

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**  
**A2 GCE**  
**F524/01**

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

**MONDAY 8 JUNE 2015: 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**

<b>A CALCULATOR MAY BE USED FOR THIS PAPER</b>
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**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.**

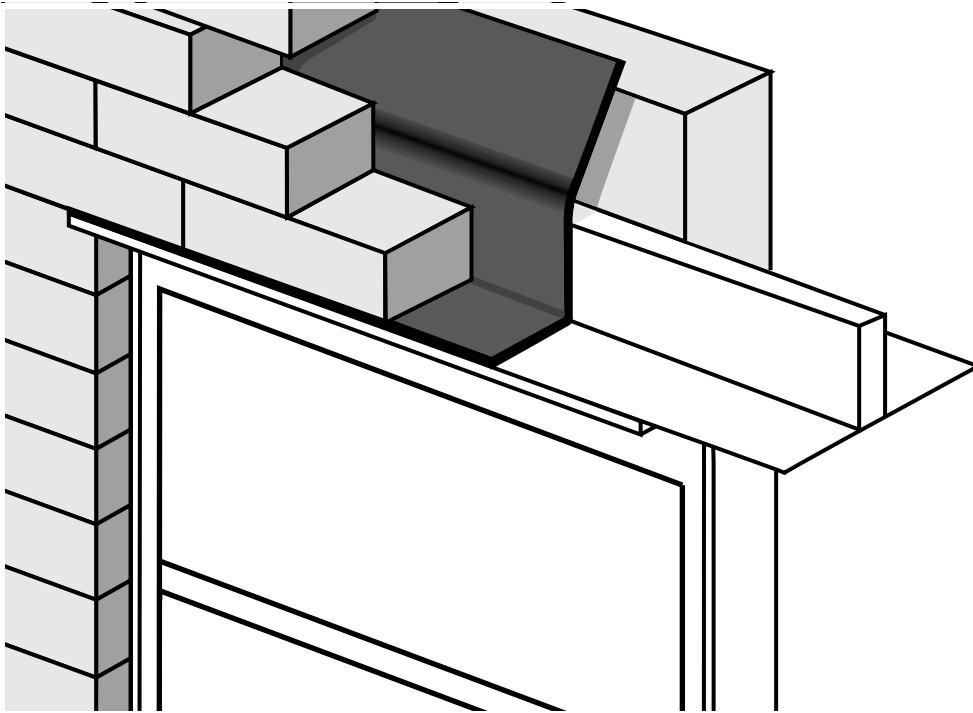
**Where appropriate calculations should be shown.**

**Any blank pages are indicated.**

# 1 BUILT ENVIRONMENT AND CONSTRUCTION

Fig. 1 shows a lintel over a window in a cavity wall.

FIG. 1



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

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

3 \_\_\_\_\_

\_\_\_\_\_

4 \_\_\_\_\_

\_\_\_\_\_

[4]

**(b) Describe TWO ways that ergonomics may have been considered in the design of a window of the type shown in Fig. 1.**

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

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

**[4]**

**(c) Digital technology is widely used in industry.**

**Describe TWO methods of rapid prototyping.**

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

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

**[4]**

**(d) Explain TWO key features of batch production.**

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**[4]**

**(e) (i) State a SUITABLE SPECIFIC MATERIAL that could be used to produce a lintel.**

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

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**[3]**

- (ii) Describe, in detail, how a semi-circular brick arch could be constructed instead of a lintel. Use annotated diagrams to support your answer. [9]**

[illegible]

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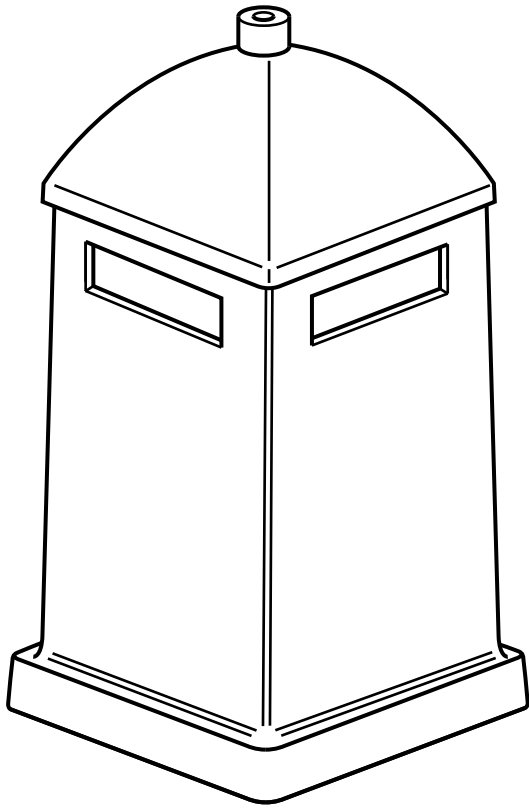
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## 2 ENGINEERING

