

SAMPLE DESIGN AND TECHNOLOGY

GCSE EXAMINATION PAPER (SAMPLE 4)

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.

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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 energy production systems is an alternative energy ?

A. Wind Power

B. Hydraulic Fracturing

C. Crude Oil

D. Coal

This link will help you answer this question

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

2. Which type of motion does the diagram below represent?



A. Rotary

B. Reciprocating

C. Linear

D. Oscillating

This link will help you answer this question

<http://www.technologystudent.com/forcmom/motion2.html>

3. A Foam Metal is:

Link to potential answer

http://www.technologystudent.com/joints_fish/metalfoam1.html

A. A dense metal, starting at the core and out to the exterior layer .

B. A metal that cannot be heated, as it will melt.

C. A solid structures, usually composed of a dense outer layer, with the inner portion in the form of a matrix of pores.

D. A composite metal, made up of several layers.

4. From the list of woods, identify the natural wood.

A. Plywood

B. MDF

C. Mahogany

D. Flexiply

[Link to potential answer](#)

<http://www.technologystudent.com/designpro/natwd1.htm>

5. Which of the following designers, designed the 'Juicy Salif' - Citrus Squeezer?

A. Charles Eames.

B. Marcel Breuer

C. Philippe Starck

D. Robin Day



[Link to potential answer](#)

http://www.technologystudent.com/despro_fish/phillipe1.html

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

[Link to potential answer](#)

<http://www.technologystudent.com/joints/plywood1.html>

A. Plywood is a composite material.

B. Plywood is composed of several layers of thin plies / veneers.

C. Plywood is relatively weak, compared to other manufactured boards.

D. Plywood is supplied in a variety of thicknesses.

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

[Link to potential answer](#)

http://www.technologystudent.com/joints_fish/property3.html

A. The ability of a material to be twisted into a variety of shapes, without the need for heat.

B. The ability of a material to resist a stretching force, without cracking.

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

D. The ability of a material to be transformed from a solid state to a liquid state, due to the application of heat.

8. Which of the following statements is representative of Iterative Design?

[Link to potential answer](#)

http://www.technologystudent.com/despro_fish/iterative1.html

- A. A linear design process, whereby one stage follows another.
- B. A process of continual improvement, of a concept, prototype, design or product, with model making, sketching, client feedback applied when required.
- C. Designing as a team, following a strict design process.
- D. A systems approach - PROCESS - SYSTEM - OUTCOME.

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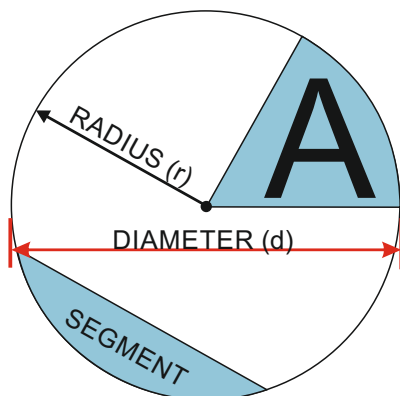
9. Which of the following is the process called 'INJECTION MOULDING'?

[Link to potential answer](#)

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

- A. An automated painting process.
- B. Plastic coating of a metal surface, to increase its resistance to temperature.
- C. A process that creates a 'reflective' coating on a range of polymers.
- D. A process involving heating 'plastic' granules to liquid form and forcing the solution into a mould.

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



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

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

- A. Sector
- B. Radian
- C. Triangulated Part
- D. Aspect

TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/joints/titanium1.html>

11. Give two reasons why Titanium is suitable for making turbine blades in jet engines. 2 marks

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Reason 1:

Reason 2:

TO HELP YOU ANSWER
THIS QUESTION

http://www.technologystudent.com/despro_flsh/graphene1.html

http://www.technologystudent.com/despro_flsh/graphene2.html

12. Describe one potential practical application of Graphene. Include in your answer, why graphene is suitable for the practical application. 2 marks

Practical Application:

Why suitable?:

TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/energy1/nuclear1.htm>

<http://www.technologystudent.com/energy1/rwaste1.htm>

13. Nuclear Power Stations, produce electricity from radioactive fuel sources such as uranium. Give two reasons why some people are against this method of energy production. 2 marks

