Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2016

Technology and Design

Unit 3: Product Design

[GTD31]

GTD31

MONDAY 6 JUNE, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Questions which require drawing or sketching should be completed using an H.B. pencil.
All other questions must be completed in blue or black ink.
Do not write in pencil or with a gel pen.
Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 80.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

9933

Answer **all** questions

1 Cycling has become a very popular activity and social considerations have played their part in making the bicycle a very successful modern day product.

(a) Outline **two** social considerations or trends that have helped to influence the success of the modern bicycle in today's society.

1. _____

_____ [1]

2. _____

_____ [1]

(b) Two modern day bicycles are illustrated in **Fig. 1** and **Fig. 2**.

(i) Give **three** reasons to suggest why the racing bicycle shown in **Fig. 1** is fit for purpose.

Fig. 1

É m-gucci / iStock / Thinkstock

1. _____

_____ [1]

2. _____

_____ [1]

3. _____

_____ [1]

[Turn over

(ii) Identify **three** features of the urban/city bicycle shown in **Fig. 2** which make it fit for purpose.

Fig. 2

1. _____

_____ [1]

2. _____

_____ [1]

3. _____

_____ [1]

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(Questions continue overleaf)

2 A manufacturer is going to make sets of chess pieces. **Fig. 3** shows a partially completed prototype chess piece made from aluminium. A second set will be made from another metal.

Fig. 3

(a) Name a manually operated machine that could be used to make the above chess piece.

_____ [1]

(b) Suggest **two** properties of aluminium which make it a suitable material for one set of chess pieces.

1. _____

_____ [2]

2. _____

_____ [2]

(c) **(i)** Name another suitable metal for the manufacture of a second set of chess pieces.

_____ [1]

(ii) Give an appropriate reason for using this metal, other than the answers to part **(b)**.

_____

_____ [1]

(d) The manufacturer has decided to make a quantity of chess pieces using a CNC process. Give **one** advantage to the manufacturer in using the CNC process compared to the manually operated machines.

_____

_____

_____ [1]

[Turn over

3 **Fig. 4** shows a domestic vacuum cleaner ready for use.

Fig. 4

(a) **(i)** Suggest **two** possible problems associated with the cable when using a vacuum cleaner.

1. _____

2. _____ [2]

(ii) The vacuum cleaner has a **BSI** and **CE** symbol. State the purpose of either of these symbols.

_____ [1]

(b) Give **two** reasons why plastic materials would be suitable for use in the outer casing of the vacuum cleaner.

1. _____ [1]

2. _____ [1]

(c) Name the chart which could be used to plan and manage the production of the cleaner.

_____ [1]

(d) The vacuum cleaner could be manufactured using either **batch production** or **mass production**.

Select either method of production for the vacuum cleaner and give a reason why the selected method would be suitable.

Method: _____

Reason: _____

_____ [2]

[Turn over

4 The development of new or improved products is often influenced by **Market Pull** or **Technology Push**.

(i) Outline what is meant by **Market Pull** and **Technology Push**.

Market Pull _____

_____ [2]

Technology Push _____

_____ [2]

(ii) With reference to a specific product explain how its development has been influenced by **Market Pull**.

_____

_____

_____ [2]

(iii) With reference to a specific product explain how its development has been influenced by **Technology Push**.

_____

_____

_____ [2]

5 **(a)** **Table 1** shows five types of material. Complete the table by inserting an example of each type of material.

Table 1

Type of material	Example
Non ferrous alloy	
Hardwood	
Non ferrous metal	
Ferrous alloy	
Softwood	

[5]

(b) Name a product, used in the home, which is manufactured from each of the following types of material.

Note: A different product should be used for each answer.

(i) **Hardwood product:** _____

(ii) **Ferrous alloy product:** _____

(iii) **Non ferrous alloy product:** _____ [3]

[Turn over

6 **Fig. 5** shows a picture of a wooden bookcase. The wood used for the body of the bookcase is MDF with an oak veneered finish.

Fig. 5 *© jongjet303 / iStock / Thinkstock*

(a) (i) Explain the meaning of the term veneered finish.

_____

_____ [1]

(ii) Suggest another manufactured board which could be veneered.

_____

_____ [1]

(b) Give **two** suitable reasons why the designer of the bookcase selected veneered MDF for the product.

1. _____

_____ [1]

2. _____

_____ [1]

(c) A list of wood joints is shown below. Select the **most** suitable method of attaching the sides and top of the bookcase together.

Use a tick (✓) to show your choice of the wooden joints.

- ☐ Mortise and Tenon Joint
- ☐ Lap Joint
- ☐ Housing Joint
- ☐ Dovetail Joint [1]

(d) In the space below, sketch a suitable method of attaching the shelves to the sides of the unit.

[3]

[Turn over

7 A number of techniques are used in Technology and Design to **generate and develop ideas**.

(i) Name **two** techniques used for **the generation and development of ideas**.

1. _____

2. _____ [2]

(ii) List **three** features or steps that are involved in each technique you have selected when it is used to generate and develop ideas.

Technique 1

1. _____

_____

2. _____

_____

3. _____

_____ [3]

Technique 2

1. _____

_____

2. _____

_____

3. _____

_____ [3]

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(Questions continue overleaf)

8 **Fig. 6** shows a picture of a typical mobile phone. Using annotated sketch(es), design a freestanding holder for the mobile phone that will support the phone in the position shown and also be able to sit on a table or unit while charging. The screen must be visible to read when in the holder. The overall dimensions of the mobile phone are shown.

Fig. 6

The design must satisfy the following specification points:

- The phone must be held securely and should be easily attached and removed from the holder. [4]
- The material(s) selection, justification and the economy of material(s) used need to be specified. [4]
- The method of construction of the holder must be clearly shown. [4]
- The holder must be stable and capable of holding the phone in the position shown. There must be easy access and clearance for the lead when connected to the charging point on the phone. [4]
- The holder must be aesthetically pleasing and the screen should be easy to read when located in the holder. [2]
- The solution should show good quality sketch(es) with notes including **three** key dimensions. [6]

Use the next page for your answer. If you need more space there is an additional page overleaf.

THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

Examiner Number