



Rewarding Learning

General Certificate of Secondary Education
2012

Centre Number

71

Candidate Number

Technology and Design

Unit 3: Product Design

[GTD31]

TUESDAY 29 MAY, AFTERNOON



TIME

1 hour.

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.
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.

For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	

Total
Marks

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- 1 A manufacturing company makes and sells a range of products which carry the following labels on all their goods.



(i)

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(ii)

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Fig. 1

- (a) Name the **two** labels shown and explain the purpose of **one** label.

Name (i) _____ [1]

Name (ii) _____ [1]

Purpose of (i) or (ii) _____

 _____ [2]

- (b) The company makes use of the system of **just-in-time manufacture** in its production process. Outline **three** main features of this system and **one** advantage that this system has for the company.

Feature 1 _____
 _____ [1]

Feature 2 _____
 _____ [1]

Feature 3 _____
 _____ [1]

Advantage _____
 _____ [1]

Examiner Only	
Marks	Remark

2 (a) Outline the purpose of a Gantt Chart.

[1]

(b) Construct a basic Gantt Chart based on the following information:

A key fob is to be made in the school workshop from mild steel sheet as shown in **Fig. 2**. The finished key fob should be shaped as shown with a 5mm hole drilled for the key ring. The key fob, which is shown in **Fig. 3**, should be finished by dip coating.

The Gantt Chart must show **five** main stages.

The manufacturing time for the key fob is 100 minutes.

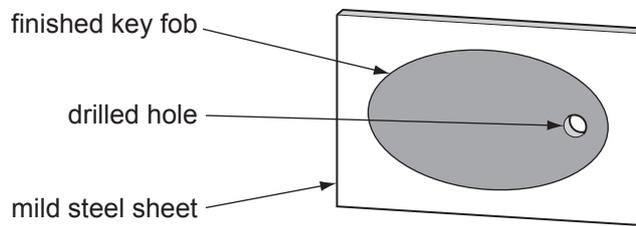


Fig. 2

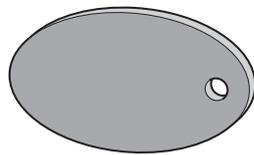


Fig. 3

Gantt Chart

[5]

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Marks	Remark

(c) State **two** reasons for dip coating the key fob.

Reason 1 _____ [1]

Reason 2 _____ [1]

Examiner Only	
Marks	Remark

- 3 A CAD drawing of a bracket is shown in **Fig. 4** with its main dimensions. It is to be made from a single piece of acrylic. **Fig. 5** shows a CAD drawing of the bracket before it is shaped.