Reason 1:

Reason 2:

TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/energy1/nuclear1.htm>
<http://www.technologystudent.com/energy1/rwaste1.htm>

14. Give two reasons why some people are in favour of Nuclear Power. 2 marks

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Reason 1:

Reason 2:

TO HELP YOU ANSWER
THIS QUESTION

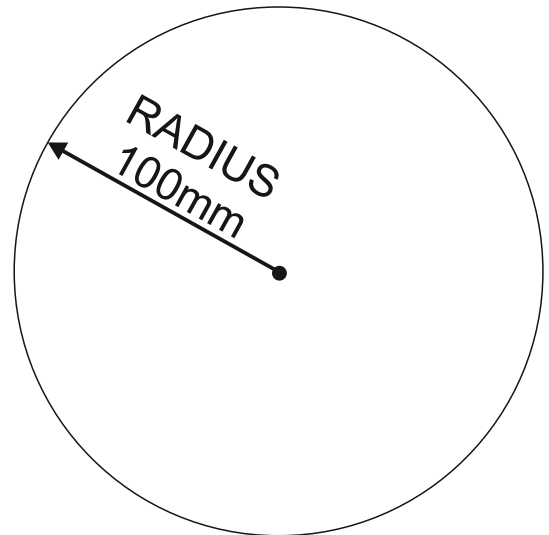
<http://www.technologystudent.com/pdf14/maths4.pdf>
PAGE 2

15. What is the circumference of the circle seen in the diagram.

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

4 marks

CALCULATION:



FORMULA

$$\text{CIRCUMFERENCE} = 2 \times \pi \times r$$

$$\pi (\text{pi}) = 3.14$$

SECTION B - Specialist Technical Principles

METAL FOAM

PLYWOOD

16. Select one of the materials listed above.

Name of Material _____

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

TO HELP YOU ANSWER
THIS QUESTION

http://www.technologystudent.com/joints_flesh/metalfoam1.html
<http://www.technologystudent.com/joints/plywood1.html>

TO HELP YOU ANSWER
THIS QUESTION

http://www.technologystudent.com/joints_flesh/metal7.html
http://www.technologystudent.com/joints_flesh/revcard_metal6.html

17a. Why is lacquer sometimes applied to a metal surface? 2 marks

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17b. Describe the process of applying lacquer to a metal surface? 2 marks

18. Select one of the products shown below. Then, give two reasons, why the product is a good example of one off / single item production. 2 x 2 marks

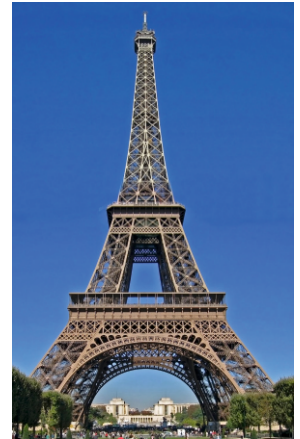
BESPOKE CHAIR



HANDMADE JEWELLERY



THE EIFFEL TOWER



TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/joints/sing1a.htm>
http://www.technologystudent.com/joints/revcard_oneoff1.html

PRODUCT: _____

REASON 1: _____

REASON 2: _____

19. Metals can be permanently joined in a number of ways. Using notes and sketches, describe / explain the industrial process called BRAZING. 5 marks

TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/equip1/braz1.htm>
<http://www.technologystudent.com/joints/braz2.htm>

THE INDUSTRIAL PROCESS CALLED BRAZING
INCLUDE NOTES AND A SKETCH(S)

20a. What is the Lean Manufacturing system? 4 marks

TO HELP YOU ANSWER
THIS QUESTION

Follow the links below.

http://www.technologystudent.com/despro_3/lean1.html
http://www.technologystudent.com/despro_3/lean2.html
[http://www.technologystudent.com/despro_3/revcard_lean1.](http://www.technologystudent.com/despro_3/revcard_lean1)

20b. Name four international companies that utilise the Lean Manufacturing philosophy 4 marks

TO HELP YOU ANSWER
THIS QUESTION

Follow the links below.

http://www.technologystudent.com/despro_3/lean1.html
http://www.technologystudent.com/despro_3/lean2.html
[http://www.technologystudent.com/despro_3/revcard_lean1.](http://www.technologystudent.com/despro_3/revcard_lean1)

