

OCR

Oxford Cambridge and RSA

Friday 10 June 2016 – 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



Candidate forename		Candidate surname	
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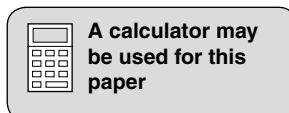
Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- 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 pile foundation.

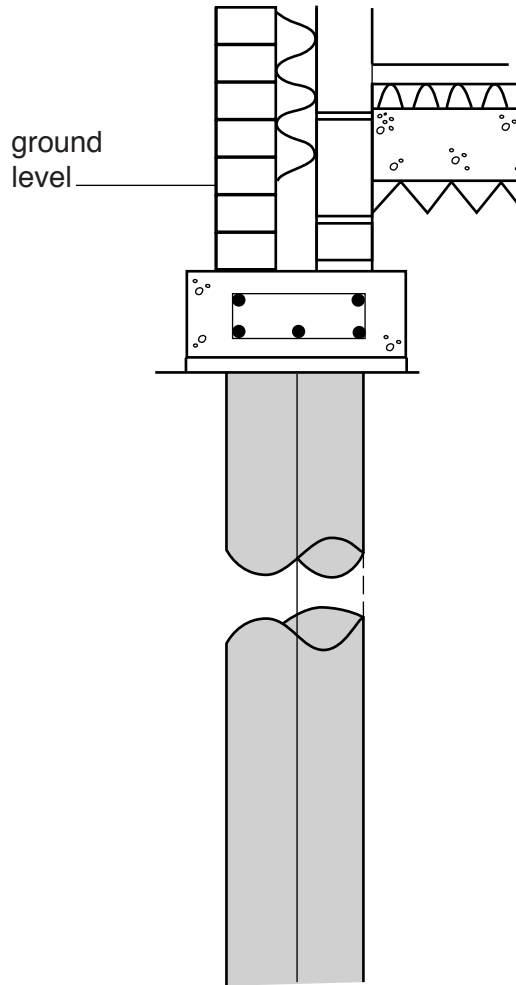


Fig. 1

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

- 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.

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[4]

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

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

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(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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- (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]

2 Engineering

Fig. 2 shows part of a flood defence system.

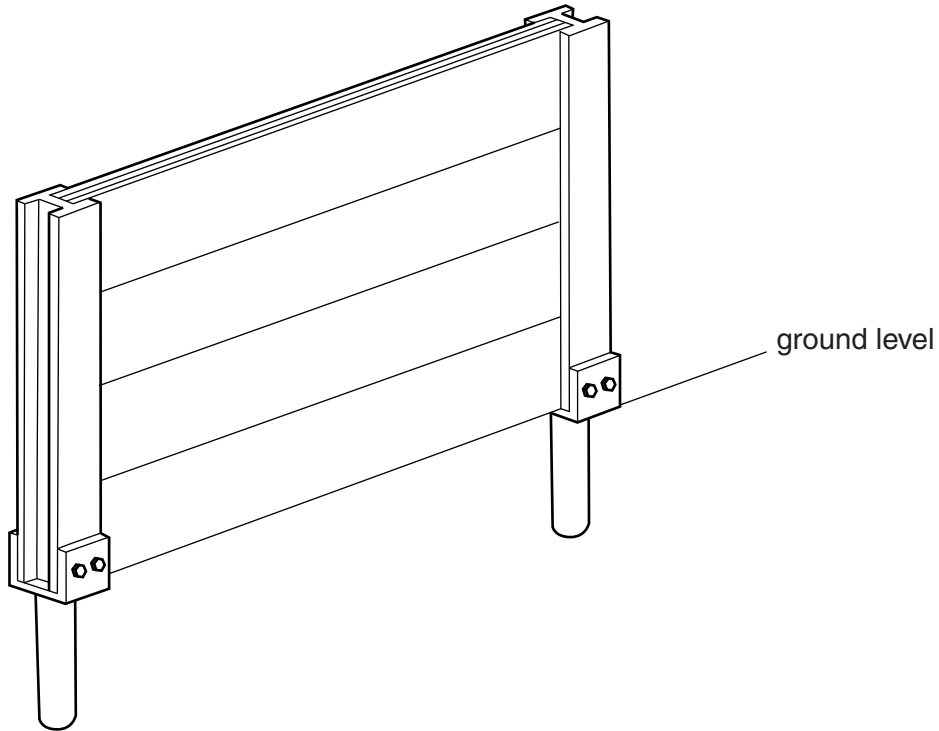


Fig. 2

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

- 1
- 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.

