

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
A2 GCE**

**F524/01**

**DESIGN AND TECHNOLOGY  
Product Design: Component 1**

**FRIDAY 10 JUNE 2016: Morning**

**DURATION: 1 hour  
plus your additional time allowance**

**MODIFIED ENLARGED**

<b>Candidate forename</b>		<b>Candidate surname</b>	
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<b>Centre number</b>						<b>Candidate number</b>				
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**Candidates answer on the Question Paper.**

**OCR SUPPLIED MATERIALS:  
None**

**OTHER MATERIALS REQUIRED:  
A calculator may be used**

**A CALCULATOR MAY BE USED FOR THIS PAPER**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

**Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**

**Use black ink. HB pencil may be used for graphs and diagrams only.**

**This paper is to be taken with F524/02 in the same examination session of 2 HOURS 30 MINUTES. The times given on the front of each paper are advisory.**

**Components 1 and 2 should be available to candidates for the full session.**

**Answer ONE question only from component 1 and ONE question only from component 2.**

**Component 1 and Component 2 choices can be from different material areas although it is envisaged that most candidates will select the same material area.**

**Read each question carefully. Make sure you know what you have to do before starting your answer.**

**The discuss question will be used to assess your Quality of Written Communication.**

**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 36.**

**All dimensions are in mm.**

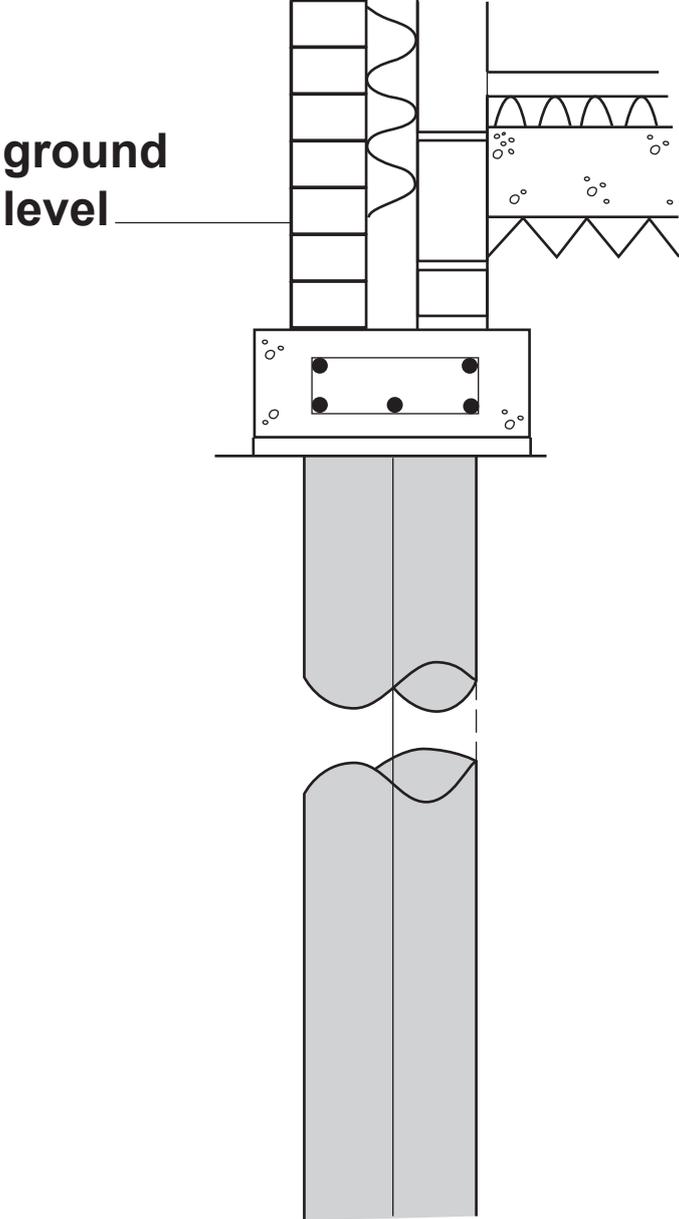
**Where appropriate calculations should be shown.**

**Any blank pages are indicated.**

# 1 BUILT ENVIRONMENT AND CONSTRUCTION

Fig. 1 shows a pile foundation.

