



General Certificate of Secondary Education
2015

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

Technology and Design

Unit 3: Product Design



[GTD31]

GTD31

MONDAY 8 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 using blue or black ink only.

Do not write in pencil or with a gel pen.

Answer **all eight** 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.



BLANK PAGE
DO NOT WRITE ON THIS PAGE

9377



20GTD3102



Answer **all** questions

1 Anthropometrics and ergonomics are important factors that need to be considered in the design of products.

(i) Outline what is meant by the term anthropometrics.

[1]

(ii) Explain why it is important to consider anthropometric data when designing or developing products.

[3]

(iii) Outline **two** specific anthropometric factors that would have an important influence on the design of a mobile phone. For each factor selected explain its influence on the design.

Specific factor 1 _____

Influence _____

_____ [2]

Specific factor 2 _____

Influence _____

_____ [2]

[Turn over



2 (a) Three common saws used in the manufacture of wooden products are listed below.

- (i) Tenon saw
- (ii) Coping saw
- (iii) Ripsaw

For each saw state its main application and explain a design feature which makes it suitable for its main application.

(i) Tenon saw

Main application _____

Explanation _____

_____ [2]

(ii) Coping saw

Main application _____

Explanation _____

_____ [2]

(iii) Ripsaw

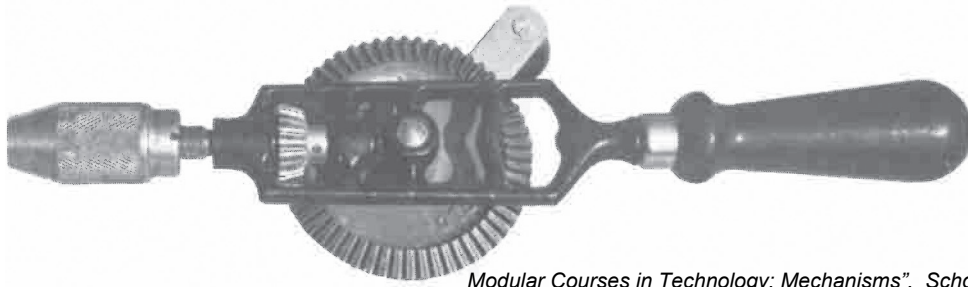
Main application _____

Explanation _____

_____ [2]



(b) Fig. 1 shows a typical hand drill which is operated through gear wheels.



*Modular Courses in Technology: Mechanisms”, Schools Council,
Pearson Education Limited © Schools Council 1981*

Fig. 1

State **two** functions of the gear wheels when used to operate the hand drill in **Fig. 1**.

Function 1 _____
_____ [1]

Function 2 _____
_____ [1]

[Turn over



3 A supermarket trolley is to be developed and produced for a new shopping complex.

During the design, development and manufacture of the product, ongoing **interaction** between those involved in this process plays an important role in the successful development of the product.

For each of the situations labelled **(a)**, **(b)**, **(c)** and **(d)** outline **two** useful interactions (discussion points) that may take place in relation to the development of the supermarket trolley.

NOTE: In each situation the points discussed should be different.

(a) Discussion between designer and client

1. _____
_____ [1]

2. _____
_____ [1]

(b) Discussion between client and user

1. _____
_____ [1]

2. _____
_____ [1]



(c) Discussion between designer and maker

1. _____
_____ [1]

2. _____
_____ [1]

(d) Discussion between designer and user

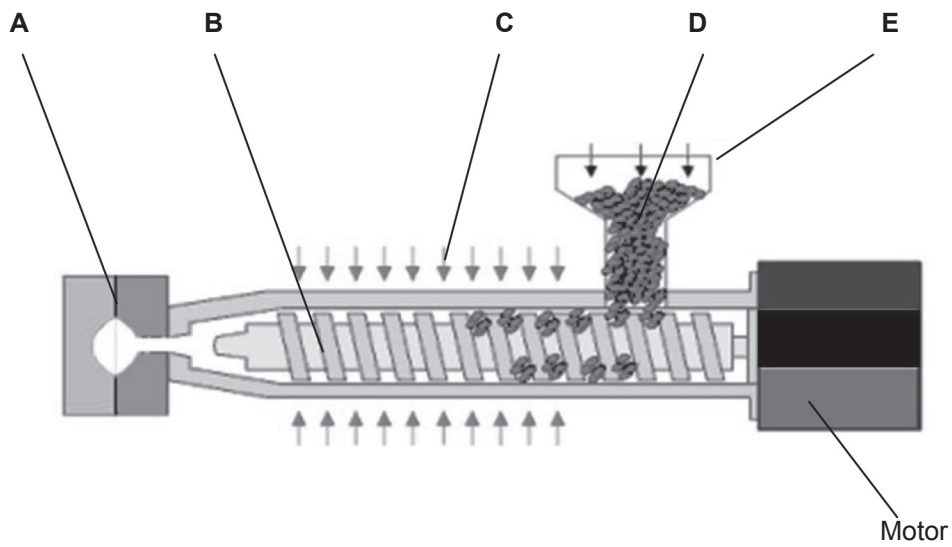
1. _____
_____ [1]

2. _____
_____ [1]

[Turn over



4 (a) Fig. 2 shows a diagram of an injection moulding machine.



© V.Ryan / Technologystudent.com

Fig. 2

Complete Fig. 2 by identifying each of the **five** main features **A–E**.

- A _____
- B _____
- C _____
- D _____
- E _____ [5]



(b) (i) Name a specific plastic material that could be used in the machine.

_____ [1]

(ii) Give **two** reasons for your choice of plastic material.

1. _____

2. _____

_____ [2]

[Turn over



5 (a) Energy efficiency is an important consideration in the choice of a light bulb. State **two** additional factors that would influence the choice of a light bulb.