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[4]

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

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

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

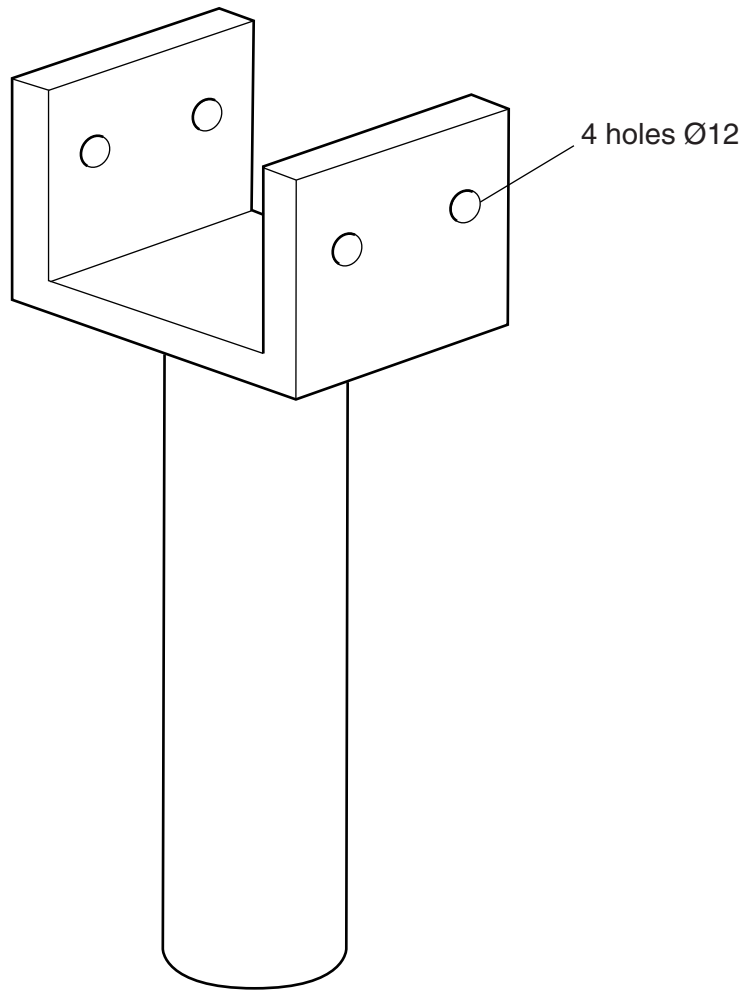


Fig. 3

- (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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- (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]

3 Food

Fig. 4 shows a Pizza.

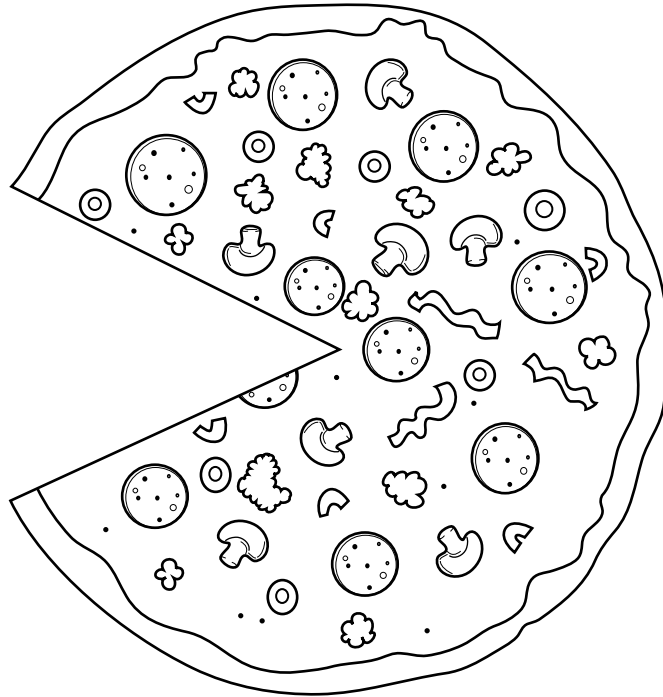


Fig. 4

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

- 1
- 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.

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[4]

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

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

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- (e) (i) Frozen and chilled Pizzas are packaged before sale. State a **suitable specific material** for the packaging of a Pizza.

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

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- (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]

4 Graphic products

Fig. 5 shows a counter-top leaflet holder.