**Fig. 2 shows a litter bin for use in public places.**

**FIG. 2**



**(a) Give FOUR justified design requirements for a litter bin of the type shown in Fig. 2.**

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

\_\_\_\_\_

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

\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_

[4]

**(b) Describe TWO ways that ergonomics may have been considered in the design of a litter bin of the type shown in Fig 2.**

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[4]

**(c) Digital technology is widely used in industry.**

**Describe TWO methods of rapid prototyping.**

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_ **[4]**

**(d) Explain TWO key features of batch production.**

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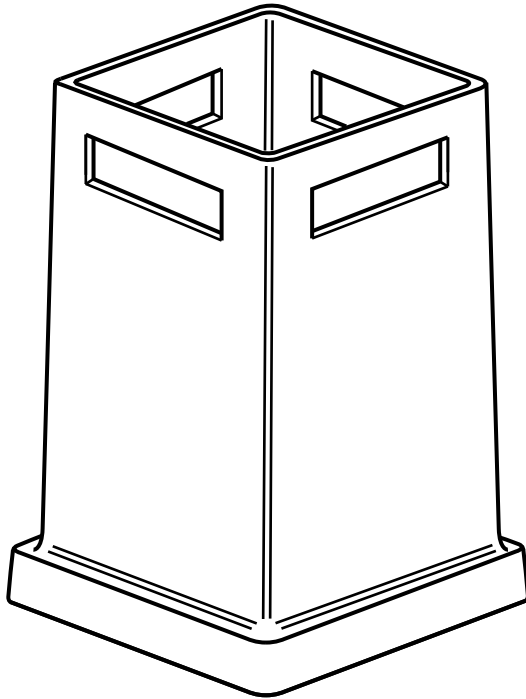
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\_\_\_\_\_ **[4]**

(e) Fig. 3 shows the main body of the litter bin.

**FIG. 3**



- (i) State a **SUITABLE SPECIFIC MATERIAL** for the main body of the litter bin shown in Fig. 3.

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

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**[3]**

- (ii) Describe, in detail, how the main body of the litter bin shown in Fig. 3 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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[illegible]

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### 3 FOOD

Fig. 4 shows a jar of jam.

**FIG. 4**



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

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

**[4]**

**(b) Describe TWO ways that ergonomics may have been considered in the design of jars for jam.**

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

**[4]**

**(c) Digital technology is widely used in industry.**

**Describe TWO methods of rapid prototyping.**

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

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**[4]**

**(d) Explain TWO key features of batch production.**

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**[4]**

**(e) (i) Fruits and vegetables are an excellent source of vitamin C.**

**Describe THREE functions of vitamin C.**

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**[3]**

- (ii) Describe, in detail, how jam would be manufactured as a batch of 250 jars. Include details of equipment, ingredients and the processes used. Use a flow chart and/or annotated diagrams to support your answer. [9]**

[illegible]