TO HELP YOU ANSWER
THIS QUESTION

Follow the links below.

http://www.technologystudent.com/prddes_2/global1.html

21a. What is Globalisation? 4 marks

TO HELP YOU ANSWER
THIS QUESTION

Follow the links below.

http://www.technologystudent.com/prddes_2/global1.html

http://www.technologystudent.com/prddes_2/global2.html

21b. Select a manufactured product that is the result of globalisation, Describe the stages involved in it's manufacture. 4 marks

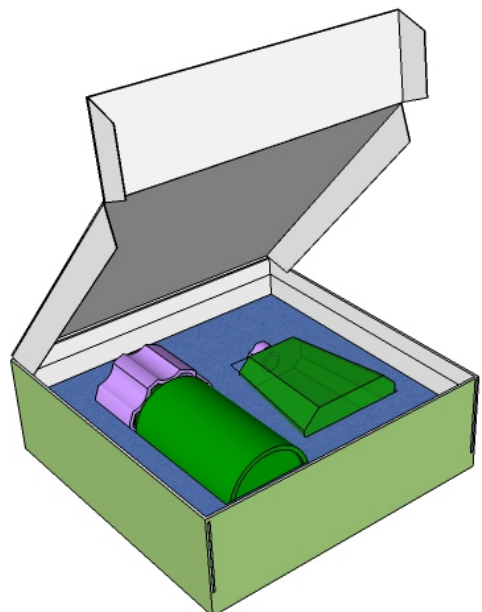
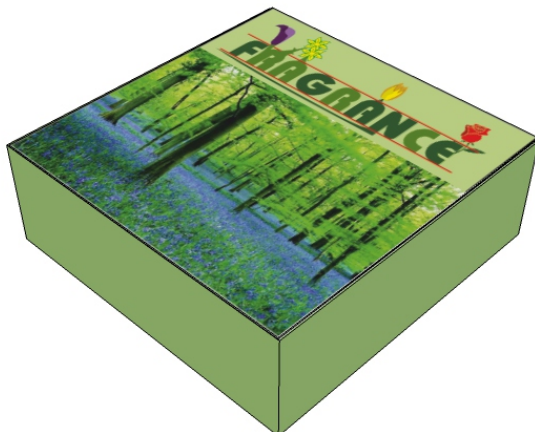
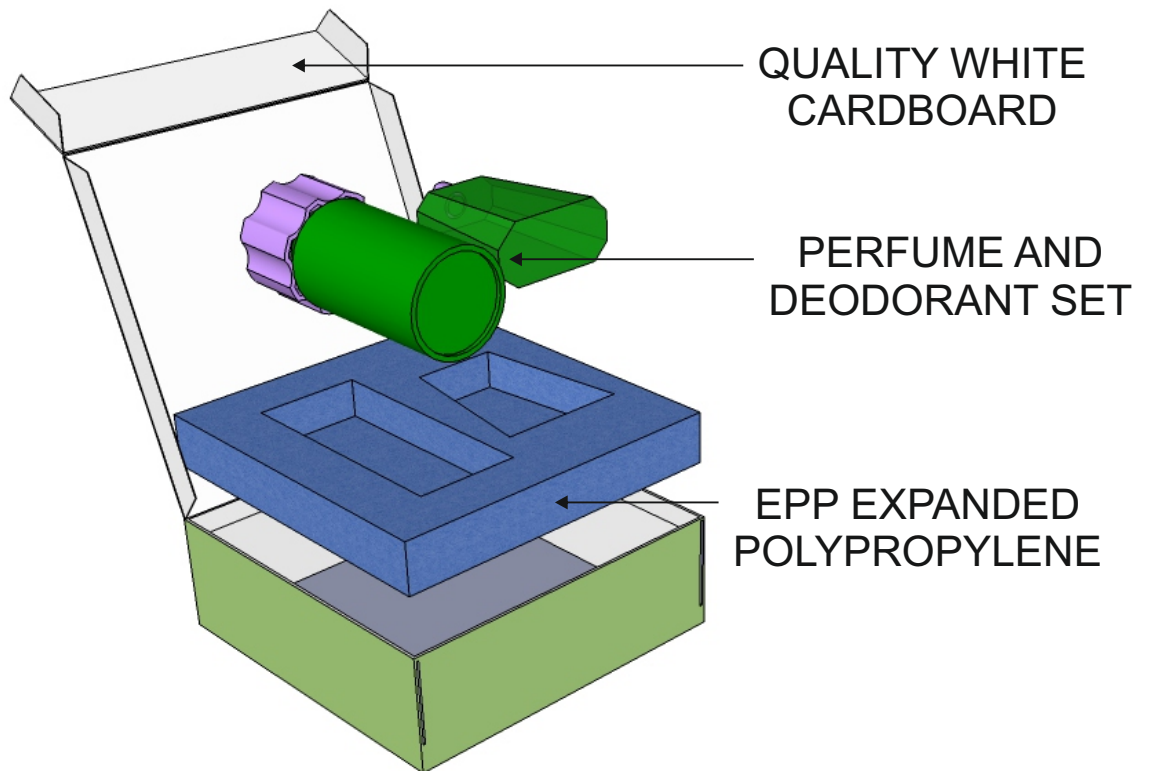
PRODUCT:

