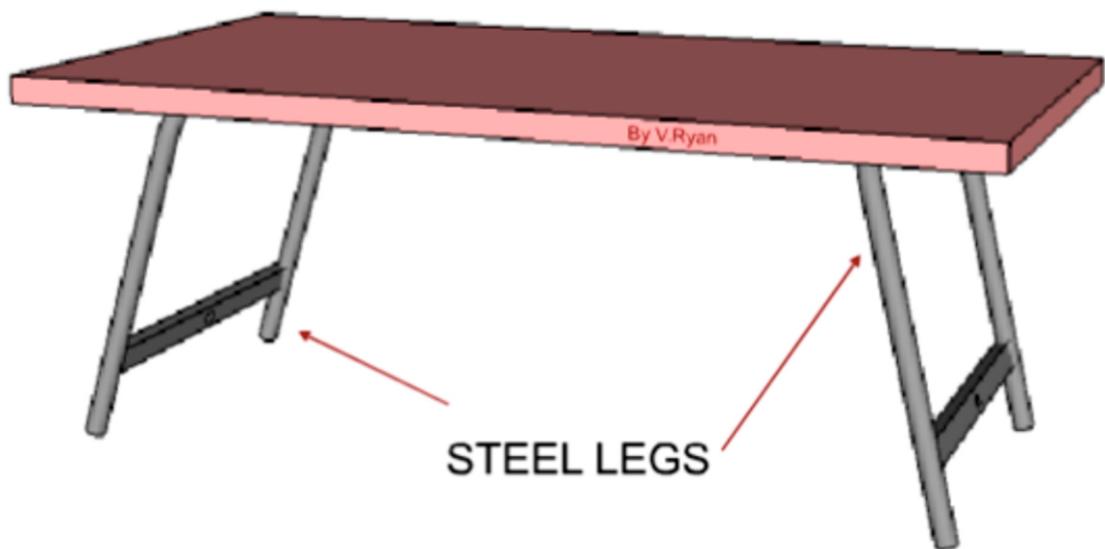
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# SECTION C - DESIGNING AND MAKING PRINCIPLES

## FOLDING PICNIC TABLE

This picnic table, has been designed to fold away to a compact form and to be transported with ease.

HIGH DENSITY POLYETHYLENE TABLE TOP



# PICNIC TABLE QUESTIONS

TO HELP YOU ANSWER  
THIS QUESTION

Follow the links below.  
<http://www.technologystudent.com/rmprep08/plastab3.html>

**22a. Why is High Density Polyethylene (HDPE), a suitable material for the table top? 4 marks**

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**22c. Describe the stages of manufacturing the table top? Use notes and diagrams 6 marks (Link for help - <http://www.technologystudent.com/rmprep08/plastab6.html>)**

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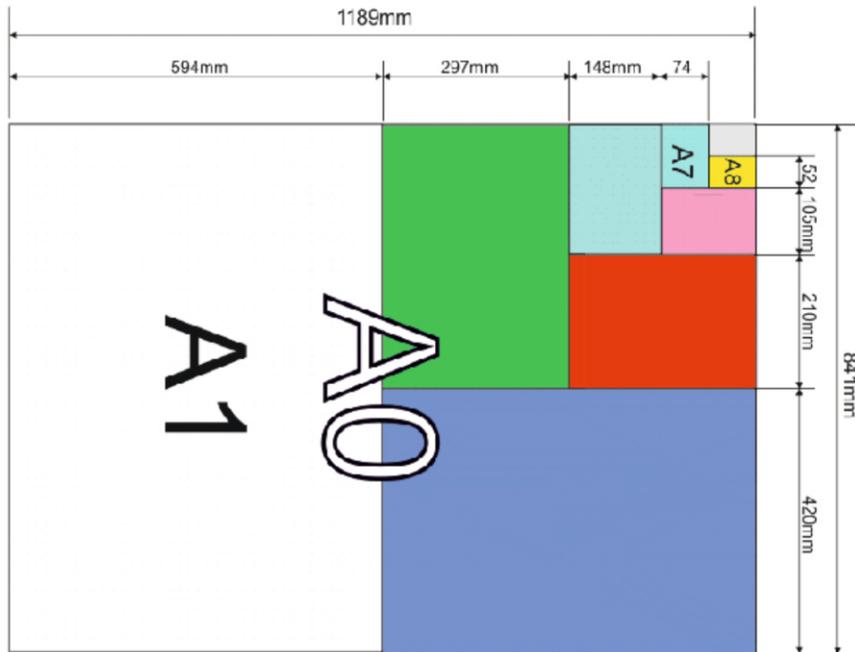
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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