1. _____

2. _____ [2]

(b) State what is meant by the sustainability of resources.

_____ [2]

(c) Name **two** fossil fuels.

1. _____

2. _____ [2]

(d) Suggest **two** ways in which dependency on fossil fuels could be reduced.

1. _____

_____ [1]

2. _____

_____ [1]





BLANK PAGE

DO NOT WRITE ON THIS PAGE

(Questions continue overleaf)



6 Fig. 3 shows an electric kettle.



© gebai / iStock / Thinkstock

Fig. 3

(i) Name a suitable metal for the body of the kettle.

_____ [1]

(ii) State **two** properties of this metal which make it suitable for the body of the kettle.

1. _____ [1]

2. _____ [1]

(iii) Name a suitable **type** of plastic for the handle of the kettle.

_____ [1]



(iv) State **two** properties of the plastic which make it suitable for the handle of the kettle.

1. _____ [1]

2. _____ [1]

(v) State **two** design considerations which influenced the shape of the kettle.

1. _____

_____ [1]

2. _____

_____ [1]

[Turn over



7 (a) A prototype of a wooden box is shown in Fig. 4.

Name each type of joint shown in Fig. 4.

A _____ [1]

B _____ [1]

C _____ [1]

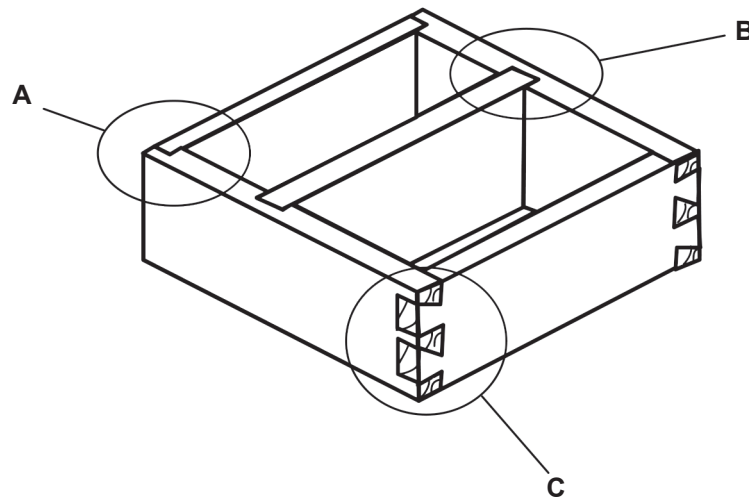


Fig. 4



(b) Explain each of the types of production listed below.

Prototype

[1]

Mass Production

[1]

Batch Production

[1]

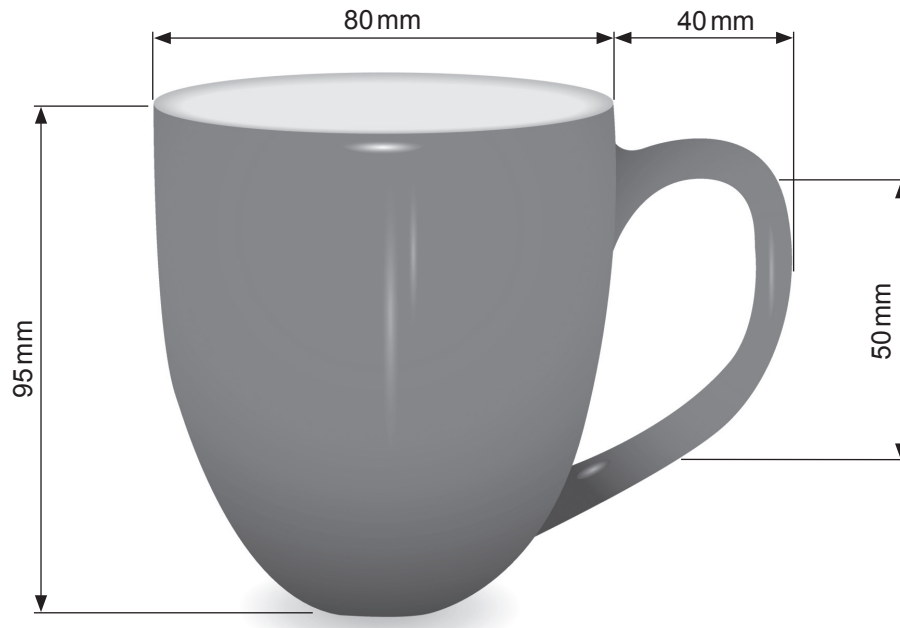
(c) It was decided that the cost of manufacturing the box in **Fig. 4** was too expensive and modifications were needed. Suggest how the box could be modified.

[2]

[Turn over



- 8 Using annotated sketch(es) on the next two pages, design a **freestanding** holder for a kitchen worktop that will accommodate six cups. The overall dimensions of each cup are shown in **Fig. 5**.



© Ingram Publishing / Thinkstock

Fig. 5

The design must satisfy the following specification points:

- Hold up to **six** cups securely. Cups need to be easily attached and removed from the holder. [4]
- Material(s) selection, justification and the economy of material(s) used. [4]
- The construction of the holder must be clearly shown. [4]
- Must be stable when resting on a kitchen worktop and holding one or more cups. [4]
- Must be aesthetically pleasing. [2]
- Include good quality sketches with notes and **three** key overall dimensions. [6]

Use the next two pages for your answer.





Answer page

[Turn over

9377



20GTD3117

Answer page

9377



20GTD3118





BLANK PAGE

DO NOT WRITE ON THIS PAGE

9377



20GTD3119

DO NOT WRITE ON THIS PAGE

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

Total Marks	
--------------------	--

Examiner Number

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA will be happy to rectify any omissions of acknowledgement in future if notified.

177682



20GTD3120