



Rewarding Learning

Centre Number

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Candidate Number

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General Certificate of Secondary Education
2014

Technology and Design

Unit 3: Product Design

[GTD31]



TUESDAY 3 JUNE, AFTERNOON

TIME

1 hour, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Questions which require drawing or sketching should be completed using an HB pencil. All other questions must be completed in blue or black ink.

Do not write 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.

Answer **all** questions

Examiner Only

Marks

Remark

1 (a) Blow moulding and injection moulding are two common industrial manufacturing processes used to produce plastic components.

(i) Which process is a **reforming** process?

[1]

(ii) Which process is a **deforming** process?

[1]

(b) (i) Outline **three** key features or stages of the **blow moulding** process.

1. _____

2. _____

3. _____

[3]

(ii) Outline **three** key features or stages of the **injection moulding** process.

1. _____

2. _____

3. _____

[3]

Total Question 1

2 Manufacturing practices involve the use of machines and power tools.

State **two** applications/uses of each of the following machines.

Circular Saw

1. _____ [1]

2. _____ [1]

Milling Machine

1. _____ [1]

2. _____ [1]

Planer

1. _____ [1]

2. _____ [1]

Lathe

1. _____ [1]

2. _____ [1]

Examiner Only

Marks _____

Remark _____

Total Question 2 _____

3 Fig. 1 shows an extension ladder manufactured from aluminium alloy.

Examiner Only	
Marks	Remark



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Fig. 1

(a) State why metals are alloyed.

[1]

(b) State **three** properties of aluminium alloy which make it a suitable material for the ladder.

1. _____
2. _____
3. _____ [3]

(c) State the advantage of buying a ladder with the Kitemark or CE markings.

_____ [2]

(d) Outline **two** design features of the ladder which are based on anthropometric data.

1. _____
2. _____ [2]

Examiner Only	
Marks	Remark

Total Question 3	

[Turn over]

8700.02 ML

4 Intellectual Property falls into a number of areas which include copyright, trademarks and patents.

(a) What is meant by Intellectual Property?

[2]

(b) Individuals or companies often apply for copyright, trademarks or patents. Give a brief explanation of each of the following:

- Copyright
- Trademarks
- Patents

Copyright _____

[2]

Trademarks _____

[2]

Patents _____

[2]

Total Question 4

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(Questions continue overleaf)

[Turn over

8700.02 ML

5 (a) A company engaged in the manufacture of gardening equipment is reordering stock. The stock is reordered using the **just-in-time** process.

(i) Give **two** reasons for using the **just-in-time** process.

1. _____

 2. _____
 _____ [2]

(ii) The company uses standardised components.

Give **two** features of this industrial practice.

1. _____
 2. _____ [2]

(b) Fig. 2 shows a sketch of a wheelbarrow manufactured by the company.



Fig. 2

(i) Give **one** reason why the body is galvanised.

_____ [1]

(ii) What shape/form of material should the company order for manufacturing the body?

_____ [1]

(iii) Name a manufacturing process which would be used to shape the body.

_____ [2]

Examiner Only

Marks

Remark

Total Question 5

8700.02 ML

[Turn over

6 An outline diagram of a manufactured component is shown in **Fig. 3**. The diagram also shows **two** key dimensions and their tolerance.

Examiner Only	
Marks	Remark

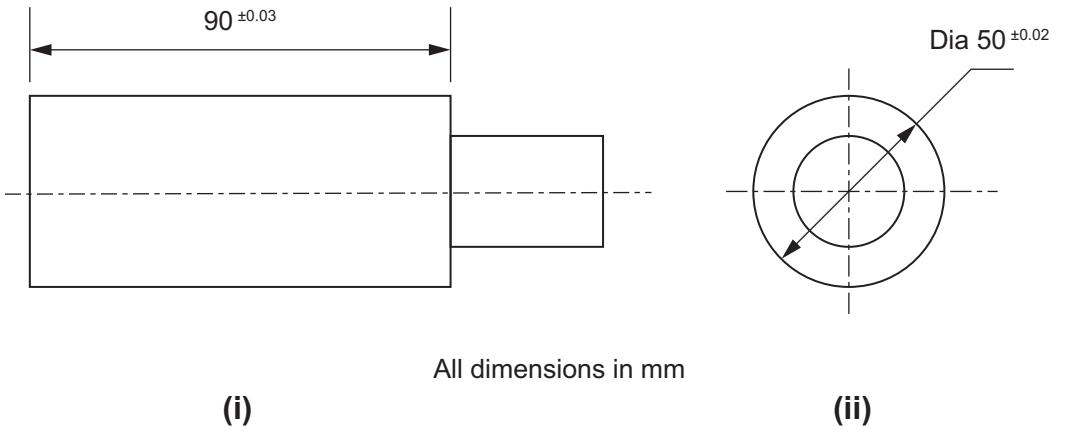


Fig. 3

(a) Calculate the maximum and minimum acceptable values for each of the given dimensions.

(i) Maximum _____ Minimum _____ [1]

(ii) Maximum _____ Minimum _____ [1]

(b) During sample testing of the components it was found that 10% were outside the tolerance.

(i) Explain what is meant by sample testing.

[2]

(ii) The quality control department demanded that this percentage should be reduced.

Give **one** reason why the quality control department would want this percentage reduced.

[1]

(iii) Give **one** method the company could use to reduce this percentage.

[1]

(c) Give **two** characteristics of quality assurance.

1. _____

[1]

2. _____

[1]

Examiner Only	
Marks	Remark

Total Question 6

7 Freehand sketches are frequently used in the communication of design ideas.

(a) (i) Give **one** reason why it is important to produce good freehand sketches.

[1]

(ii) Annotation or notes are often added to sketches.

What is the purpose of adding annotation to freehand sketches?

[1]

(iii) Give **two** advantages of using brief notes for annotation rather than long comments.

1. _____

2. _____

[2]

(b) The design process also makes use of modelling techniques which include mock-ups, prototypes and computer modelling.

(i) State a benefit of using computer modelling.

_____ [1]

(ii) Explain the difference between mock-ups and prototypes. Your explanation should include how, when and why each would be used by a designer in the design process.

 _____ [3]

Examiner Only	
Marks	Remark

Total Question 7	

[Turn over]

8700.02 ML

8 Using an annotated sketch or sketches, design an adjustable desk lamp suitable for a bedside table or unit. The lamp is to be made from materials generally available in a school workshop. The design must satisfy the following:

- The height or angle of the lamp should be easily adjustable. [4]
- Material(s) selection, justification and the economy of material(s) used. [4]
- It must have an on/off switch and its own 9 volt battery supply which must be accessible to replace the battery.
Details of circuit/electronic systems are not asked for. [4]
- Must be stable to sit on a bedside table or unit. [4]
- Must be an aesthetically pleasing and functional design. [4]
- Good quality annotated sketches should be used. A minimum of three overall dimensions should be included. [4]

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

Examiner Only	
Marks	Remark
Total Question 8	

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For Examiner's use only	
Question Number	Marks
1	
2	
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8	

Total Marks	
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Examiner Number

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