SAMPLE DESIGN AND TECHNOLOGY
GCSE EXAMINATION PAPER

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.

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

The links to 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
Not be distributed at courses or by course instructors / consultants
The questions to follow are multiple choice. Tick one answer for each question.

1. Which one of the following manufacturers, initially concentrated on designing and manufacturing ‘metal’ kitchenware?
   A. Apple  
   B. Alessi  
   C. Raleigh  
   D. Tesla

2. Which type of mechanism does the diagram opposite represent?
   A. Cam  
   B. Spring  
   C. Treadle  
   D. Worm Gear

3. Linear Motion is:
   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

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

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

6. Which of the following statements describing ‘POLYESTER’ is FALSE?

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?

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?

- 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.

9. Which of the statements below is accurate regarding ‘wood turning’?

- 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?

- A. Segment
- B. Chord
- C. Tangent
- D. Aspect
11. Describe two ways, in which sustainable forests can contribute to the local economy. 2 marks

1: __________________________________________________________

2: __________________________________________________________

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

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 produced 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:**

FORMULA

\[
\text{AREA} = \frac{1}{2} \times \text{BASE} \times \text{HEIGHT}
\]

\[
\text{AREA} = \frac{b \times h}{2}
\]
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_flsh/nylon2.html
17a. List two properties of nylon? 2 marks

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

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

PRODUCT: ________________________________

REASONS 1: ________________________________

REASONS 2: ________________________________

REASONS 3: ________________________________

REASONS 4: ________________________________

REASONS 5: ________________________________

REASONS 6: ________________________________
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.

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=-FxWMnY4aQ&t=7s
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
This picnic table, has been designed to fold away to a compact form and to be transported with ease.
22a. Why is High Density Polyethylene (HDPE), a suitable material for the table top?  
4 marks

22c. Describe the stages of manufacturing the table top? Use notes and diagrams
6 marks  
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/cardpap1.html

TO HELP YOU ANSWER THIS QUESTION Follow the link below.
http://www.technologystudent.com/despro_flsh/eurosym1.html
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.

24b. There are different forms of corrugated card. These include: Single Face, Single Wall and Double Wall. Draw a simple diagram representing each of the forms listed. 3 marks.
25a. These questions are related to key business terms / phrases (6 marks in total)

What is crowd funding?   2 marks

---

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

---

25c. What are cooperatives?   2 marks

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

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

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

TO HELP YOU ANSWER THIS QUESTION Follow the link below.  
http://www.technologystudent.com/prddes1/ictmod1.html
27. An acrylic window for a school project seen below, is composed of two pieces, accurately cut to size on a laser cutter. They fit perfectly together.  

2 x 3 marks (6 marks in total)

a. Calculate the area of piece A

b. Calculate the area of piece B
28a. In general terms, what is a PIC microcontroller? What does it do? 2 marks

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

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

29b. What is a gear train? 1 mark

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

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