

OCR

Oxford Cambridge and RSA

Monday 8 June 2015 – Morning

A2 GCE DESIGN AND TECHNOLOGY

F524/01 Product Design: Component 1

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

- A calculator may be used

Duration: 1 hour



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|--------------------|--|-------------------|--|
| Candidate forename | | Candidate surname | |
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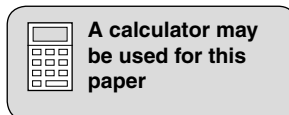
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|---------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre number | | | | | | Candidate number | | | | |
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. 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.
- Do **not** write in the bar codes.
- 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.
- This document consists of **40** pages. Any blank pages are indicated.



1 Built Environment and Construction

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

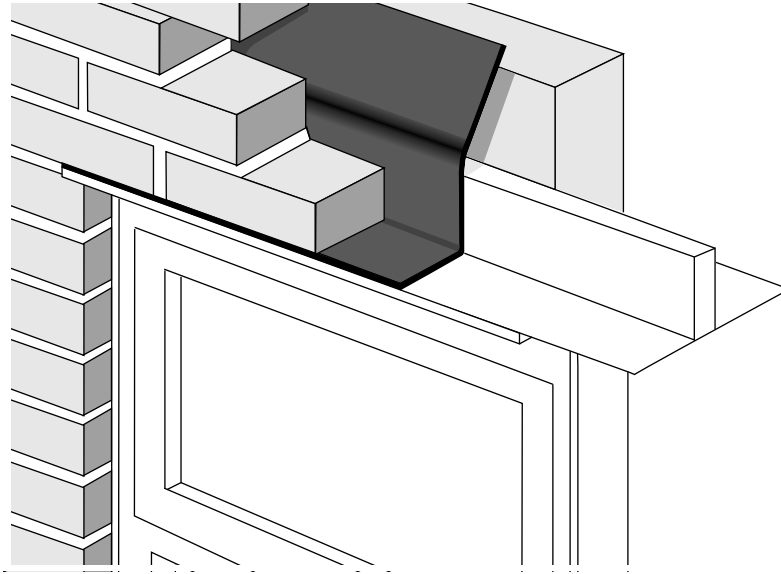


Fig. 1

(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.

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[4]

(c) Digital technology is widely used in industry.

Describe **two** methods of rapid prototyping.

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[4]

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

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(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.

2 Engineering

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

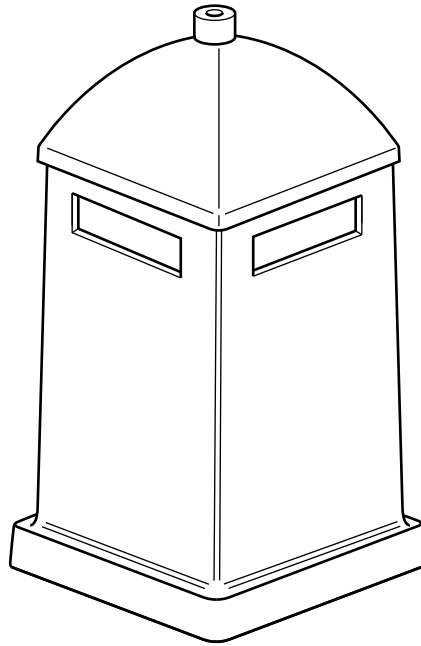


Fig. 2

(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.

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[4]

(c) Digital technology is widely used in industry.

Describe **two** methods of rapid prototyping.

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

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

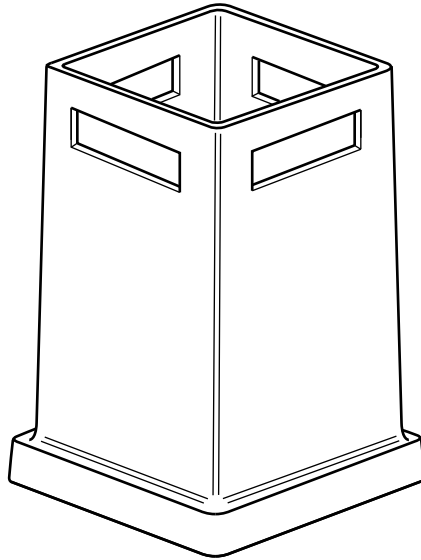


Fig. 3

(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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- (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]

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.

