PRODUCT ANALYSIS

A

Choose just one answer, a, b, c or d.

1 **Most products are manufactured:**
a) in batches
b) as one-offs
c) as continuous flow materials
d) using metal castings (1 mark)

2 **A technique for studying existing products to gather design ideas is often called:**
a) product manufacture
b) tool analysis
c) product analysis
d) study analysis (1 mark)

3 **Product analysis is generally used in the:**
a) distribution stage
b) quality assessment stage
c) manufacturing stage
d) design and development stage (1 mark)

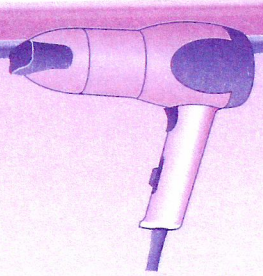
4 **Which of the following products would not lend itself to product analysis for school projects?**
a) electrical kettle
b) hairdryer
c) chemical plant
d) mobile phone (1 mark)

5 **Taking a product apart to help analyse the various parts and how it fits together is called:**
a) commercial analysis
b) safety analysis
c) product disassembly
d) detection analysis (1 mark)

Score / 5

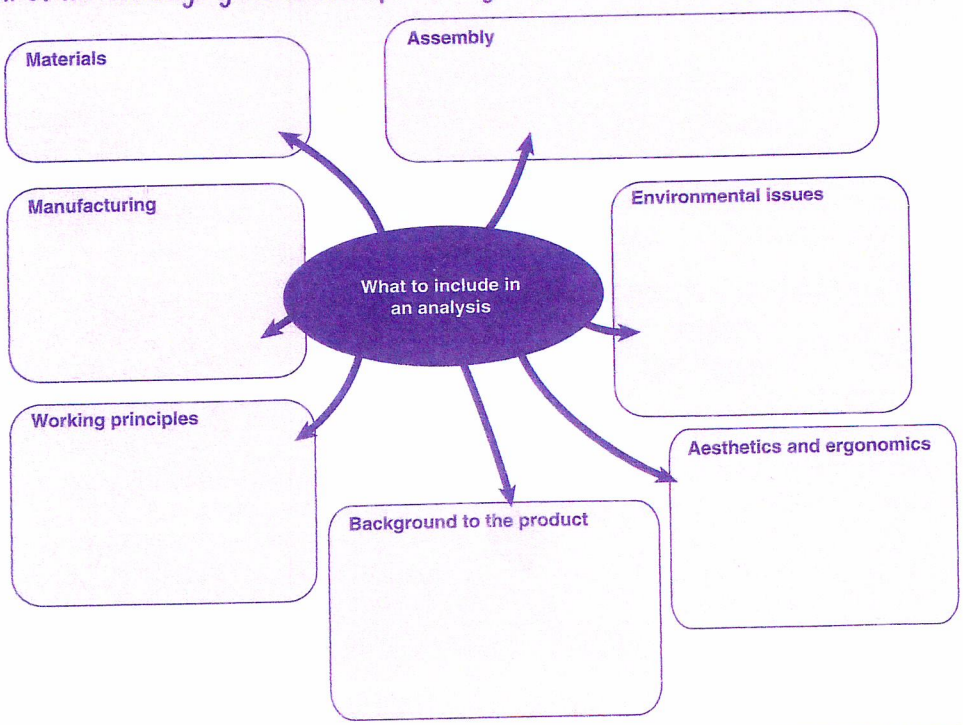
B

Answer all parts of the questions.



1 As part of your design studies you have been asked to analyse the design of a hairdryer.

For each of the headings given in the spider diagram, list two factors you would look for in your analysis.



(12 marks)

Score / 12

C These are GCSE-style questions. Answer all parts of the questions.

1 The sketch shows a wheelbarrow commonly used in household gardens.

a) Make a checklist under the following headings of some of the points you would look for when carrying out a product analysis.

i) materials

ii) environmental factors

iii) assembly

.....

.....

.....

.....

.....

..... (6 marks)

b) Select two other products that could be used for a product analysis. Explain why you have chosen them.

Product 1 .....

.....

