

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**  
**DESIGN AND TECHNOLOGY**

**1959/04**

Industrial Technology  
Paper 4 (Higher Tier)

Candidates answer on the Question Paper

**OCR Supplied Materials:**  
None

**Other Materials Required:**  
None

**Tuesday 22 June 2010**  
**Morning**

**Duration:** 1 hour 15 minutes



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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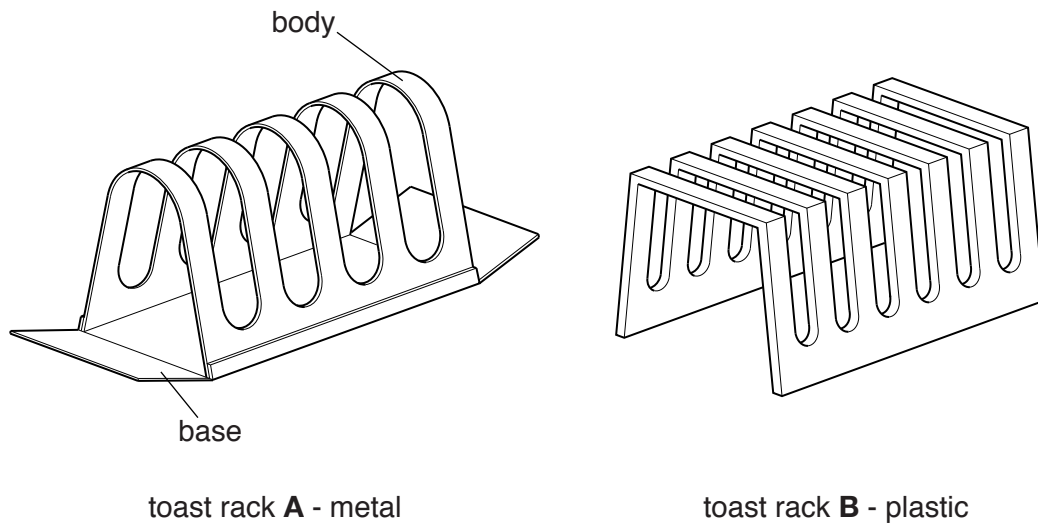
**INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **50**.
- All dimensions are in millimetres.
- Assume any mechanical system to be 100% efficient.
- This document consists of **12** pages. Any blank pages are indicated.

1 Fig. 1 shows two toast racks.



**Fig. 1**

(a) (i) Name **one** suitable metal for toast rack **A**.

..... [1]

(ii) Name the industrial process used to make toast rack **A**.

..... [1]

(iii) Give **two** reasons for fitting the base to toast rack **A**.

Reason 1 .....

..... [1]

Reason 2 .....

..... [1]

(b) An acrylic prototype for toast rack **B** is produced using CAD/CAM.

(i) Give **three** benefits, to the designer, of using CAD.

Benefit 1 .....  
..... [1]

Benefit 2 .....  
..... [1]

Benefit 3 .....  
..... [1]

(ii) Name **one** type of computer controlled machine suitable for cutting the slots in the acrylic prototype for toast rack **B**.

..... [1]

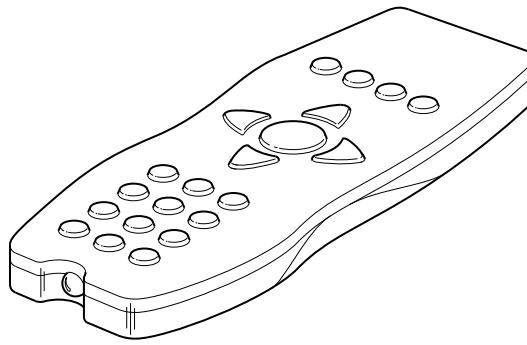
(iii) Give **two** benefits to the manufacturer, other than speed, of using CAM when making products in large quantities.

Benefit 1 .....  
..... [1]

Benefit 2 .....  
..... [1]

[Total: 10]

2 Fig. 2 shows a remote control.



**Fig. 2**

(a) The case of the remote control is made from injection moulded plastic.

Give **two** benefits of using plastic for the case of the remote control.