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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.

4 Graphic Products

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

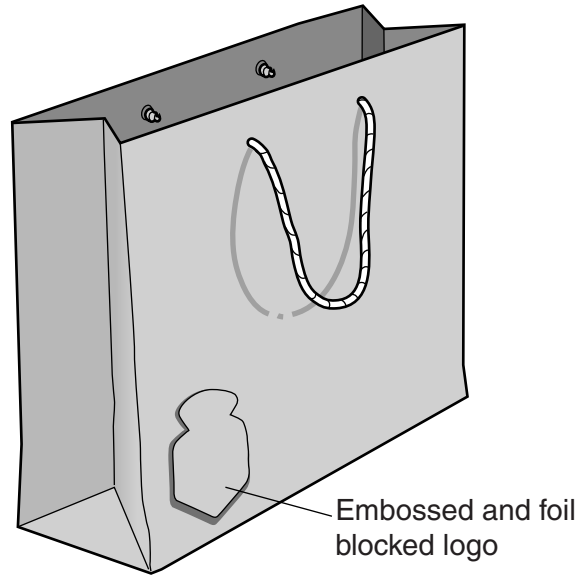


Fig. 5

(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.

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[4]

(c) Digital technology is widely used in industry.

Describe **two** methods of rapid prototyping.

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(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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- (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.

5 Manufacturing

Fig. 6 shows a metal door knocker.

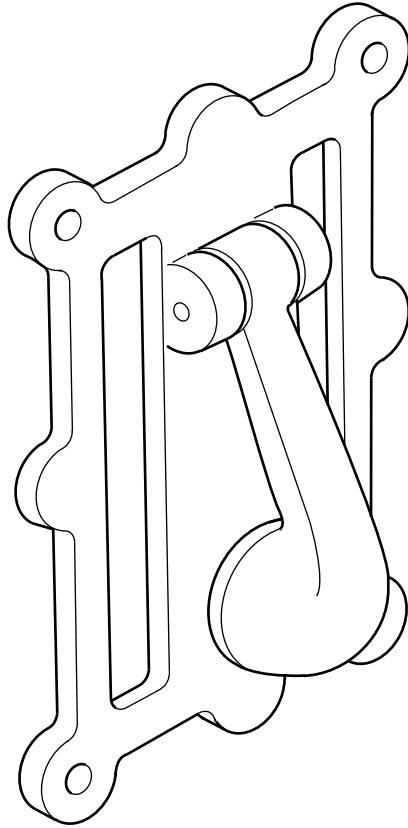


Fig. 6

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

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- 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.

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[4]

(c) Digital technology is widely used in industry.

Describe **two** methods of rapid prototyping

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

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

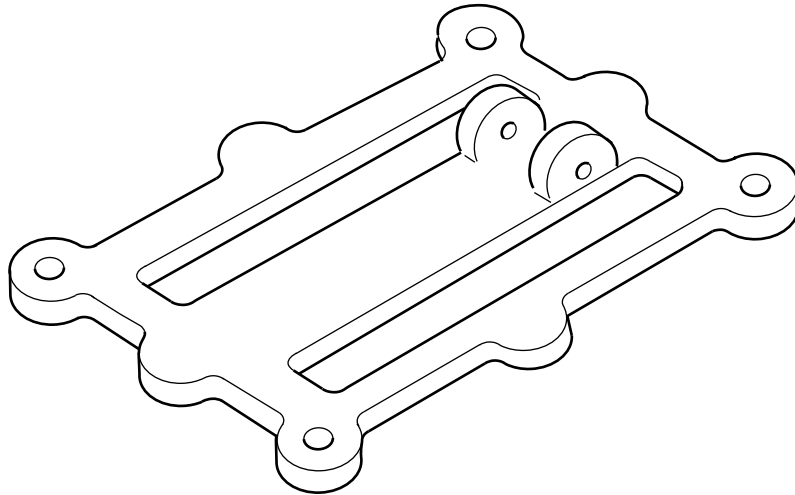


Fig. 7

- (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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- (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.

6 Resistant Materials

Fig. 8 shows an adjustable desk lamp.