[http://www.technologystudent.com/despro\\_flsh/cardpap1.html](http://www.technologystudent.com/despro_flsh/cardpap1.html)

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**23a. The International Standard ISO 216 (International Organization for Standardization), sets out the common paper sizes used around the world? Mark the following paper sizes on the diagram below, in the correct positions . A2, A3, A4, A5  
4 marks**



**23b. What is the meaning of the symbol shown below? 4 marks**

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

[http://www.technologystudent.com/despro\\_flsh/eurosym1.html](http://www.technologystudent.com/despro_flsh/eurosym1.html)

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

[http://www.technologystudent.com/despro\\_flsh/laminate1.html](http://www.technologystudent.com/despro_flsh/laminate1.html)

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**24a. Laminated card packs such as Tetra Paks , are often used to store liquids. Briefly, describe the process of manufacture, of this type of pack. 5 marks.**

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**24b. There are different forms of corrugated card. These include: Single Face, Single Wall and Double Wall . Draw a simple diagram representing each the the forms listed. 3 marks**

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

[http://www.technologystudent.com/despro\\_flsh/charity9.html](http://www.technologystudent.com/despro_flsh/charity9.html)

**Single Face**

**Single Wall**

**Double Wall**

Two vertical lines are drawn, one to the left of the 'Single Wall' column and one to the right of the 'Double Wall' column, defining three columns for drawing diagrams.

TO HELP YOU ANSWER THIS QUESTION Follow the link below.  
[http://www.technologystudent.com/prddes\\_2/crowd1.html](http://www.technologystudent.com/prddes_2/crowd1.html)

**25a. These questions are related to key business terms / phrases (6 marks in total)**

**What is crowd funding? 2 marks**

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**25b. What is the Fair Trade system? 2 marks**

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**25c. What are cooperatives? 2 marks**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/prddes1/ictmod1.html>

**Designers need an understanding of the role ICT, in designing and developing ideas.**

**26a. What role does ICT play in modelling and developing ideas? 4 marks**

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**26b. What is the meaning of CNC? Include an explanation of the role of coordinates in your answer. 4 marks**

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/cam/cnccut1.html>

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TO HELP YOU ANSWER THESE QUESTION Follow the link below.

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

28a. In general terms, what is a PIC microcontroller? What does it do? *2 marks*

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28b. Name a piece of programming software, used to program PIC Microcontrollers and to design circuits. *1 mark*

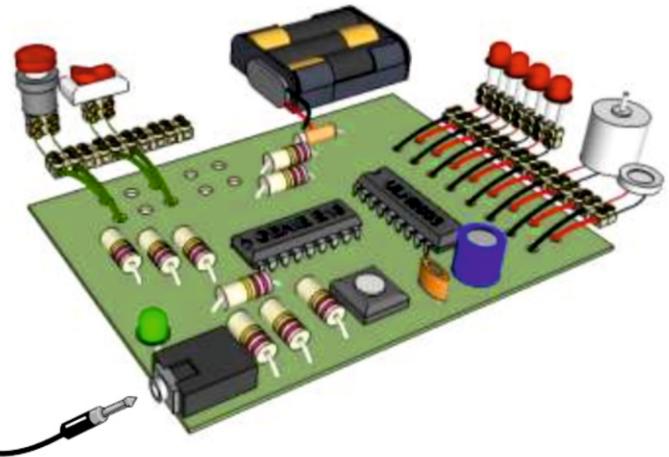
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28c. The diagram below shows all the necessary equipment for operating a PIC microcontroller. Label the equipment and explain how it works together, to enable the programming of the microcontroller. *5 marks*

CIRCUIT WIZARD SOFTWARE BEING USED TO PROGRAMME THE GENIE PIC MICROCONTROLLER



A GENIE PIC MICROCONTROLLER PROGRAMMABLE CIRCUIT



TO HELP YOU ANSWER THIS QUESTION Follow the link below.

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

**29a. When gears mesh together, what are they called? 1 mark**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/gears1/gears2.htm>

**29b. What is a gear train? 1 mark**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/gears1/gears4.htm>

**29c. Write a simple description of a rack and pinion gear system. Include a diagram. 4 marks**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/gears1/bevel1.htm>

**29d. What is the main purpose of a bevel gear? Include an example of a practical application. 2 marks**

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TO HELP YOU ANSWER THIS QUESTION Follow the link below.

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



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

A 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**