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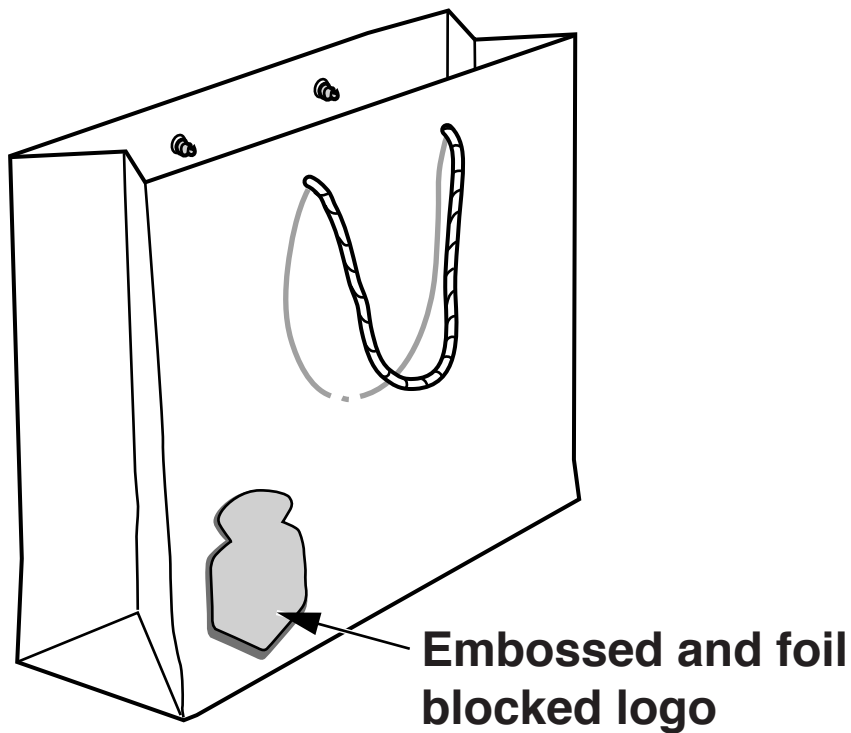
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## 4 GRAPHIC PRODUCTS

Fig. 5 shows an embossed and foil blocked gift bag.

**FIG. 5**



(a) Give **FOUR** justified design requirements for an embossed and foil blocked gift bag of the type shown in Fig. 5.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_

[4]

**(b) Describe TWO ways that ergonomics may have been considered in the design of an embossed and foil blocked gift bag of the type shown in Fig. 5.**

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[4]

**(c) Digital technology is widely used in industry.**

**Describe TWO methods of rapid prototyping.**

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

**[4]**

**(d) Explain TWO key features of batch production.**

\_\_\_\_\_

\_\_\_\_\_

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**[4]**

- (e) (i) State a SUITABLE SPECIFIC MATERIAL for the gift bag shown in Fig. 5.**

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

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**[3]**

- (ii) Describe, in detail, how the decoration on the gift bag shown in Fig. 5 would be applied by embossing and foil blocking. 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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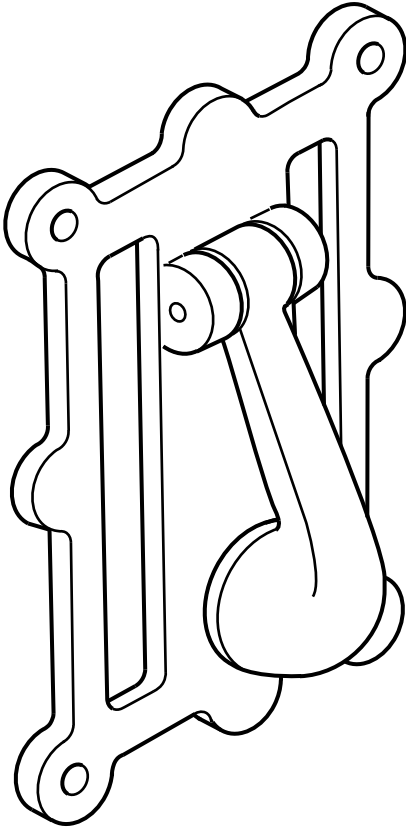
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## 5 MANUFACTURING

**Fig. 6 shows a metal door knocker.**

**FIG. 6**



**(a) Give FOUR justified design requirements for a door knocker of the type shown in Fig. 6.**

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

\_\_\_\_\_

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

\_\_\_\_\_

3 \_\_\_\_\_  
\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_

[4]

**(b) Describe TWO ways that ergonomics may have been considered in the design of a door knocker of the type shown in Fig. 6.**

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[4]

