

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
ADVANCED GCE**

F524/01

DESIGN AND TECHNOLOGY

Product Design: Component 1

FRIDAY 25 JUNE 2010: Morning

DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the Question Paper

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

A calculator may be used

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.
- Use black ink. 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.
- 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 and make sure that you know what you have to do before starting your answer.
- Please note that the instruction ‘discuss’ denotes that you should:
 - identify THREE relevant issues/points raised by the question; [P].
 - explain why you consider THREE of these issues/points to be relevant; [Q]
 - Use TWO specific examples/evidence to support your answer. [S]
- The discuss question will be used to assess the 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.**

1 BUILT ENVIRONMENT AND CONSTRUCTION

Fig. 1. shows a part elevation of a timber framed external wall of a house.

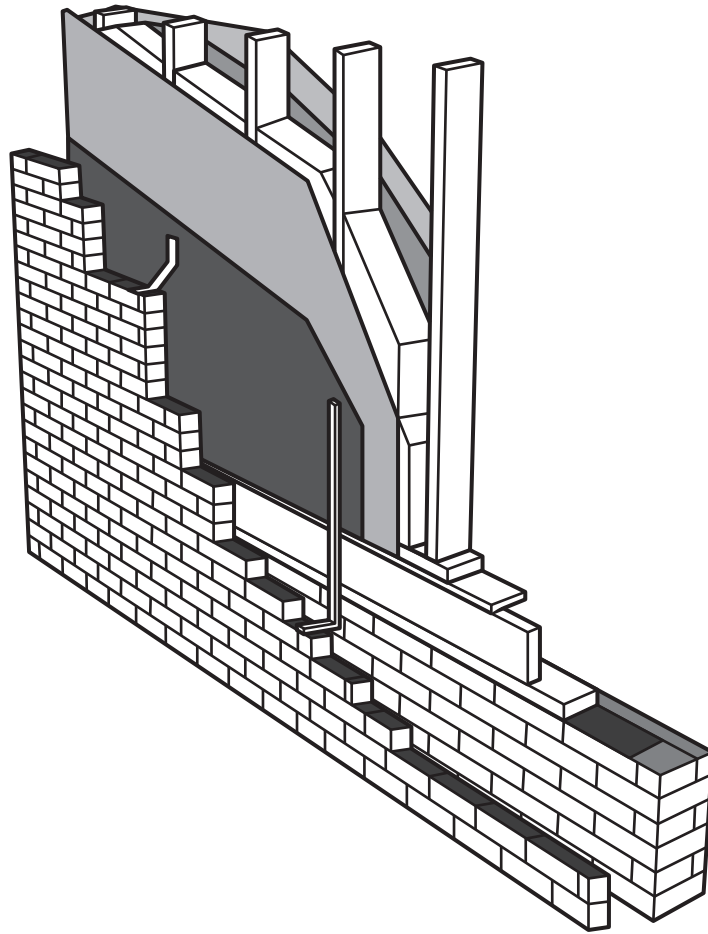


Fig. 1

(a) Give FOUR justified design requirements for the timber framed external wall shown in Fig. 1.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO ways in which the needs of the consumer are identified when designing for the built environment.

1 _____

2 _____

[4]

(c) Describe TWO ways in which safety in the built environment is ensured.

1 _____

2 _____

[4]

- (e) (i) State a SUITABLE SPECIFIC MATERIAL to provide weather protection to an external timber framed wall and give TWO properties or characteristics that make the material suitable for this use.

[3]

(ii) Describe, in detail how a timber framed external wall would be constructed. Include details of how stability is achieved.

Use a flowchart and/or annotated diagrams to support your answer.

[9]

[8]

Question 1 Total [36]

2 ENGINEERING

Fig. 2 shows a mechanical lifting platform.
The lifting platform is operated by an electric winch.