Examiner Only	
Marks	Remark

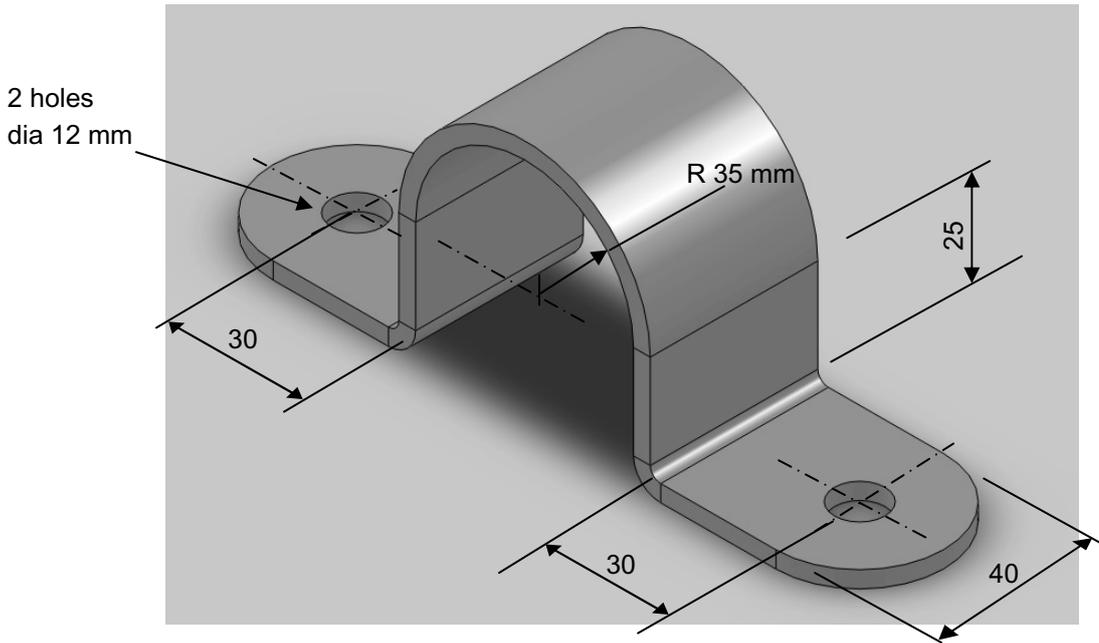


Fig. 4

- (a) List **three** machines/items of equipment needed (other than hand tools) to make this bracket in a school workshop.

_____ [3]

- (b) **Fig. 5** has **three** missing dimensions. Insert in **Fig. 5** the **three** missing dimensions.

[3]

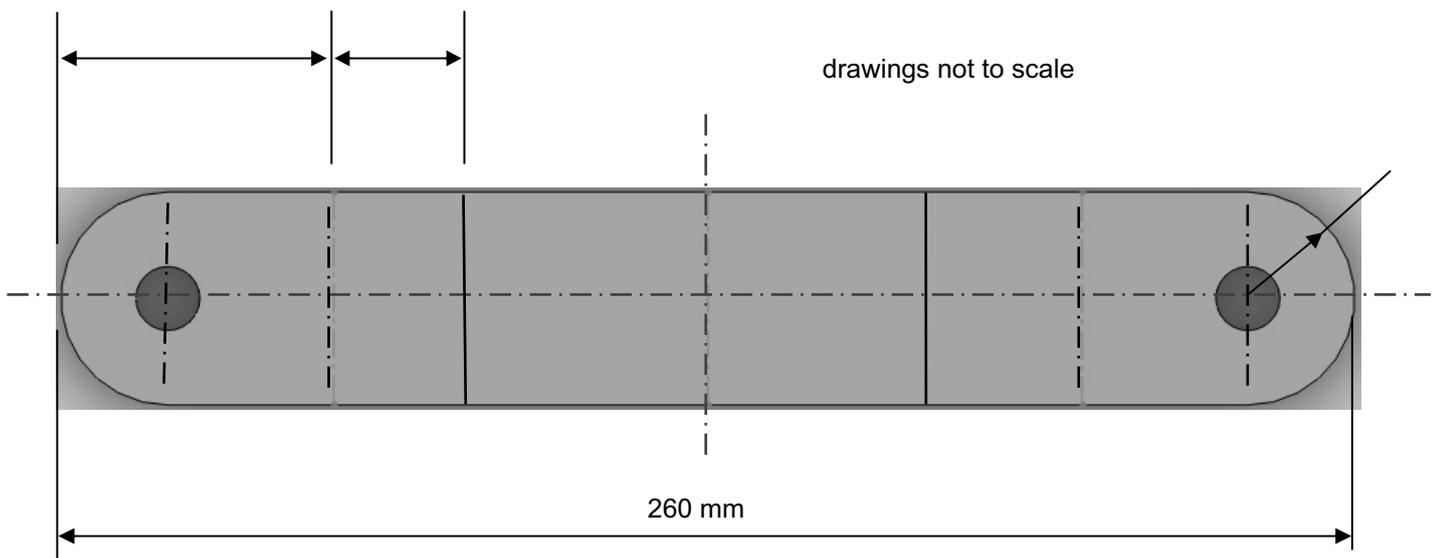


Fig. 5

(c) If this bracket was to be manufactured in industry it could be produced by using batch or mass production methods.
Explain the difference between batch and mass production.

[2]