**(c) Digital technology is widely used in industry.**

**Describe TWO methods of rapid prototyping**

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

**[4]**

**(d) Explain TWO key features of batch production.**

\_\_\_\_\_

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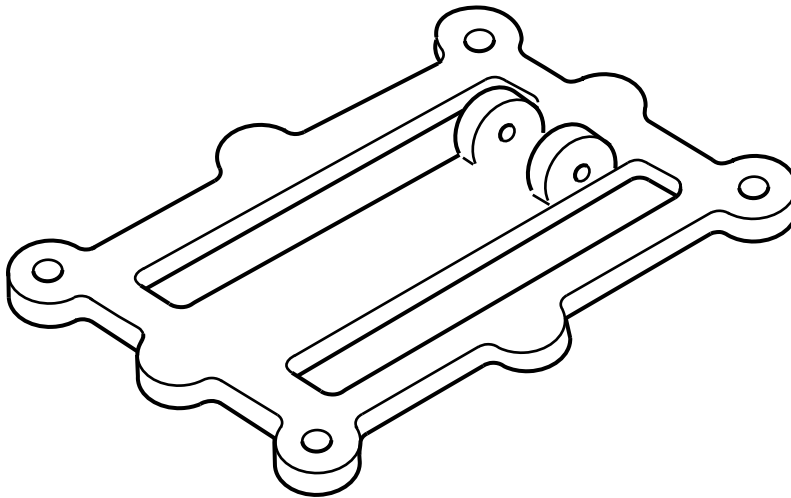
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**[4]**

(e) Fig. 7 shows the back plate from the door knocker.

**FIG. 7**



- (i) State a **SUITABLE SPECIFIC MATERIAL** for the back plate shown in Fig. 7.

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

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**[3]**

- (ii) Describe, in detail, how the back plate shown in Fig. 7 would be manufactured as a batch of 5,000.  
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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[illegible]

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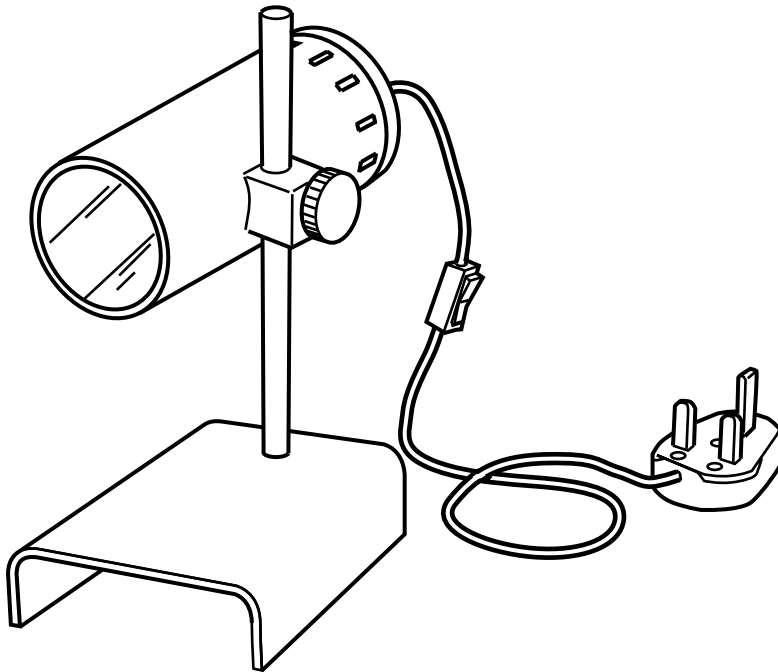
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## 6 RESISTANT MATERIALS

Fig. 8 shows an adjustable desk lamp.

**FIG. 8**



**(a) Give FOUR justified design requirements for an adjustable desk lamp of the type shown in Fig. 8.**

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

4 \_\_\_\_\_  
\_\_\_\_\_  
[4]

**(b) Describe TWO ways that ergonomics may have been considered in the design of an adjustable desk lamp of the type shown in Fig. 8.**

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
[4]