Product 2 .....

..... (4 marks)

2 **a)** Why might product disassembly be a good method for analysing existing products?

.....

..... (3 marks)

b) Make a checklist of factors you might look for during such a disassembly.

.....

.....

.....

..... (4 marks)

Score / 17

How well did you do?

0–10 correct Try again
11–19 correct Getting there
20–27 correct Good work
28–34 correct Excellent!

TOTAL SCORE / 34

For more information on this topic see pages 24–25 of your Success Guide

GENERATING DESIGN PROPOSALS

A

Choose just one answer, a, b, c or d.

1 **Design changes that are the result of changes in people's tastes are commonly called:**
a) planned obsolescence
b) design changes
c) fashion changes
d) human changes (1 mark)

2 **Adding design features to make a product outdated after a certain time is called:**
a) technology obsolescence
b) breakdown obsolescence
c) safety obsolescence
d) planned obsolescence (1 mark)

3 **Developing a design proposal is:**
a) the last stage of a design and technology project
b) the first stage of a project
c) not necessary in a project
d) better if carried out in the manufacturing stage of the project (1 mark)

4 **A specific statement of the design problem to be solved is termed the:**
a) design essay b) design factors
c) design brief d) design list (1 mark)

5 **A chosen area of study from which a design project may be found is called the:**
a) design specification
b) design context
c) design list
d) design factors (1 mark)

Score / 5

B

Answer all parts of the questions.

1 Consider this list of tasks which refers to stages in the generation of a design proposal. Rearrange the list into the most appropriate order for design development generation.

Define the project need

Carry out research to help in the initial design stages

Prepare a design brief

Write a specification for the project

Choose an area of study (context) from which a project need can be found

Select the best idea or ideas for further development. Give reasons for choices.

.....

.....

.....

..... (6 marks)

2 Give four reasons why design ideas are continually being generated in industries and other areas.

Reason 1 .....

Reason 2 .....

Reason 3 .....

Reason 4 ..... (4 marks)

Score / 10

C

These are GCSE-style questions. Answer all parts of the questions.

1 A common piece of outdoor furniture is shown in the diagram. As part of a design and technology project you have been asked to complete the following.

a) State four factors that could be included in the design specification for the product.

.....

.....

.....

..... (4 marks)

b) Outline three factors that could influence the manufacturing route and processes for the product.

.....

.....

..... (3 marks)

c) Briefly explain why modelling is a useful method in the design proposal stage.

.....

..... (2 marks)

2 Mobile phone companies need to constantly update the styles of hand phones.

a) Give three reasons why a company might have to do this.

.....

.....

..... (3 marks)

b) Give four specification factors that a mobile phone designer might need to consider when designing a new phone for the market.

.....

.....

.....

..... (4 marks)

c) What sort of research could be carried out in order to gather information for a new design?

.....

..... (3 marks)

Score /19

How well did you do?

0–10 correct Try again
11–19 correct Getting there
20–27 correct Good work
28–34 correct Excellent!

TOTAL SCORE / 34

For more information on this topic see pages 26–27 of your Success Guide

PRODUCT DEVELOPMENT AND PLANNING

A

Choose just one answer, a, b, c or d.

1 **Dimensioned drawings that are used for manufacturing are called:**
a) initial sketches b) planning sketches
c) mock-up drawings d) working drawings
(1 mark)

2 **Factors that relate the dimensions of people to a product are called:**
a) ergonomic factors b) specification factors
c) population factors d) aesthetic factors
(1 mark)

3 **Aesthetics is concerned with the:**
a) weight of a product
b) machineability of a product
c) appearance of a product
d) size of a product (1 mark)

4 **A network chart is a type of:**
a) planning chart
b) mock-up chart
c) manufacturing system
d) dimensional drawing (1 mark)

5 **Final working drawings are often produced with the aid of:**
a) CNC
b) CAD
c) CAM
d) ROM (1 mark)

Score / 5

B

Answer all parts of the questions.