Examiner Only	
Marks	Remark

4 Fig. 6 shows part of a kitchen.

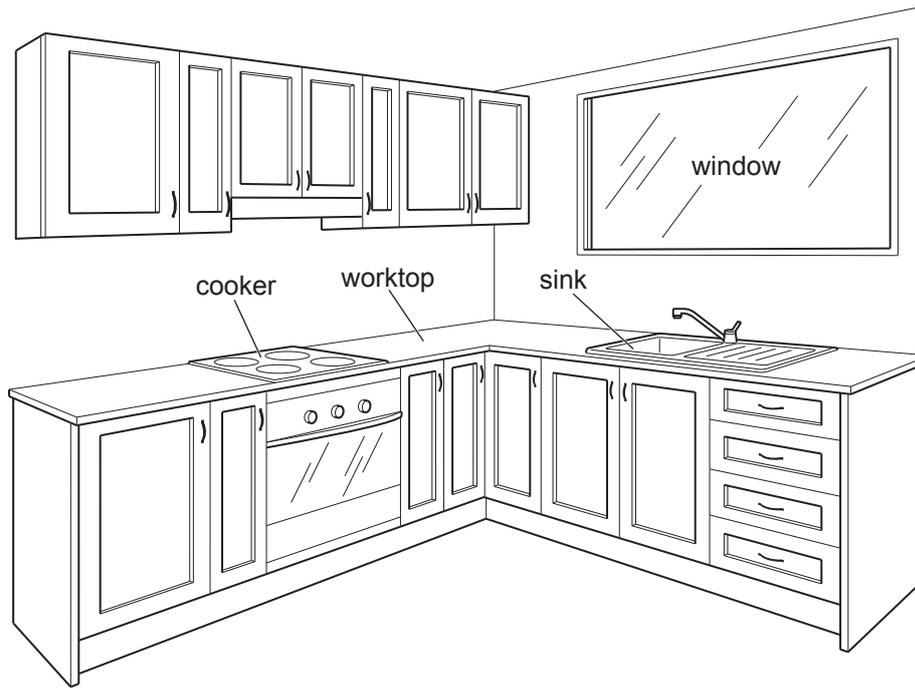


Fig. 6

- (a) Select a suitable material for the following item.
Give a reason for your answer.

Sink _____

Reason _____ [2]

- (b) Anthropometrics involve statistics on the dimensions of the human body. Suggest **two** dimensions in the kitchen which are based on anthropometrics.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

(c) (i) Explain what is meant by recycling.

_____ [2]

(ii) Many household items which are used in the kitchen can be recycled. Explain **two** environmental benefits of recycling.

Benefit 1 _____

Benefit 2 _____
_____ [2]

Examiner Only	
Marks	Remark

- 5 (a) Different materials have different properties. Explain what the material property “plasticity” means and give **one** application where this property is required.

Plasticity _____

Application _____

_____ [2]

- (b) Fig. 7 shows a machine being lifted by a crane in a factory. The machine has a bracket welded to the top. The lifting cable is attached to this bracket using a shackle and a locating pin **D** as shown.

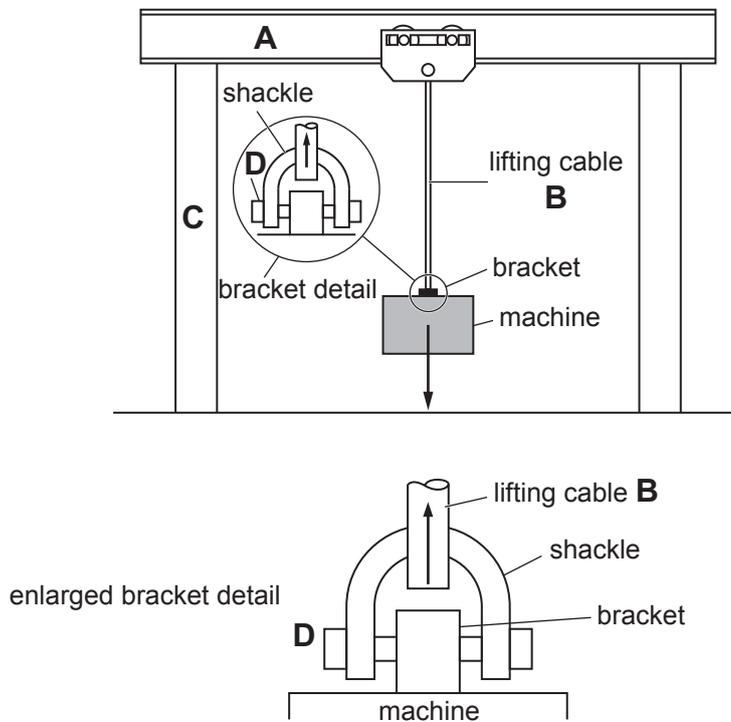


Fig. 7

- (i) Choose the main effect of the loading applied to: beam **A**; lifting cable **B**; column **C** and pin **D** from the list below.

Tension Compression Bending Torsion Shear

A _____

B _____

C _____

D _____ [4]

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Marks	Remark

(ii) Sketch and name the shape of the cross section of beam A.