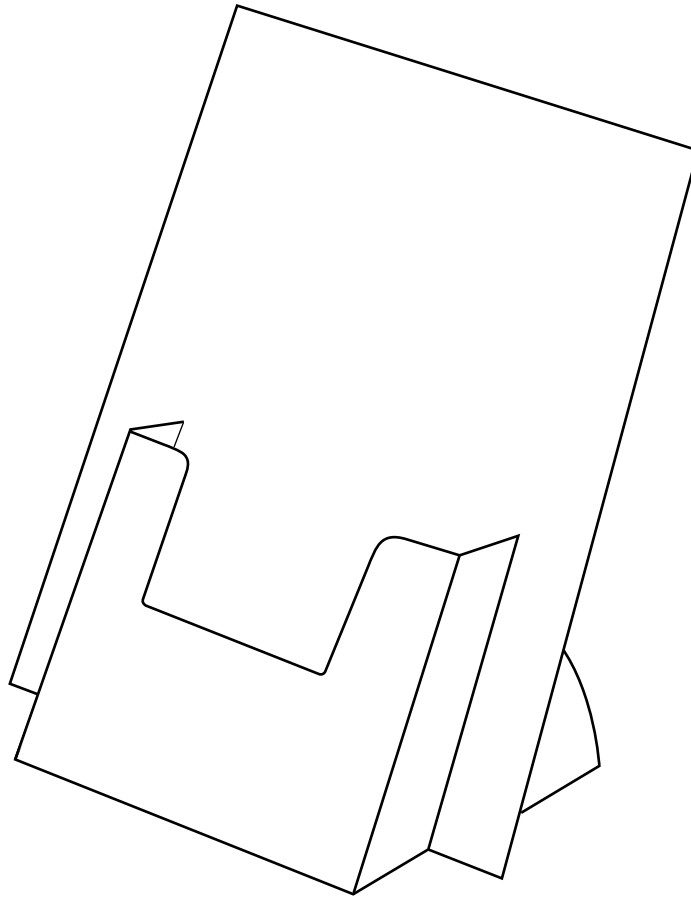


Fig. 5

(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.

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[4]

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

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

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

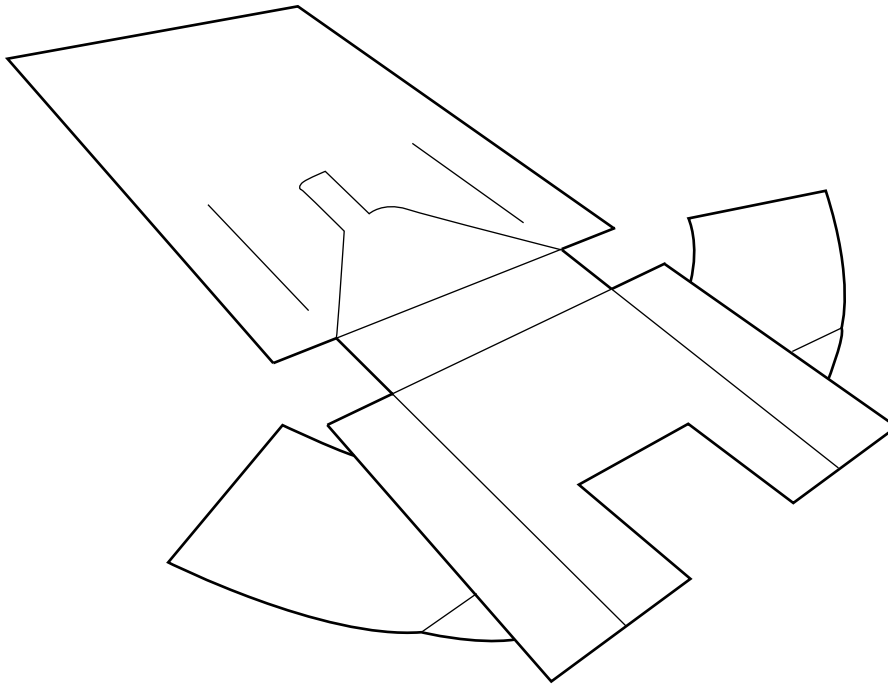


Fig. 6

(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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- (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]