**(c) Digital technology is widely used in industry.**

**Describe TWO methods of rapid prototyping.**

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_ **[4]**

**(d) Explain TWO key features of batch production.**

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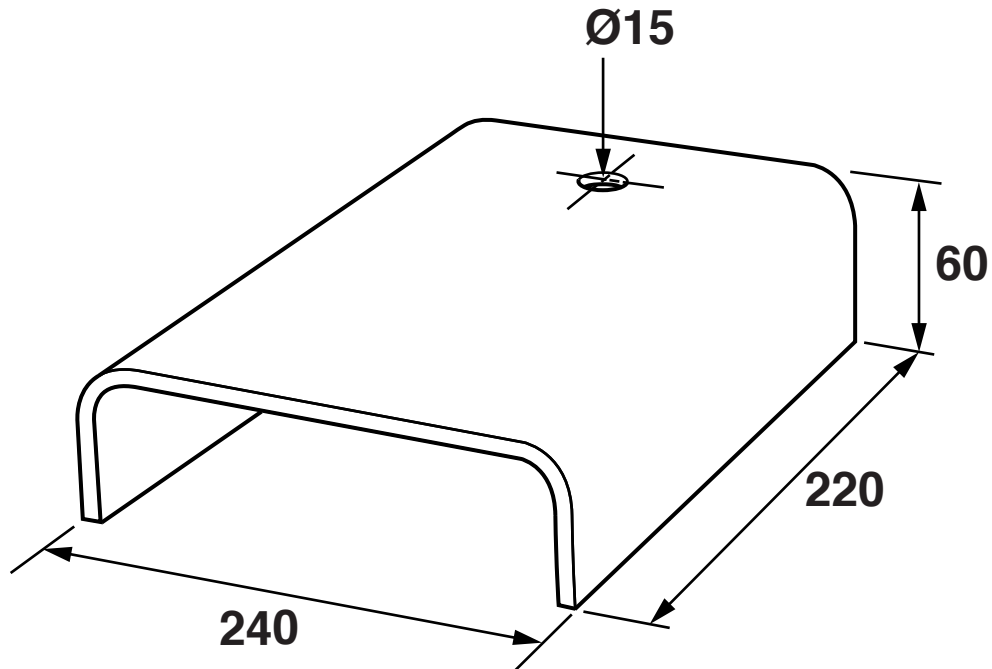
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\_\_\_\_\_ **[4]**

- (e) Fig. 9 shows details of the base of the adjustable desk lamp.

**FIG. 9**



- (i) State a **SUITABLE SPECIFIC MATERIAL** for the base of the adjustable desk lamp.

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

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**[3]**

- (ii) Describe, in detail, how the base would be manufactured as a batch of 250. 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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[illegible]

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## 7 SYSTEMS AND CONTROL

Fig. 10 shows an electric toaster.

FIG. 10



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

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

3 \_\_\_\_\_

\_\_\_\_\_

4 \_\_\_\_\_

\_\_\_\_\_

[4]

**(b) Describe TWO ways that ergonomics may have been considered in the design of an electric toaster of the type shown in Fig. 10.**

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

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

**[4]**

**(c) Digital technology is widely used in industry.**

**Describe TWO methods of rapid prototyping**

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

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

**[4]**

**(d) Explain TWO key features of batch production.**

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**[4]**

- (e) (i) The electric toaster has a mechanism to pop-up the toast at the end of its cycle.**

**Sketch a labelled diagram of a simple mechanism that could pop-up the toast in response to an electrical signal. [3]**

- (ii) The electric toaster is controlled by a timer circuit that can be set by the user to provide adjustable toasting times.**

**Draw a full circuit diagram that could provide the timing function for the electric toaster. Explain the operation of the circuit and show how the time could be adjusted. [9]**

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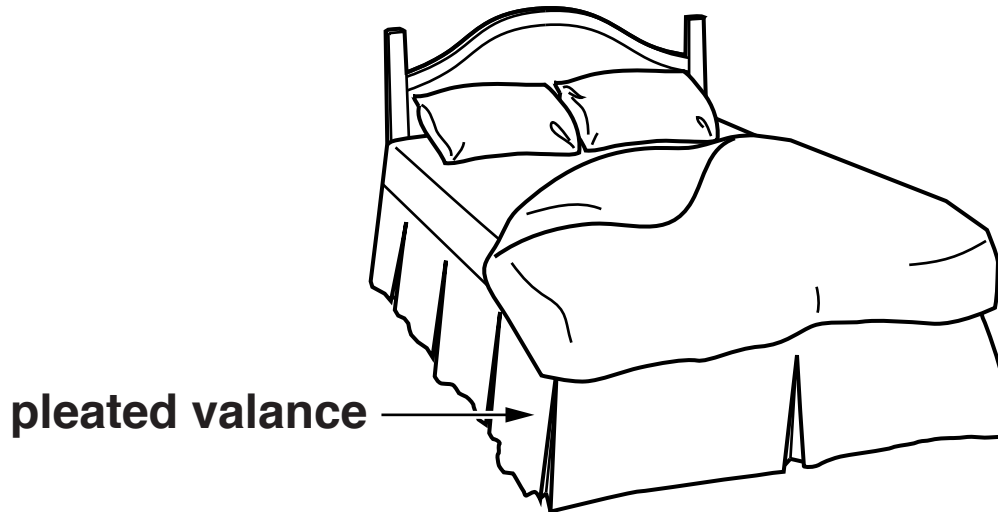
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## 8 TEXTILES