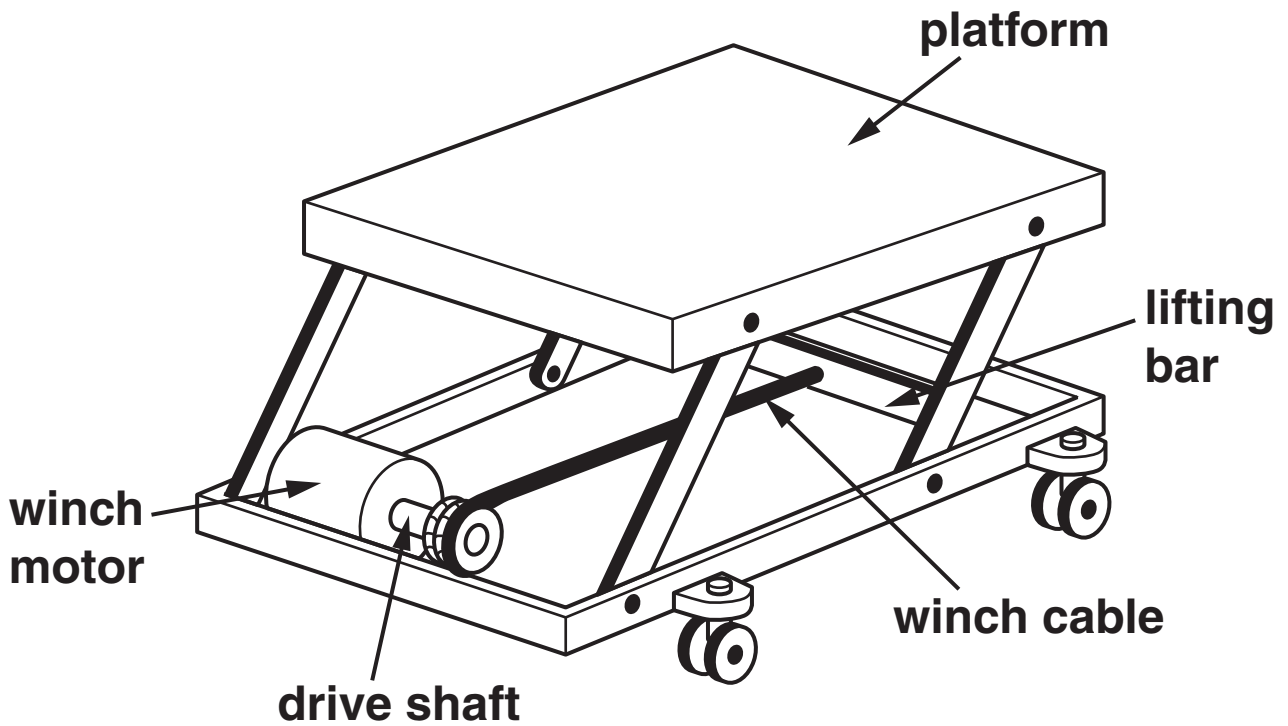


Fig. 2

(a) Give FOUR justified design requirements for the mechanical lifting platform shown in Fig. 2.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO ways in which the needs of the consumer are identified when designing engineered products.

1 _____

2 _____

[4]

(c) Describe TWO ways in which the safety of engineered products is ensured.

1 _____

2 _____

[4]

(d) Explain the key stages in the Life Cycle Assessment (LCA) of an engineered product.

[4]

Fig. 3 shows the drive shaft from the lifting platform.