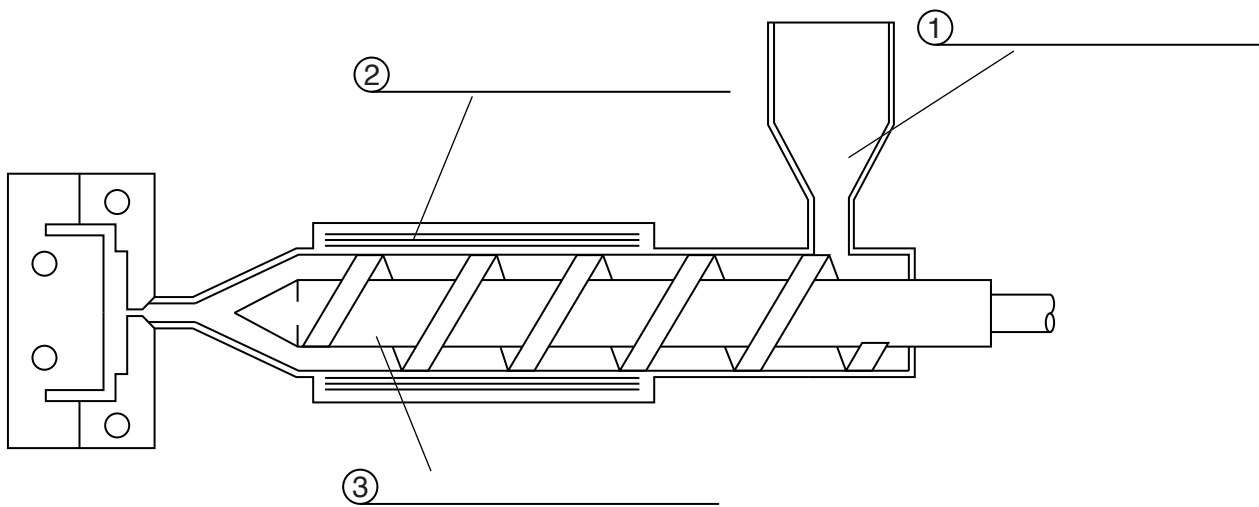
Benefit 1 .....  
 ..... [1]

Benefit 2 .....  
 ..... [1]

(b) Describe how ergonomics have been considered in the design of the remote control.

.....  
 .....  
 .....  
 ..... [2]

(c) Fig. 3 shows a line diagram of an injection moulding machine.



**Fig. 3**

- (i) Label the **three** parts of the injection moulding machine shown in Fig. 3. [3]  
 (ii) Explain how plastic injection mouldings are produced.

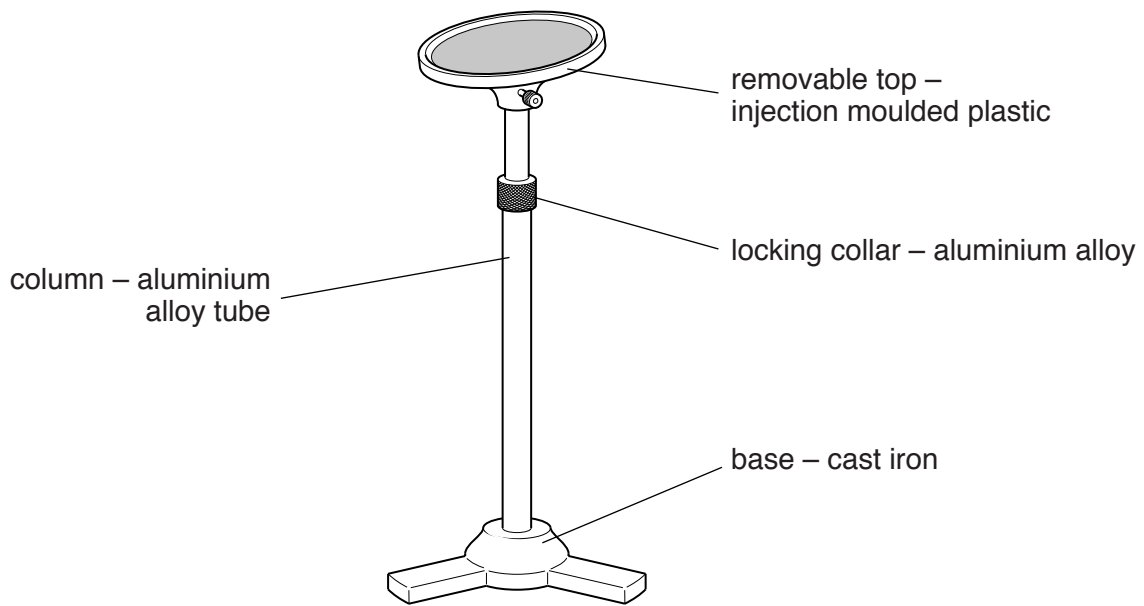
.....  
 .....  
 .....  
 .....  
 ..... [2]

- (d) Name **one** other plastics moulding process.