[2]

Examiner Only	
Marks	Remark

- 6 Government has been keen for many years to introduce energy efficiency measures, for example, home insulation.

(a) State **three** different home insulation techniques currently in use.

1. _____ [1]

2. _____ [1]

3. _____ [1]

A less successful measure has been the development of electric cars.

(b) Outline **two** social reasons that the government would have considered to encourage the development of electric cars.

Reason 1 _____
 _____ [1]

Reason 2 _____
 _____ [1]

(c) Market Pull will also have had an influence on the development and introduction of the electric car.

Briefly discuss **three** Market Pull factors that would have a negative effect on the development of electric cars.

Factor 1 _____
 _____ [1]

Factor 2 _____
 _____ [1]

Factor 3 _____
 _____ [1]

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Marks	Remark

- 7 **Fig. 8** shows a design for a wall mounted tool holder which is to be made from one piece of aluminium 1.5 mm thick. **Fig. 9** shows the aluminium for the holder before it is shaped.

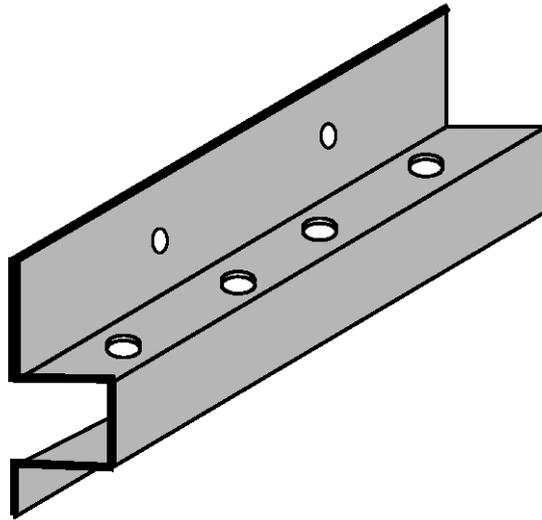


Fig. 8

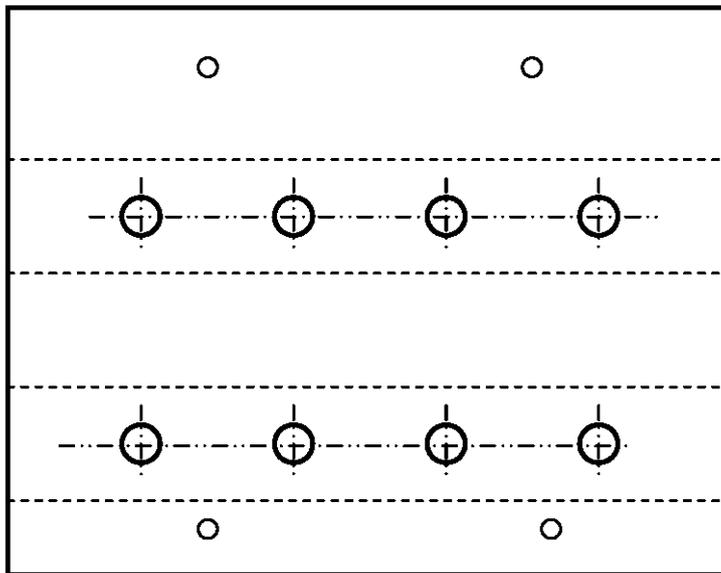


Fig. 9

- (a) Give **two** reasons why aluminium was chosen for the holder compared to mild steel.

Reason 1 _____
 _____ [1]

Reason 2 _____
 _____ [1]

Examiner Only	
Marks	Remark

8 Using annotated sketches, design a modern/contemporary compact disc (CD) holder to hold 10 CDs in their cases. Your design must satisfy the following specification points:

- Be aesthetically pleasing [4]
- Make efficient use of material(s) [4]
- Must be freestanding and stable [4]
- Allow easy selection and readability of each CD [4]
- Clear dimensioned solution [4]
- Identification and justification of appropriate material(s) and manufacturing techniques for your solution [4]

Use the following information to help you:

The CD holder is intended to be used by teenagers

Consider and identify material(s)

Consider and identify all important dimensions

A typical single CD case is approximately 140 mm × 125 mm × 10 mm thick

A typical double CD case is approximately 140 mm × 125 mm × 20 mm thick

Use the next 2 pages for your answer.

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Marks	Remark

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Marks	Remark

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