5 Manufacturing

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

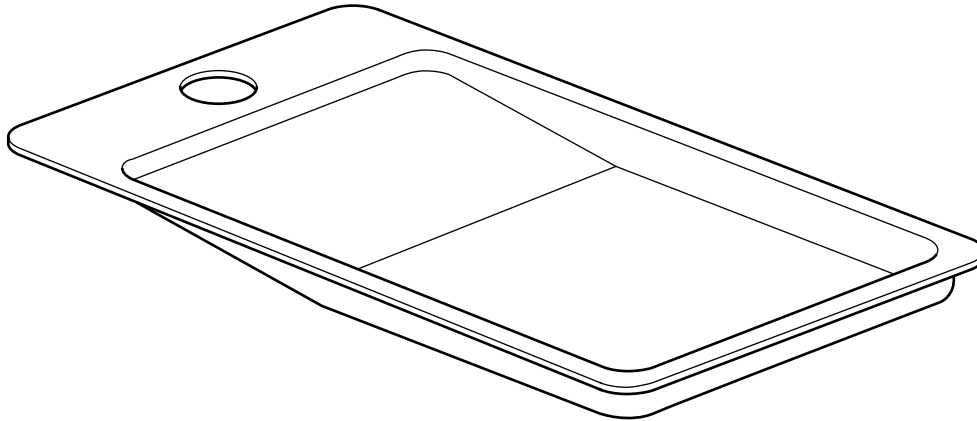


Fig. 7

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

- 1
- 2
- 3
- 4

[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.

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[4]

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

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(e) (i) State a **suitable specific material** for the paint tray.

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

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- (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]

6 Resistant materials

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

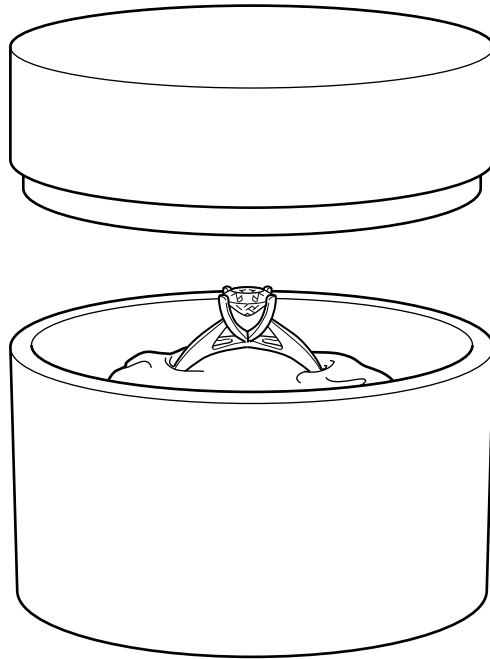


Fig. 8

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

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- 3
- 4

[4]

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

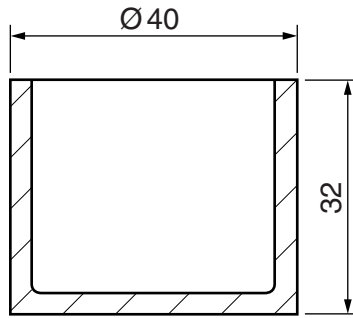


Fig. 9

(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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- (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.

7 Systems and Control

Fig. 10 shows an electric angle grinder.

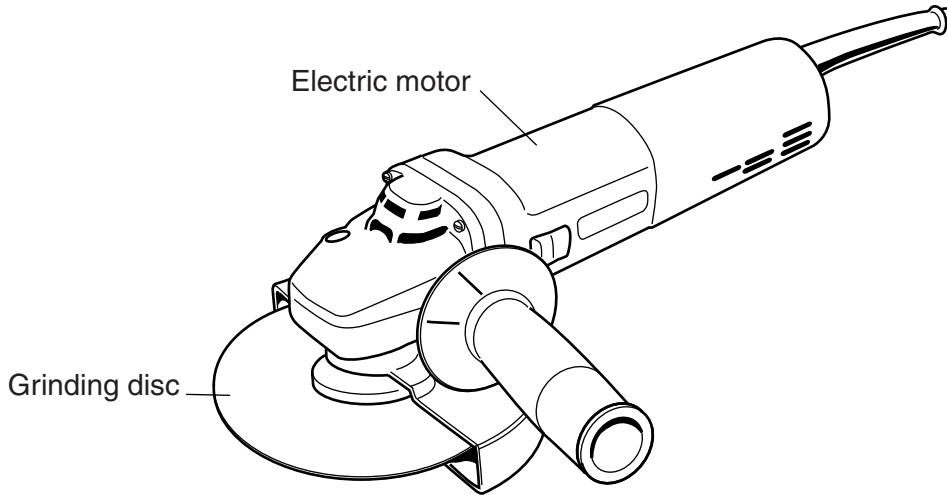


Fig. 10

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

- 1
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- 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.

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[4]

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

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

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- (e) (i) The electric angle grinder transfers rotary motion from the electric motor through 90° to the grinding disc.

Sketch a labelled diagram to show a gear system that can transfer rotary motion through 90° 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]

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
- 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.

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[4]

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

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

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(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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- (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.

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