**Fig. 11 shows a co-ordinated bed set including a duvet cover, fitted sheet, pillow cases and a pleated valance.**

**FIG. 11**



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

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

**[4]**

**(b) Describe TWO ways that ergonomics may have been considered in the design of a bedding set of the type shown in Fig. 11.**

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

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

**[4]**

**(c) Digital technology is widely used in industry.**

**Describe TWO methods of rapid prototyping**

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

**2** \_\_\_\_\_  
\_\_\_\_\_  
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**[4]**

**(d) Explain TWO key features of batch production.**

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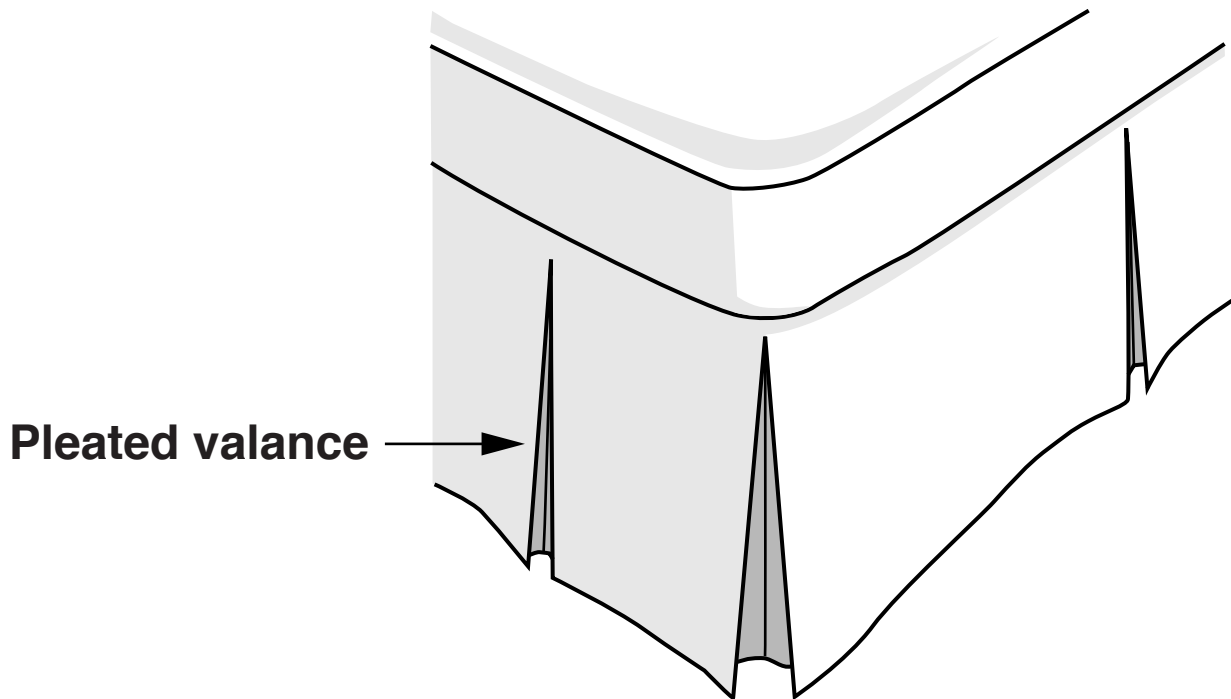
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**[4]**

(e) Fig. 12 shows details of the pleated valance.

**FIG. 12**



- (i) State a **SUITABLE SPECIFIC FABRIC** for the pleated valance.

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

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**[3]**

- (ii) Describe, in detail, how the pleated valance would be produced as a batch of 250. Include full details of manufacture. Use a flow chart and/or annotated diagrams to support your answer. [9]**

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