1 Complete the sentences below. Use one of the following phrases in each sentence.

manufacturing route	sketches	final working drawing	final design proposal

Planning is essential to plan the ..... ,
the manufacturing times and how the quality of the product will be controlled.
Computer aided design is widely used to produce the ..... .
Development makes use of ..... , further research and mock-ups to refine ideas.
During the product development stage, work is carried out to transform the ..... into working drawings. (4 marks)

2 Give three reasons why accurate mock-up models are useful in the product development and planning stage of the design and manufacture process.

Reason 1 .....
Reason 2 .....
Reason 3 ..... (3 marks)

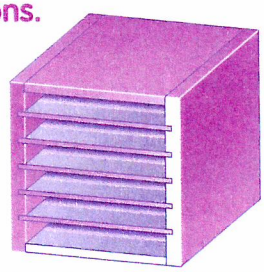
3 Make a checklist of points you would consider during the design and development stage.

.....
..... (4 marks)

Score / 11

C These are GCSE-style questions. Answer all parts of the questions.

1 A cassette rack is to be made using a CNC routing machine and then hand-assembling the machined parts together.



a) Assuming you are starting from the wood-cutting stage, make a list of the procedures that have to be carried out to make the cassette rack.

.....

.....

.....

..... (4 marks)

b) Draw a network, or similar, diagram to show how the stages of manufacture would be linked together during the manufacturing cycle.

(5 marks)

c) Give two other factors that would have to be considered when the product is being manufactured.

.....

..... (2 marks)

2 **a)** What is meant by the term 'design aesthetics'?

.....

..... (2 marks)

b) What is meant by the term 'ergonomics'?

.....

..... (2 marks)

c) Explain why planning is an important aspect of the design and technology process.

.....

.....

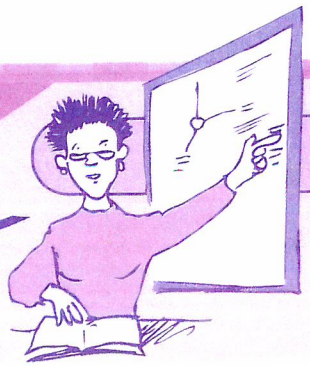
.....

..... (4 marks)

Score / 19

How well did you do?

0–11 correct Try again
12–20 correct Getting there
21–28 correct Good work
29–35 correct Excellent!



TOTAL SCORE / 35

For more information on this topic see pages 28–29 of your Success Guide

SOCIAL AND ENVIRONMENTAL CARE

A

Choose just one answer, a, b, c or d.

1 **Chemicals that can cause harm to people and animals are called:**
a) chemi products
b) taxic products
c) toxic products
d) bio products (1 mark)

2 **Which of the following is not a renewable energy resource?**
a) wind b) water
c) coal d) solar power (1 mark)

3 **Manufactured boards are mainly made from:**
a) reprocessed newspaper
b) recycled timber
c) new trees that have been felled
d) a combination of plastics and timber (1 mark)

4 **Which of the following materials is the most difficult to recycle?**
a) paper
b) glass
c) thermosetting plastic
d) card (1 mark)

5 **Waste materials that are able to decompose easily in the environment are called:**
a) biodegradable materials
b) non-biodegradable materials
c) packaging materials
d) toxic materials (1 mark)

Score / 5

B

Answer all parts of the questions.

Consider whether the following statements are true or false.

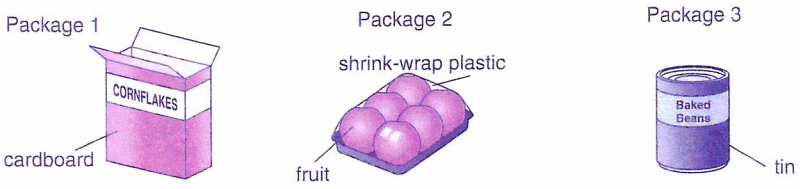
		True	False
1	A renewable resource is one that cannot be renewed within 500 years.	☐	☐
2	Softwood trees take longer to grow than hardwood trees.	☐	☐
3	Metals are a non-renewable resource.	☐	☐
4	Plastics are a renewable resource.	☐	☐
5	Manufacturing processes that use plastics tend to use less energy than manufacturing processes that use metals.	☐	☐
6	Paints that contain lead can be used to paint children's toys.	☐	☐
7	A thermoplastic cannot be recycled.	☐	☐

(7 marks)

Score / 7

C These are GCSE-style questions. Answer all parts of the questions.