Fig. 1



**(a) Give FOUR justified design requirements for a pile foundation of the type shown in Fig. 1.**

**1** \_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

**3** \_\_\_\_\_

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**4** \_\_\_\_\_

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**[4]**

**(b) Some companies employ Total Quality Management (TQM) procedures to guarantee the manufacture of a quality product. Describe TWO key features of a Total Quality Management (TQM) system.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

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**[4]**

**(c) Describe TWO benefits to the manufacturer of using bought-in components in the manufacture of products.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

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**[4]**

**(d) Explain TWO ways in which the Trade Descriptions Act protects the rights of consumers.**

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**[4]**

**(e) (i) State a SUITABLE SPECIFIC MATERIAL used in the construction of the pile foundation.**

**Give TWO properties or characteristics that make the material suitable for this use.**

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**[3]**

- (ii) Describe, in detail, how the sides of a foundation trench can be temporarily supported to prevent them from collapsing. Use a flow chart and/or annotated diagrams to support your answer. [9]**



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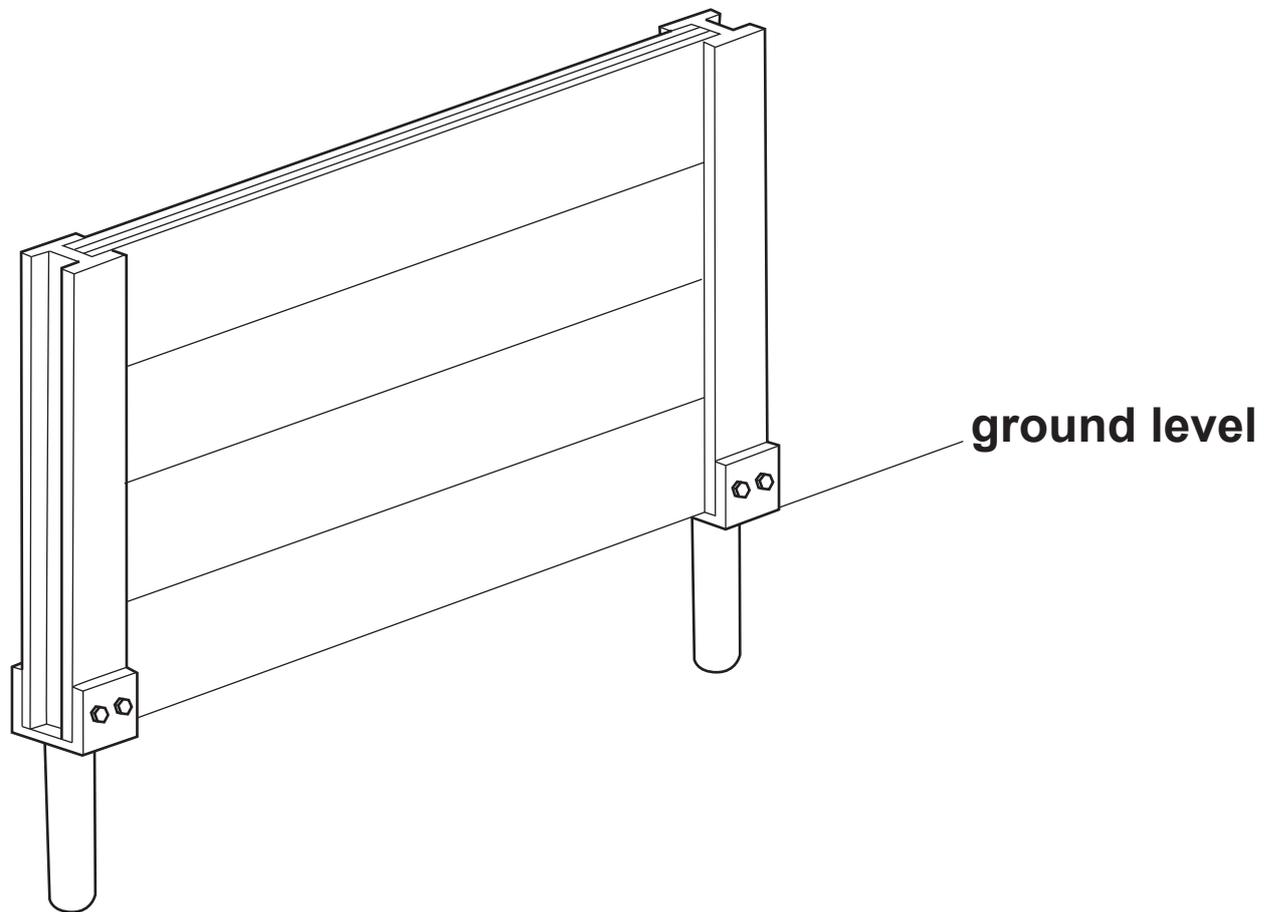
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## 2 ENGINEERING

Fig. 2 shows part of a flood defence system.