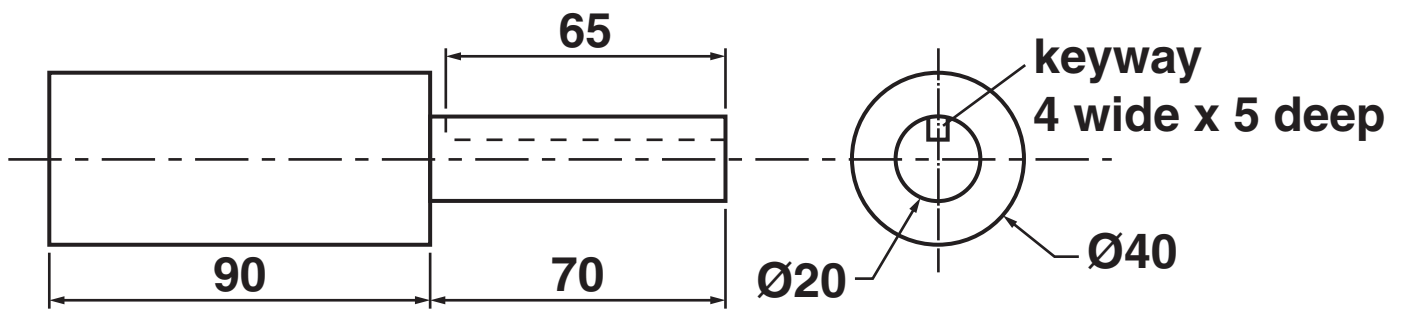


Fig. 3

- (e) (i) State a SUITABLE SPECIFIC MATERIAL for the drive shaft shown in Fig. 3 and give TWO properties or characteristics that make the material suitable for this use.**

[3]

(ii) Describe, in detail, how the drive shaft shown in Fig. 3 would be manufactured.

Include details of quality control checks that you would use.

Use a flowchart and/or annotated diagrams to support your answer.

[8]

Question 2 Total [36]

3 FOOD

Fig. 4 shows a bread product.

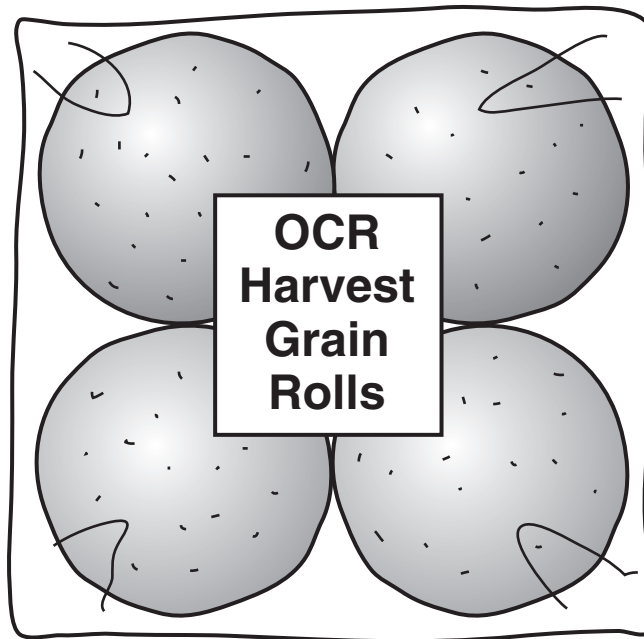


Fig. 4

(a) Give FOUR justified design requirements for the bread product shown in Fig. 4.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO ways in which the needs of the consumer are identified when designing food products.

1 _____

2 _____

[4]

(c) Describe TWO ways in which the safety of food products is ensured.

1 _____

2 _____

[4]

(ii) Describe, in detail, how the bread product shown in Fig. 4 would be manufactured.

Include details of all ingredients and the scientific principles underlying the process.

Do not include the packaging.

Use a flowchart and/or annotated diagrams to support your answer.

[9]

[8]

Question 3 Total [36]

4 GRAPHIC PRODUCTS

Fig. 5 shows an A4 folder used for promotional literature.