DESCRIPTION:

SECTION C - DESIGNING AND MAKING PRINCIPLES

PACKAGING OF PERFUMED PRODUCTS

The packaging seen below, has been designed to hold / store deodorant and perfume containers.



22. The packaging should have the following design features:

TO HELP YOU ANSWER
THIS QUESTION

Follow the links below.

<http://www.technologystudent.com/despro2/drink7.htm>
<http://www.technologystudent.com/despro2/drink14.htm>

22a. Draw a typical symbol that should be found on the packaging and add a description / explanation of the symbol. 2 marks

22b. What is the advantage of using Expanded Polypropylene (EPP)? 2 marks (Link for help <http://www.technologystudent.com/prddes1/perfpk3.html>)

22c. Why is quality card also used in the manufacture of the packaging? 2 marks (Link for help - <http://www.technologystudent.com/prddes1/perfpk4.html>)

22d. The printing process called lithography is used to print the detail, images and colour on to the surfaces of the packaging. Draw a labelled diagram of lithography and included a written explanation. 4 marks (Link for help <http://www.technologystudent.com/designpro/prtpro5.htm>)

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

http://www.technologystudent.com/despro_3/promopk2.html

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23a. List FOUR ways, in which the printed surfaces of packaging, helps in the promotion of a product? 4 marks

23b. How could the packaging be improved, if the target market was specifically aimed at teenagers? 4 marks

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/despro2/prneff2.htm>

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24a. The surface of the packaging is to finished through the process of UV varnishing? Explain this process with a diagram and notes 5 marks

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/prddes1/perfpk12>.

24b. The packaging is in the form of a cuboid. Give three advantages of using this common shape 3 marks

REASON 1:

REASON 2:

REASON 3:

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/prddes1/brand1.html>

<http://www.technologystudent.com/prddes1/brand2.html>

25a. These questions are related to Brand Identity (8 marks in total)

What is a brand? 2 marks

25b. Name a company that you think has reached brand status. Explain why you consider it has reached this status. 2 marks

25c. Describe / explain four characteristics of Brand Identity. 4 marks

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/prddes1/markrs1.html>

<http://www.technologystudent.com/prddes1/markrs2.html>

<http://www.technologystudent.com/prddes1/markrs2.html>

<http://www.technologystudent.com/prddes1/ict1.html>

Designers need an understanding of Market Research

26a. What is meant by the term Market Research? 4 marks

26b. How can ICT specifically contribute to market research? 4 marks

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

http://www.technologystudent.com/joints_flsh/phosphor1.html
http://www.technologystudent.com/joints_flsh/recard_phos1.html

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

28b. Describe two practical applications of Phosphorescent Pigments. 2 x 3 marks

PRACTICAL APPLICATION 1:

PRACTICAL APPLICATION 1:

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/designpro/model1.htm>

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29a. Designers make models throughout the design and development of a product? Why is model making important? 2 marks

TO HELP YOU ANSWER THIS QUESTION Follow the links below.