Fig. 2



**(a) Give FOUR justified design requirements for a flood defence system of the type shown in Fig. 2.**

**1** \_\_\_\_\_

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**2** \_\_\_\_\_

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**3** \_\_\_\_\_

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**4** \_\_\_\_\_

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**[4]**

**(b) Some companies employ Total Quality Management (TQM) procedures to guarantee the manufacture of a quality product. Describe TWO key features of a Total Quality Management (TQM) system.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

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**[4]**

**(c) Describe TWO benefits to the manufacturer of using bought-in components in the manufacture of products.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

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**[4]**

**(d) Explain TWO ways in which the Trade Descriptions Act protects the rights of consumers.**

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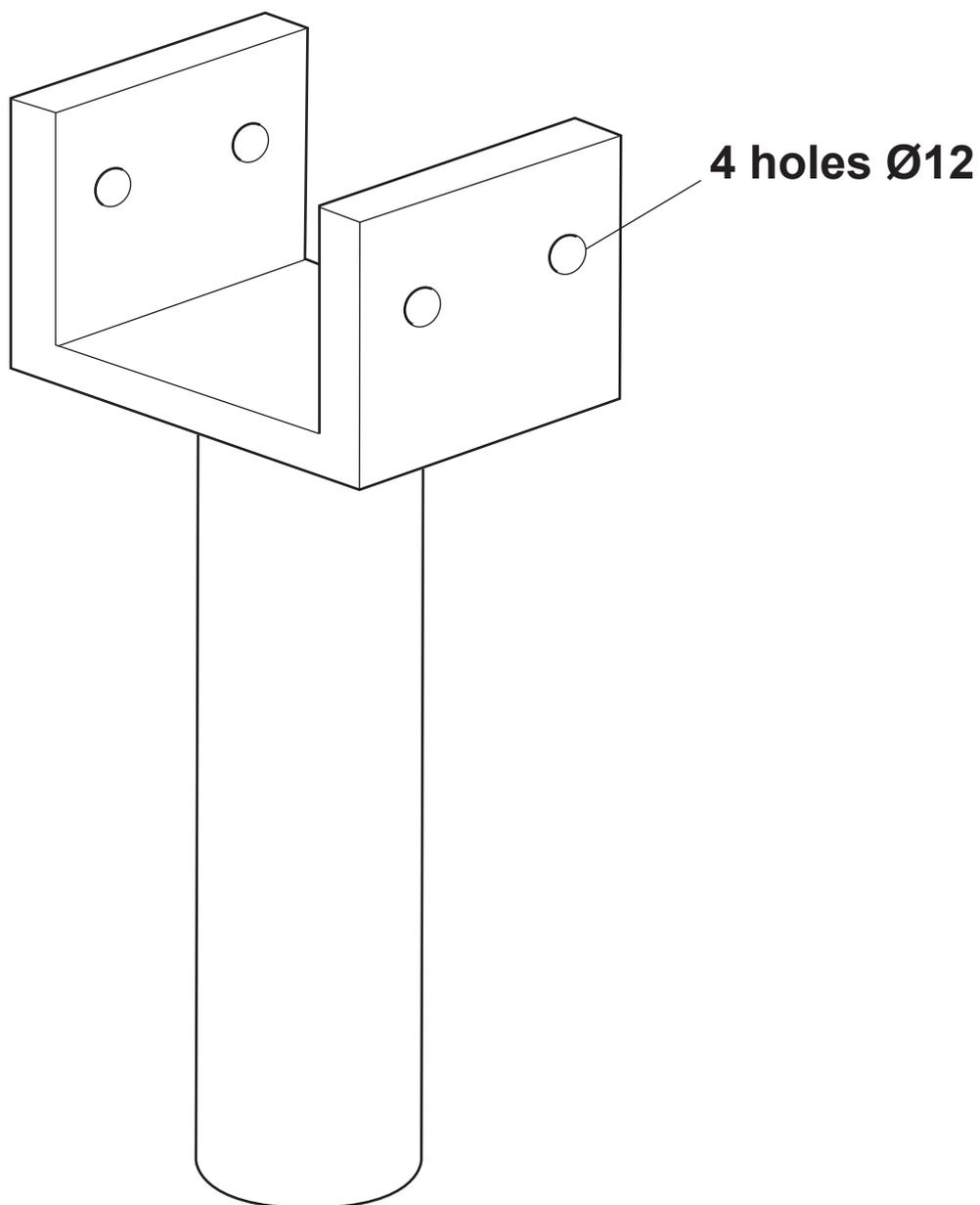
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**[4]**

(e) Fig. 3 shows a post support for the flood defence system.