1 The sketches show three common types of food packaging.



a) Consider each of these types of packaging. Complete the table below.

Package	Type of Material Used	Is the Material Biodegradable?
1		
2		
3		

(6 marks)

b) Give three environmental factors that should be considered when designing packaging for products.

Factor 1 .....

Factor 2 .....

Factor 3 ..... (3 marks)

2 You have been asked to give a five-minute talk on methods of reducing waste in your school workshop.

a) Give three points that you would make during your talk.

.....

.....

..... (3 marks)

b) Give two examples of a renewable energy source.

.....

..... (2 marks)

c) Give two examples of a non-renewable energy resource.

.....

..... (2 marks)

d) Explain why manufactured boards may be better for the environment as a whole than using natural timber.

.....

.....

..... (3 marks)

Score / 19

How well did you do?

0–8 correct Try again
9–17 correct Getting there
18–23 correct Good work
24–31 correct Excellent!

TOTAL SCORE / 31

For more information on this topic see pages 30–31 of your Success Guide

USE OF CAD

A

Choose just one answer, a, b, c or d.

1 **CAD stands for:**
a) computer action design
b) computer automated design
c) computer aided design
d) computer aided drawing (1 mark)

2 **Two-dimensional drawings are called:**
a) orthographic drawings b) solid models
c) isometric drawings d) pictorial drawings
(1 mark)

3 **Which of the following types of CAD packages allow drawings to be rotated and viewed at various angles?**
a) 2-D CAD packages
b) standard parts packages
c) solid modelling CAD packages
d) working drawing CAD packages (1 mark)

4 **Which of the following types of drawings often show how a product is assembled together?**
a) freehand sketching
b) component drawing
c) 2-D drawing
d) exploded drawing (1 mark)

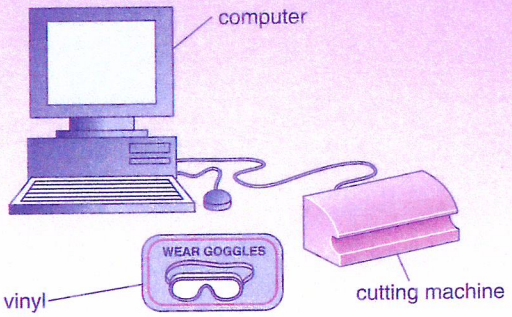
5 **Which of the following is not usually carried out using CAD methods?**
a) 2-D drawings
b) 3-D drawings
c) initial design research sketches
d) orthographic drawings (1 mark)

Score / 5

B

Answer all parts of the questions.

1 A computer plotter cutting machine is being used to produce safety signs for a school workshop.



a) Give four advantages of using the computer cutter rather than cutting the vinyl by hand.

.....

.....

.....

..... (4 marks)

b) When might it be more beneficial to cut out the signs without the use of the computer system?

.....

..... (2 marks)

c) Give two other ways in which a CAD package can be used directly to make products in the school workshop.

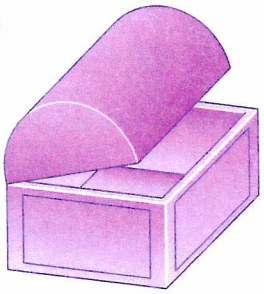
.....

..... (2 marks)

Score / 8

C These are GCSE-style questions. Answer all parts of the questions.

1 The diagram shows the main features of a box which is to be designed using a CAD system.



a) List three types of drawings that could be drawn using the CAD system and give one reason why each would be used in the design process.

.....

.....

..... (3 marks)

b) Explain how the CAD system could be used to make other similar boxes, with slight modifications, quickly and easily.

.....

.....

.....

..... (4 marks)

c) Give two reasons why the CAD system can help reduce the time between the design process and manufacture.

.....

..... (2 marks)

2 **a)** Explain how CAD packages can be used in addition to free-hand sketching in the design of products.