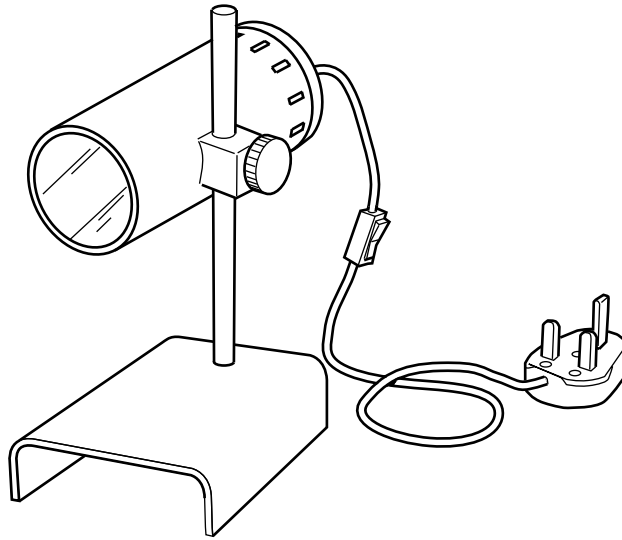


Fig. 8

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

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- 3
- 4

[4]

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

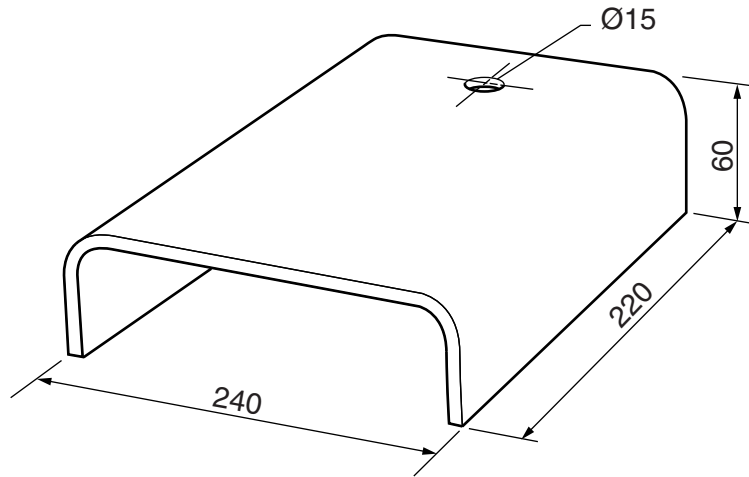


Fig. 9

(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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- (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.

7 Systems and Control

Fig. 10 shows an electric toaster.

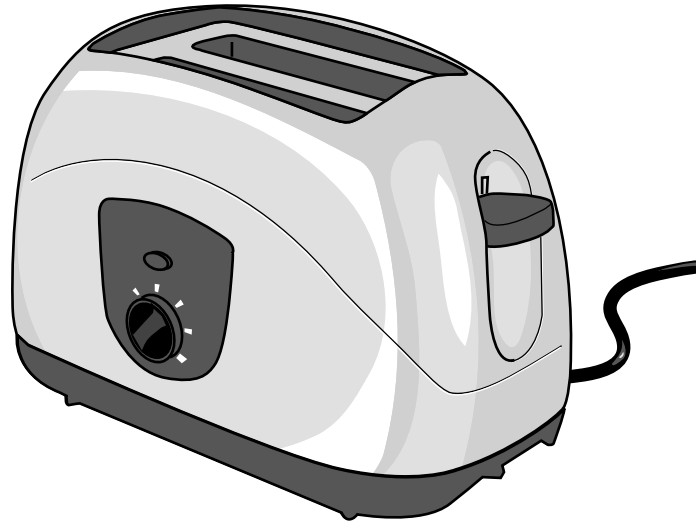


Fig. 10

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

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- 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.

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[4]

(c) Digital technology is widely used in industry.

Describe **two** methods of rapid prototyping

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[4]

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

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- (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.