..... [1]

**[Total: 10]**

3 Fig. 4 shows an adjustable display stand.



**Fig. 4**

(a) Give **two** reasons why aluminium alloy is a suitable material for the column.

Reason 1 ..... [1]

Reason 2 ..... [1]

(b) Name the lathe process used to produce the grip on the locking collar.

..... [1]

- (c) The base for the display stand is made by casting, which is a 'forming' process.

Name **two** other forming processes for metal.

1. .... [1]

2. .... [1]

- (d) Use sketches and notes to show how the aluminium alloy column could be fitted to the cast iron base.

The column must be:

- vertical to the base;
- easily fitted and removed without tools;
- unable to work loose when being used.

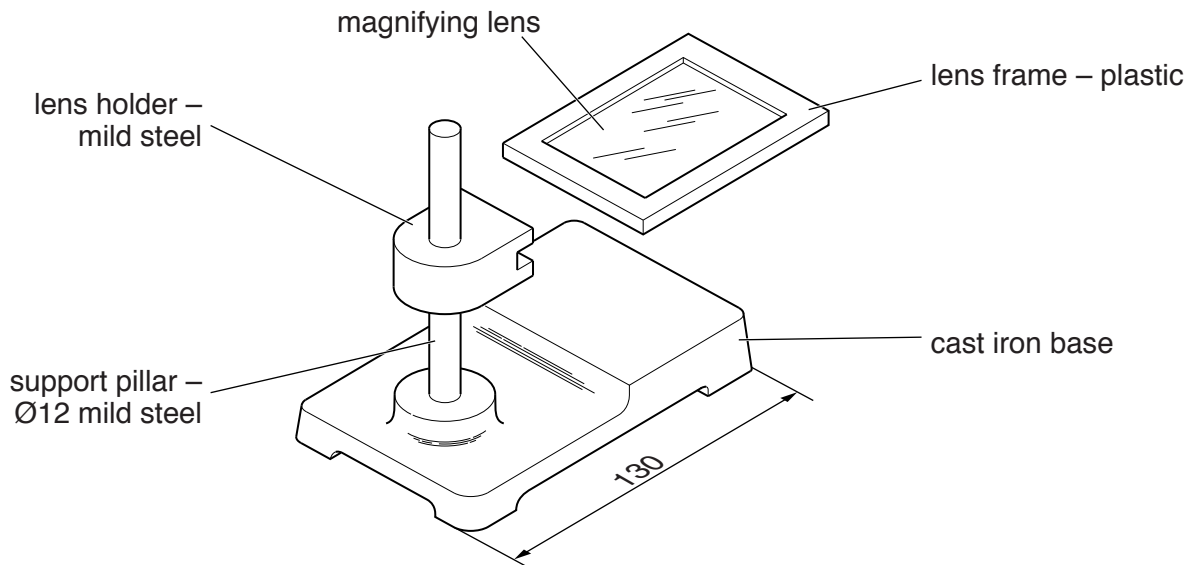
Give details of construction and components used.

[5]

[Total: 10]

Turn over

4 Fig. 5 shows a stand for a magnifying lens.



**Fig. 5**

- (a) (i) Name **one** specific method of casting that could be used to manufacture the base of the stand shown in Fig. 5.

..... [1]

- (ii) Name **one** other metal suitable for casting the base.

..... [1]

- (b) Use sketches and notes to show how the magnifying lens frame could be fixed firmly in the lens holder.

The lens frame must not be damaged by the fixing and must be easy to fit and remove.



**(c)** It is found that it is difficult to focus the magnifying lens accurately.

Use sketches and notes to show a design modification that will allow the lens holder to:

- be prevented from turning on the support pillar as it is adjusted;
- be lockable at the required height;
- have fine adjustment to focus the lens.

**[6]**

**[Total: 10]**

5 'Just-in-time' (JIT) is widely used in the manufacturing industry.

(a) (i) Explain how JIT operates.

.....

.....

.....

.....

..... [3]

(ii) Describe **one** disadvantage of JIT.

.....

.....

..... [2]

(iii) Name **one** other manufacturing system.

..... [1]

(b) The recycling of used and waste materials is becoming increasingly important.

Describe **two** benefits to the environment of recycling used and waste materials.

1. ....

.....

..... [2]

2. ....

.....

..... [2]

[Total: 10]

11  
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