**Fig. 3**



- (i) **State a SUITABLE SPECIFIC MATERIAL for the post support.  
Give TWO properties or characteristics that make the material suitable for this use.**

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**[3]**

- (ii) Describe, in detail, how the post support would be manufactured as a batch of 250. Give details of any special tooling and quality control checks that would be used. Use a flow chart and/or annotated diagrams to support your answer. [9]**



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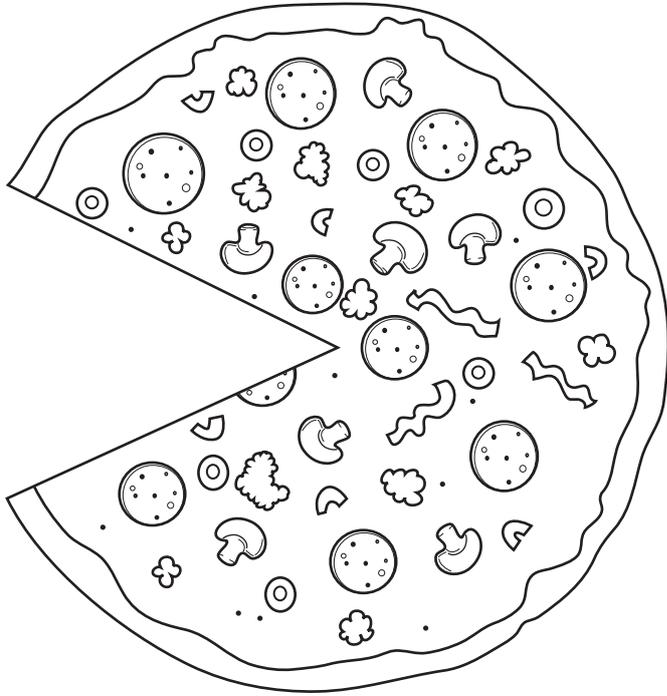
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### 3 FOOD

Fig. 4 shows a Pizza.

Fig. 4



**(a) Give FOUR justified design requirements for a Pizza of the type shown in Fig. 4.**

**1** \_\_\_\_\_

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**2** \_\_\_\_\_

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**3** \_\_\_\_\_

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**4** \_\_\_\_\_

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**[4]**

**(b) Some companies employ Total Quality Management (TQM) procedures to guarantee the manufacture of a quality product. Describe TWO key features of a Total Quality Management (TQM) system.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

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**[4]**

**(c) Describe TWO benefits to the manufacturer of using bought-in components in the manufacture of products.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

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**[4]**



**(ii) Describe, in detail, how a batch of 500 frozen pizzas would be manufactured. Include details of packaging. Use a flow chart and/or annotated diagrams to support your answer. [9]**