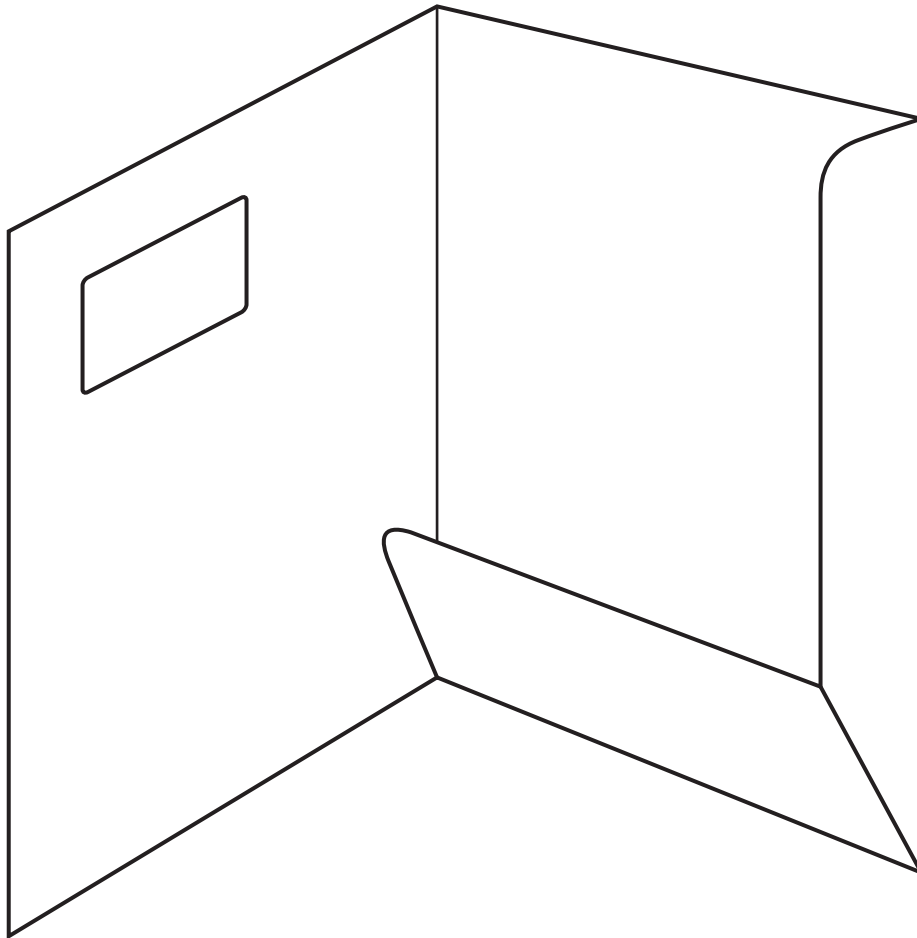


Fig. 5

(a) Give FOUR justified design requirements for the promotional A4 folder shown in Fig. 5.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO ways in which the needs of the consumer are identified when designing graphic products.

1 _____

2 _____

[4]

(c) Describe TWO ways in which the safety of graphic products is ensured.

1 _____

2 _____

[4]

(e) (i) State a SUITABLE SPECIFIC MATERIAL for the promotional A4 folder shown in Fig. 5 and give TWO properties or characteristics that make the material suitable for this use.

[3]

(ii) Describe, in detail, how the promotional A4 folder shown in Fig. 5 would be manufactured as a batch of 50,000. Include details of specific equipment used.

Use a flowchart and/or annotated diagrams to support your answer.

[8]

Question 4 Total [36]

5 MANUFACTURING

Fig. 6 shows a wall cupboard for use in a kitchen. The cupboard is manufactured as a 'flat-pack' product, for self-assembly by the purchaser.