<http://www.technologystudent.com/prddes1/modmat1.html>
<http://www.technologystudent.com/prddes1/modemat2.html>

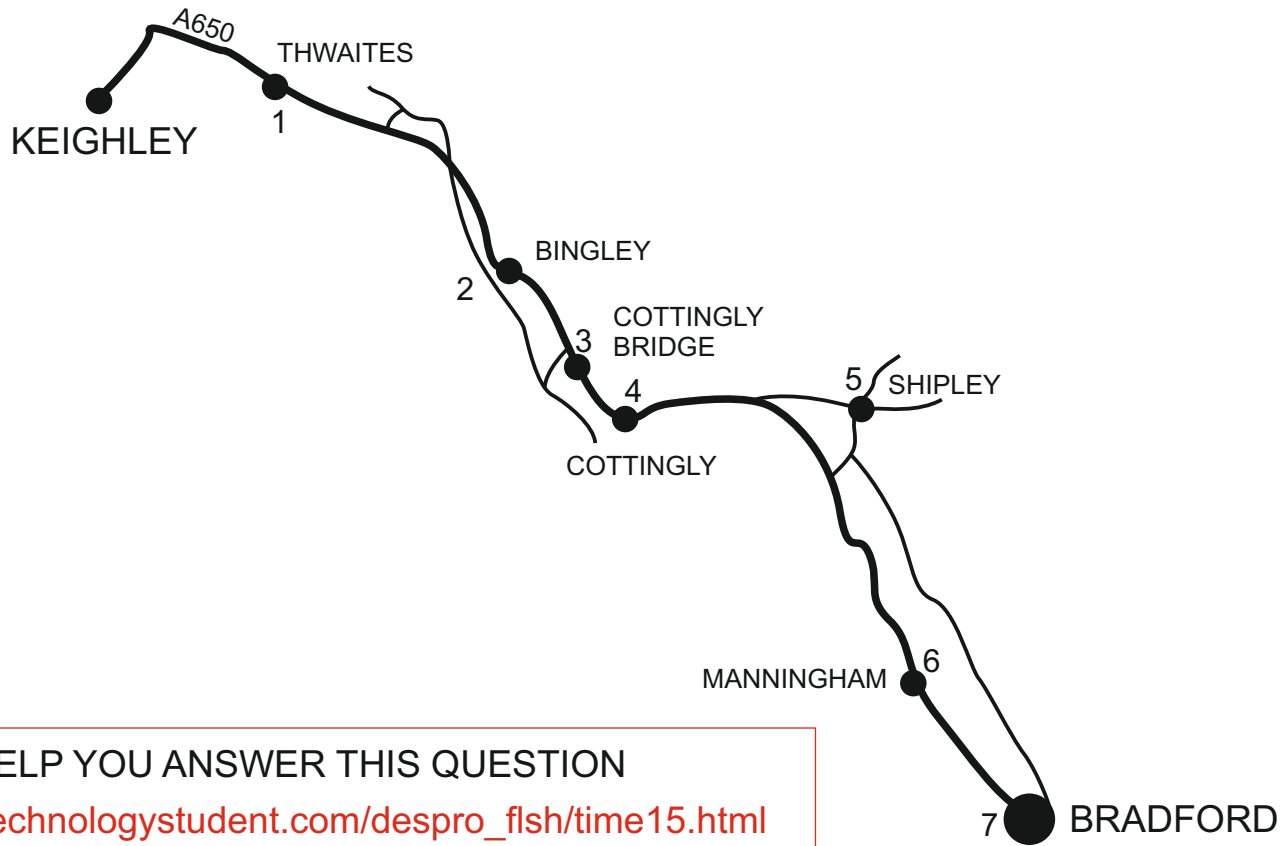
29b. Name two model making materials used by designers and describe the characteristics that make them suitable for model making. 2 x 3 marks

Modelling Materials 1:

Modelling Material 2:

30. A local public bus, takes a route from Keighley to Bradford, as shown on the map below. The bus stops are indicated on the map

Draw a topological map, in the style of London Underground, in the available space.
6 marks



TO HELP YOU ANSWER THIS QUESTION

http://www.technologystudent.com/despro_flesh/time15.html

http://www.technologystudent.com/despro_flesh/time16.html