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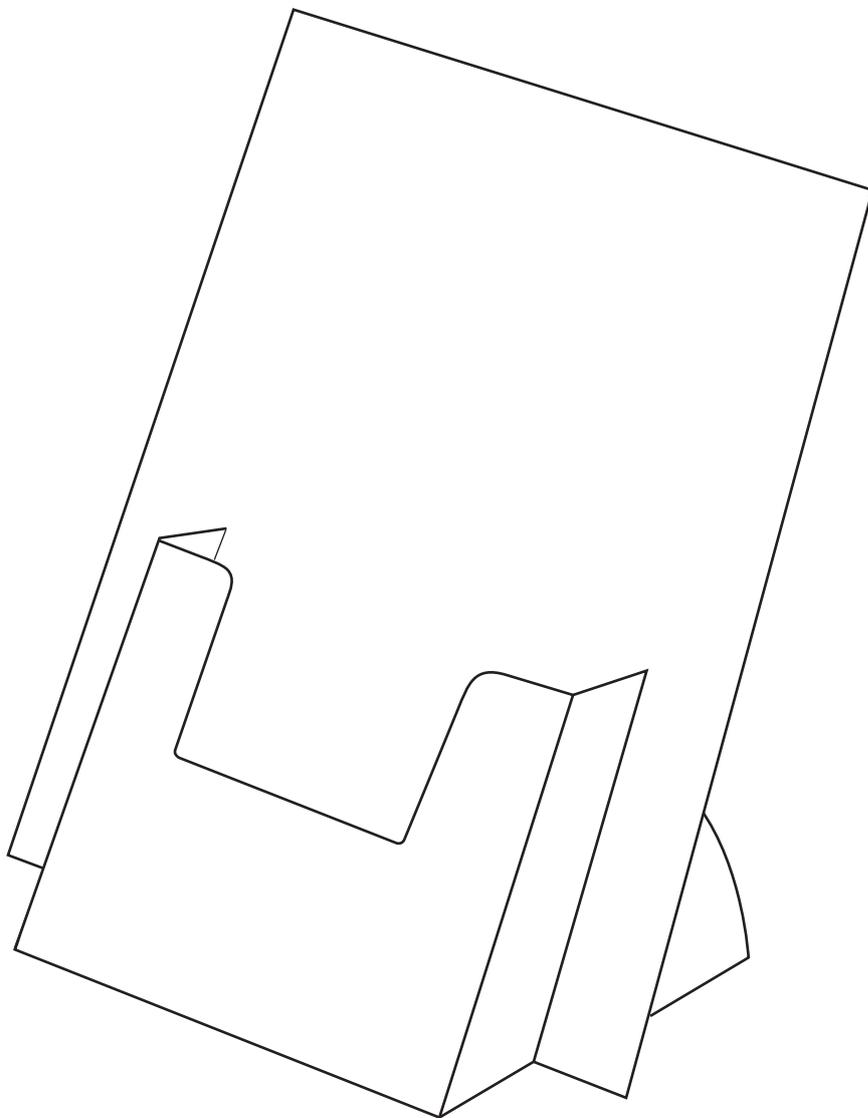
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## 4 GRAPHIC PRODUCTS

Fig. 5 shows a counter-top leaflet holder.

Fig. 5



**(a) Give FOUR justified design requirements for a leaflet holder of the type shown in Fig. 5.**

**1** \_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

**3** \_\_\_\_\_

\_\_\_\_\_

**4** \_\_\_\_\_

\_\_\_\_\_

**[4]**

**(b) Some companies employ Total Quality Management (TQM) procedures to guarantee the manufacture of a quality product. Describe TWO key features of a Total Quality Management (TQM) system.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

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**[4]**

**(c) Describe TWO benefits to the manufacturer of using bought-in components in the manufacture of products.**

**1** \_\_\_\_\_

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\_\_\_\_\_

**2** \_\_\_\_\_

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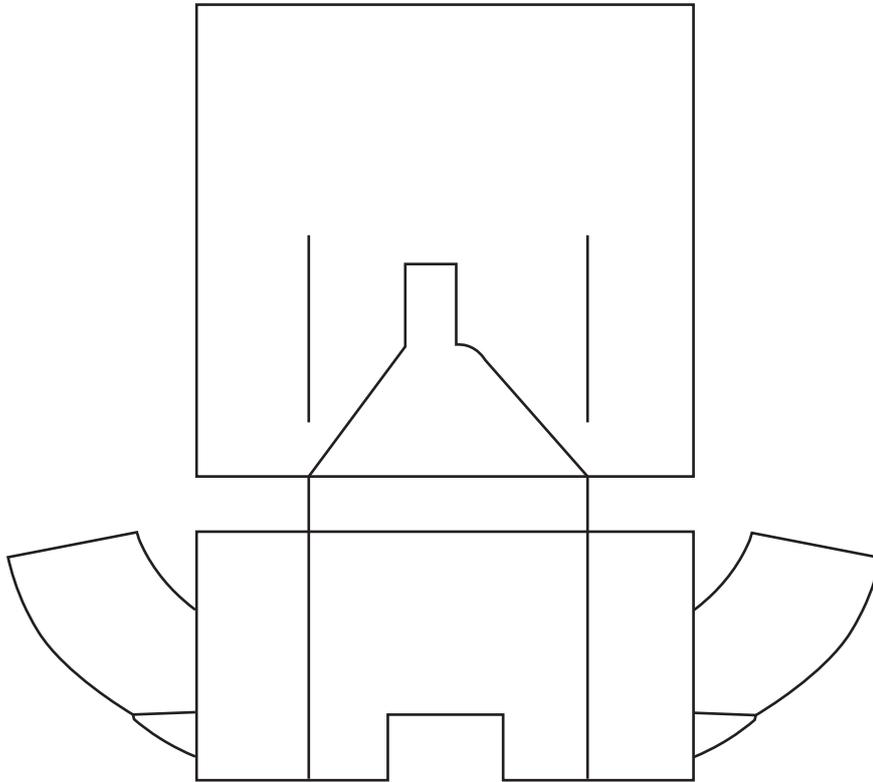
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**[4]**