.....

..... (2 marks)

b) How might the use of CAD speed up product manufacture?

.....

.....

.....

..... (3 marks)

Score / 14

How well did you do?

0–8 correct	Try again
9–14 correct	Getting there
15–22 correct	Good work
23–27 correct	Excellent!

TOTAL SCORE / 27

For more information on this topic see pages 32–33 of your Success Guide

SYSTEMS AND CONTROL DESIGN

A

Choose just one answer, a, b, c or d.

1 **Which of the following gears is used to turn shafts at right angles to each other?**
a) compound gears
b) rack and pinion gears
c) bevel gears
d) idler gears (1 mark)

2 **Which type of gears can be used to change rotary motion into linear motion?**
a) worm gears
b) rack and pinion gears
c) bevel gears
d) helical gears (1 mark)

3 **Which type of belt drive results in no slippage during use?**
a) toothed belts b) smooth belts
c) vee belts d) circular belts (1 mark)

4 **Reciprocating motion is often achieved using a:**
a) helical gear mechanism
b) vee belt mechanism
c) cam mechanism
d) cog mechanism (1 mark)

5 **Closed-loop systems normally include feedback:**
a) sensors
b) gears
c) belt drives
d) bulbs (1 mark)

Score / 5

B

Answer all parts of the questions.

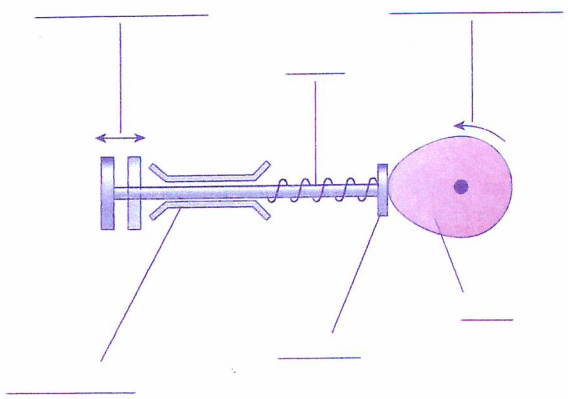
1 State whether these statements are true or false.

	True	False
a) An open-loop system is where there is some feedback to help control the system.	☐	☐
b) Closed-loop systems tend to be more accurate than open-loop systems.	☐	☐
c) Systems diagrams are block diagrams that show how the various parts of a system link together.	☐	☐
d) A quality check can be regarded as a feedback loop in a manufacturing system.	☐	☐

(4 marks)

2 The diagram shows a typical use of a cam mechanism. Complete the diagram by using these words to label the parts.

slider | rotational motion | cam | cam follower | slider guide | reciprocating motion



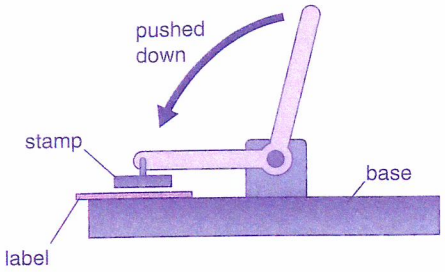
(6 marks)

Score / 10

C These are GCSE-style questions. Answer all parts of the questions.

1 A small mechanism has been designed to help print some labels. To print, a label is pushed underneath the stamp and the lever is then pushed down.

a) Indicate on the diagram the position of the applied load, the effort and the pivot. (3 marks)



b) Show how the lever could be made to return automatically. (2 marks)

c) Design a simple method of moving the print plate at a constant rate to speed up the operation.

(6 marks)

2 **a)** Name three types of gears that are used in mechanisms.

.....

.....

..... (3 marks)

b) State two advantages of using gears rather than belt drives.

.....

..... (2 marks)

c) Explain the difference between a simple gear train and a compound gear train.

.....

.....

..... (3 marks)

Score / 19

How well did you do?

0–8 correct	Try again
9–15 correct	Getting there
16–22 correct	Good work
23–28 correct	Excellent!

TOTAL SCORE / 28

For more information on this topic see pages 34–35 of your Success Guide