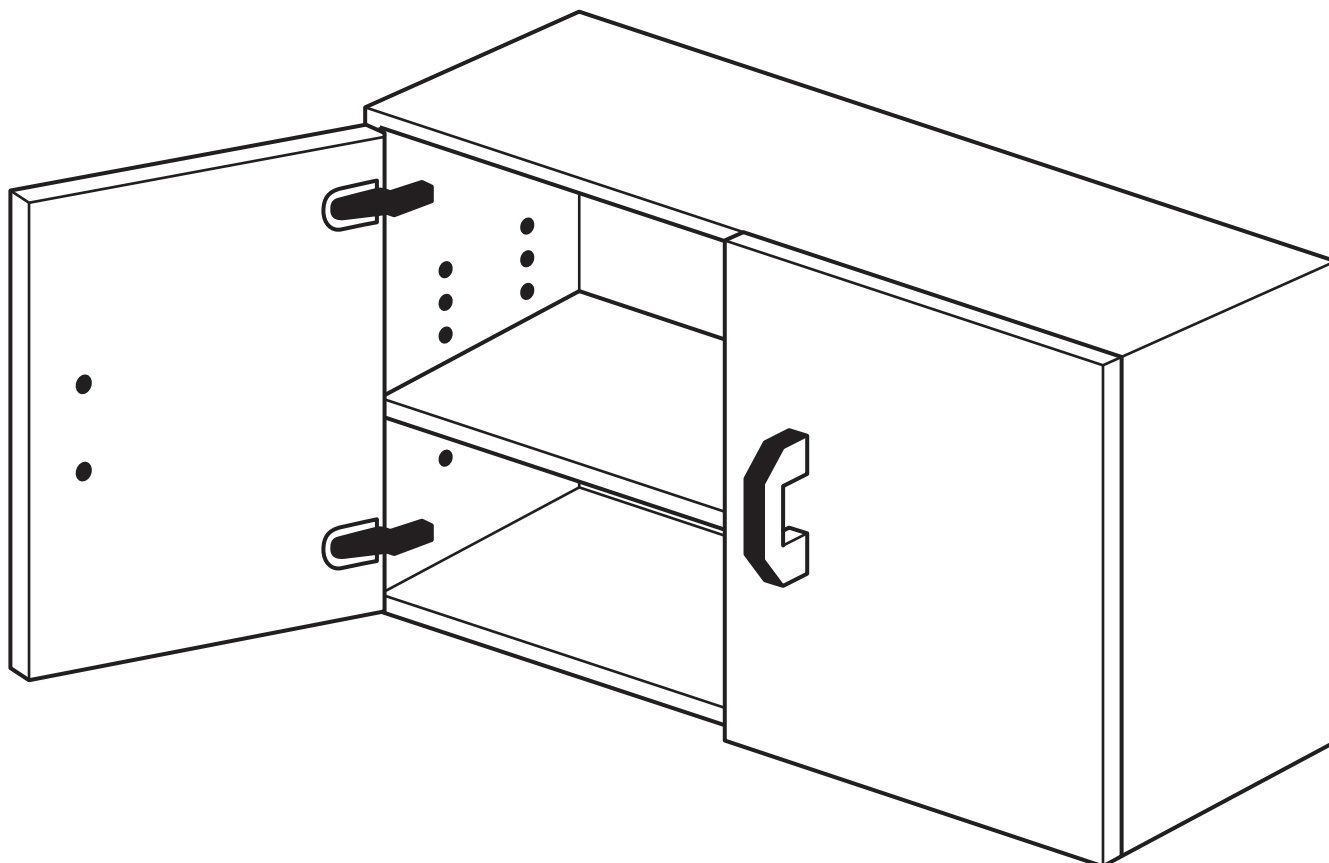


Fig. 6

(a) Give **FOUR** justified design requirements for the wall cupboard shown in Fig. 6.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO ways in which the needs of the consumer are identified when designing manufactured products.

1 _____

2 _____

[4]

(c) Describe TWO ways in which the safety of manufactured products is ensured.

1 _____

2 _____

[4]

Fig. 7 shows an injection moulded cupboard handle.

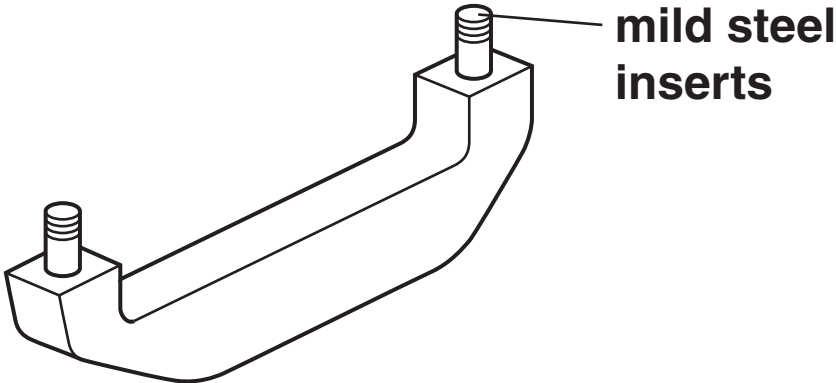


Fig. 7

(e) (i) State a SUITABLE SPECIFIC MATERIAL for the injection moulded handle shown in Fig. 7 and give TWO properties or characteristics that make the material suitable for this use.