(e) Fig. 6 shows a net view of the leaflet holder.

Fig. 6



(i) State a **SUITABLE SPECIFIC MATERIAL** for the leaflet holder.

Give **TWO** properties or characteristics that make the material suitable for this use.

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[3]

- (ii) Describe, in detail, how the leaflet holder with colour graphics, would be manufactured in a batch of 20,000. Include details of any jigs and/or formers used. Use a flow chart and/or annotated diagrams to support your answer. [9]**



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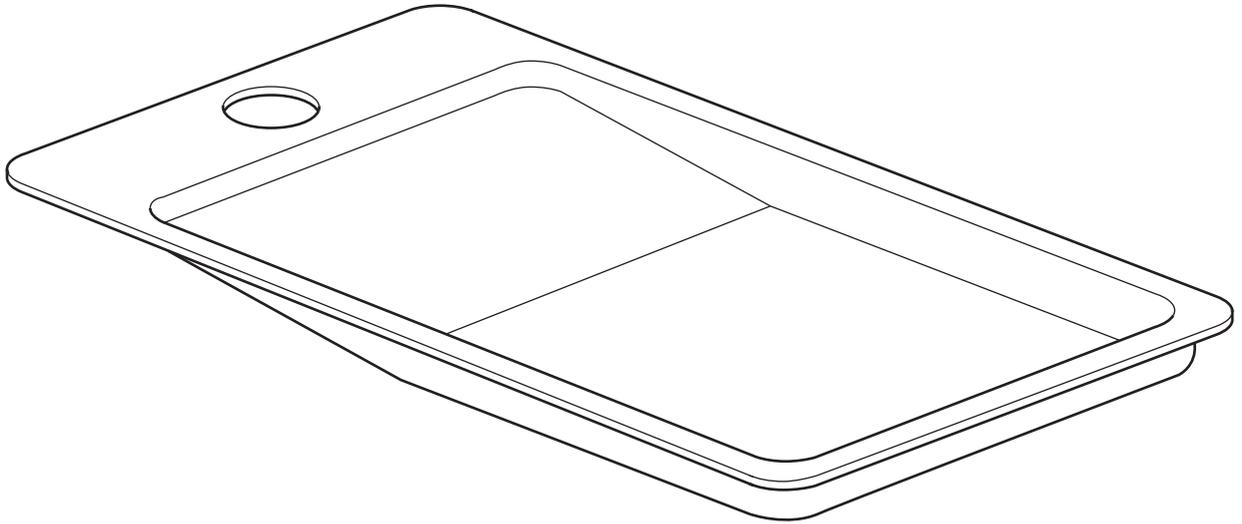
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## 5 MANUFACTURING

Fig. 7 shows a paint tray to be used with a roller.

Fig. 7



(a) Give **FOUR** justified design requirements for a paint tray of the type shown in Fig. 7.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

3 \_\_\_\_\_

\_\_\_\_\_

4 \_\_\_\_\_

\_\_\_\_\_

**(b) Some companies employ Total Quality Management (TQM) procedures to guarantee the manufacture of a quality product. Describe TWO key features of a Total Quality Management (TQM) system.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

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**[4]**

**(c) Describe TWO benefits to the manufacturer of using bought-in components in the manufacture of products.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**[4]**



- (ii) Describe, in detail, how the paint tray would be manufactured as a batch of 10,000. Give details of any special tooling and quality control checks that would be used. Use a flow chart and/or annotated diagrams to support your answer. [9]**