8 Textiles

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

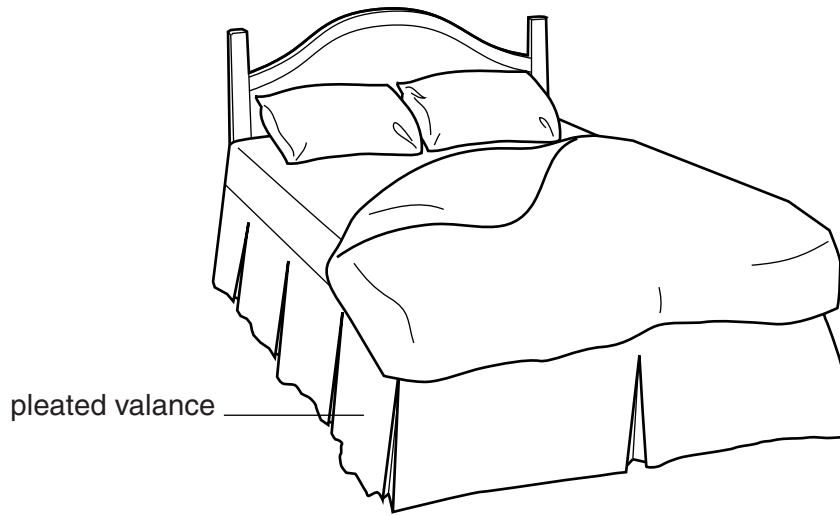


Fig. 11

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

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- 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.

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[4]

(c) Digital technology is widely used in industry.

Describe **two** methods of rapid prototyping

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

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

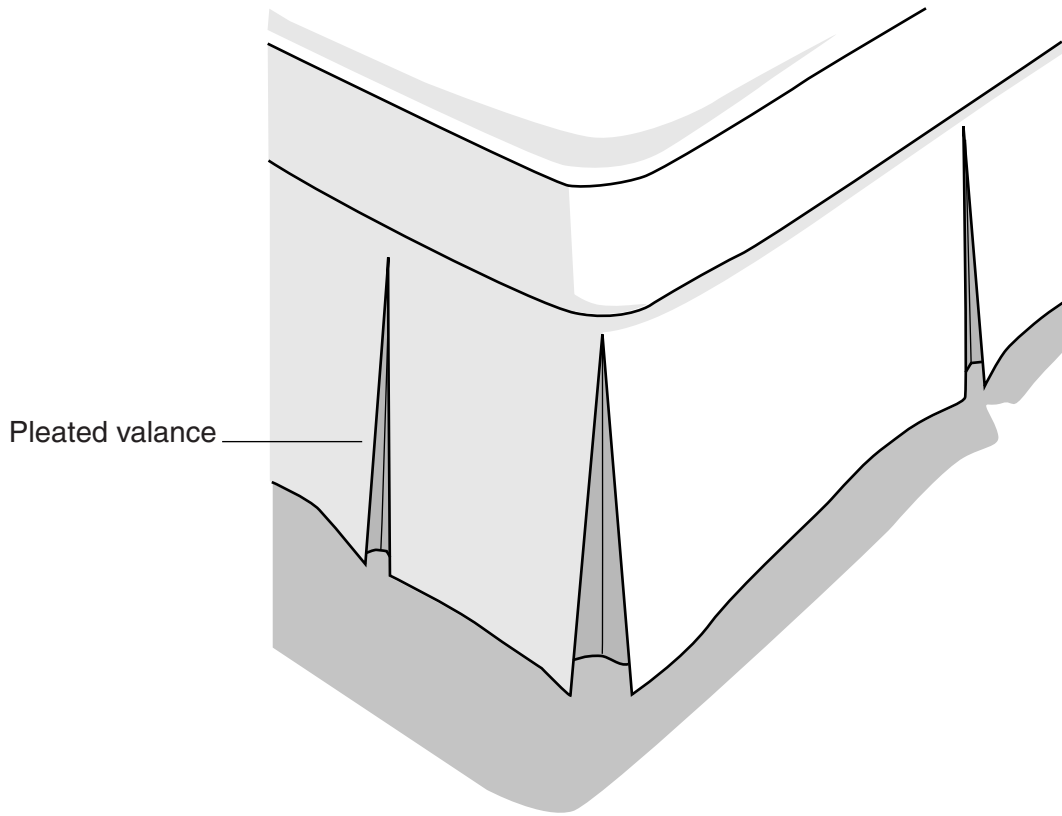


Fig. 12

(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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- (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.