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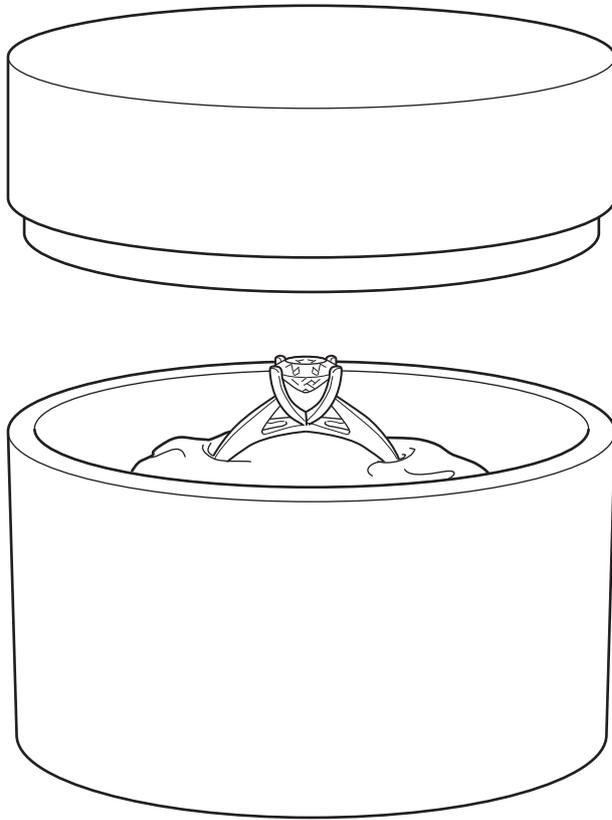
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## 6 RESISTANT MATERIALS

Fig. 8 shows a box for a single item of jewellery.

Fig. 8



**(a) Give FOUR justified design requirements for a jewellery box of the type shown in Fig. 8.**

**1** \_\_\_\_\_

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**2** \_\_\_\_\_

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**3** \_\_\_\_\_

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**4** \_\_\_\_\_

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**[4]**

**(b) Some companies employ Total Quality Management (TQM) procedures to guarantee the manufacture of a quality product. Describe TWO key features of a Total Quality Management (TQM) system.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

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**[4]**

**(c) Describe TWO benefits to the manufacturer of using bought-in components in the manufacture of products.**

**1** \_\_\_\_\_

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\_\_\_\_\_

**2** \_\_\_\_\_

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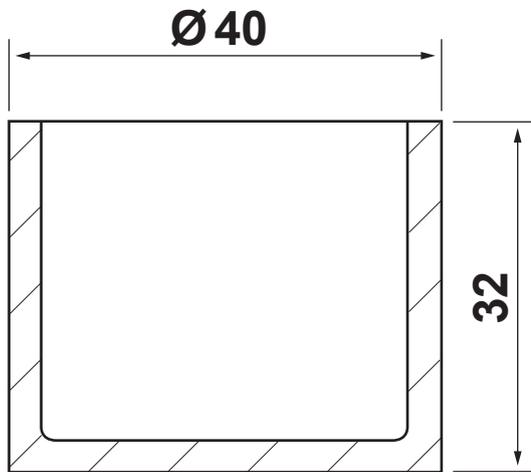
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**[4]**



(e) Fig. 9 shows a sectional view of the lower part of the jewellery box.

Fig. 9



(i) State a **SUITABLE SPECIFIC MATERIAL** for the lower part of the jewellery box.

Give **TWO** properties or characteristics that make the material suitable for this use.

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[3]

- (ii) Describe, in detail, how the lower part of the jewellery box would be manufactured as a batch of 100. Include details of any jigs and/or formers used. Use a flow chart and/or annotated diagrams to support your answer. [9]**



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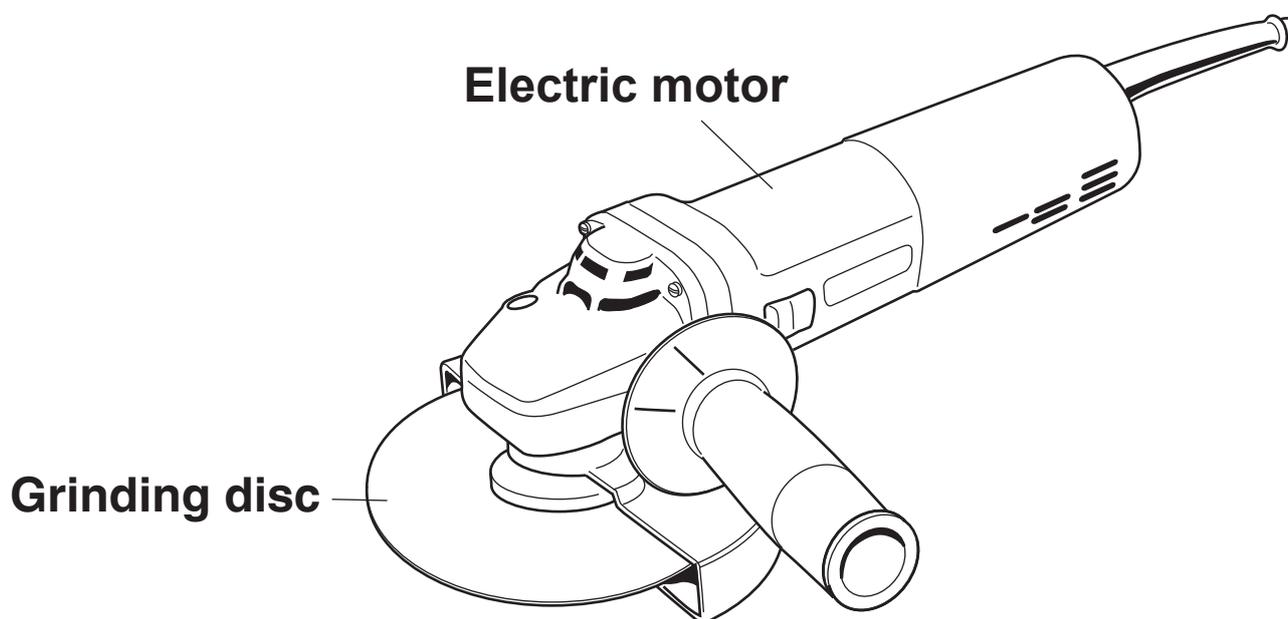
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## 7 SYSTEMS AND CONTROL

Fig. 10 shows an electric angle grinder.

Fig. 10



**(a) Give FOUR justified design requirements for an electric angle grinder of the type shown in Fig. 10.**

**1** \_\_\_\_\_

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**2** \_\_\_\_\_

\_\_\_\_\_

**3** \_\_\_\_\_

\_\_\_\_\_

**4** \_\_\_\_\_

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**[4]**

**(b) Some companies employ Total Quality Management (TQM) procedures to guarantee the manufacture of a quality product. Describe TWO key features of a Total Quality Management (TQM) system.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

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**[4]**

**(c) Describe TWO benefits to the manufacturer of using bought-in components in the manufacture of products.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

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**[4]**



- (e) (i) The electric angle grinder transfers rotary motion from the electric motor through  $90^\circ$  to the grinding disc.**

**Sketch a labelled diagram to show a gear system that can transfer rotary motion through  $90^\circ$  without a reduction in speed. [3]**

- (ii) Some power tools, such as the electric angle grinder, use a counter circuit to display the speed of the motor.**

**Draw a labelled circuit diagram of a counter that can count up to 99 and display on two 7-segment displays.**

**Label the input connection and show how the counter can be reset. [9]**



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## 8 TEXTILES

**Fig. 11 shows a ladies' satin shirt.**

**Fig. 11**



**(a) Give FOUR justified design requirements for a satin shirt of the type shown in Fig. 11.**

**1** \_\_\_\_\_

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**2** \_\_\_\_\_

\_\_\_\_\_

**3** \_\_\_\_\_

\_\_\_\_\_

**4** \_\_\_\_\_

\_\_\_\_\_

**[4]**

**(b) Some companies employ Total Quality Management (TQM) procedures to guarantee the manufacture of a quality product. Describe TWO key features of a Total Quality Management (TQM) system.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**[4]**

**(c) Describe TWO benefits to the manufacturer of using bought-in components in the manufacture of products.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

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**[4]**

**(d) Explain TWO ways in which the Trade Descriptions Act protects the rights of consumers.**

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**[4]**

**(e) (i) State a SUITABLE SPECIFIC FIBRE for the satin woven fabric for the shirt.**

**Give TWO properties or characteristics that make the fibre suitable for this use.**

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**[3]**

**(ii) Describe, in detail, how to work the buttonholes and attach the buttons to the front of the satin shirt.**

**Use a flow chart and/or annotated diagrams to support your answer. [9]**



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**END OF QUESTION PAPER**



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