[3]

- (ii) Draw a flowchart to show the key stages of manufacture of the cupboard handle shown in Fig. 7, from raw material to final assembly. Include details of quality control checks.**

[9]

[8]

Question 5 Total [36]

6 RESISTANT MATERIALS

Fig. 8 shows a toast rack to be used in a chain of hotels.

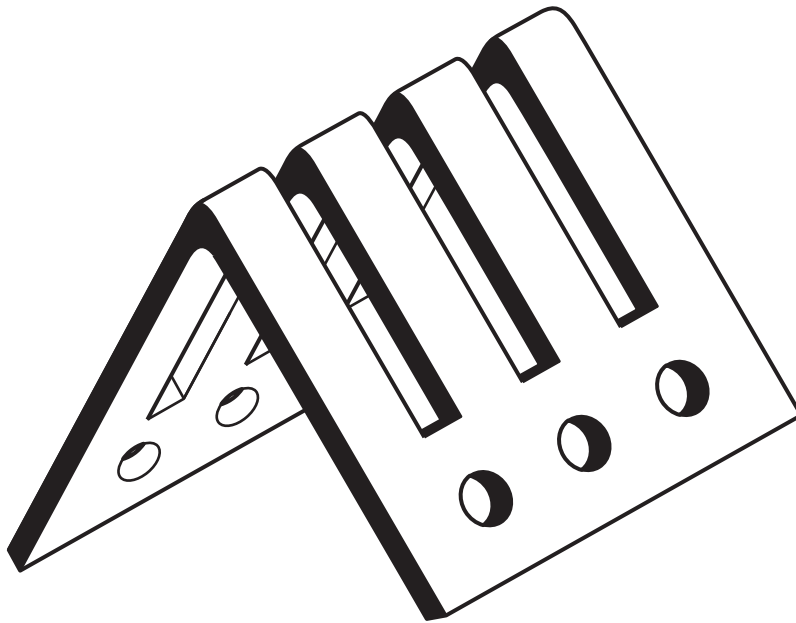


Fig. 8

(a) Give **FOUR** justified design requirements for the toast rack to be used in a chain of hotels shown in Fig. 8.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO ways in which the needs of the consumer are identified when designing products in resistant materials.

1 _____

2 _____

[4]

(c) Describe TWO ways in which the safety of resistant materials products is ensured.

1 _____

2 _____

[4]

(d) Explain the key stages in the Life Cycle Assessment (LCA) of a resistant materials product.

[4]

(e) (i) State a SUITABLE SPECIFIC MATERIAL for the toast rack shown in Fig. 8 and give TWO properties or characteristics that make the material suitable for this use.

[3]

- (ii) Describe, in detail, how the toast rack shown in Fig. 8 would be manufactured as a batch of 50,000. Include details of specialist tooling used. Use a flowchart and/or annotated diagrams to support your answer.**

[8]

Question 6 Total [36]

7 SYSTEMS AND CONTROL

Fig. 9 shows an exercise bike.



Fig. 9

(a) Give **FOUR** justified design requirements for the exercise bike shown in Fig. 9.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO ways in which the needs of the consumer are identified when designing products that involve the use of systems and control.

1 _____

2 _____

[4]

(c) Describe TWO ways in which the safety of products, that involve the use of systems and control, are ensured.

1 _____

2 _____

[4]

- (e) (i) State an electronic component which could be used on an exercise bike to sense the revolutions of the pedal wheel and sketch a labelled diagram to show how the component would be used.**

[3]

- (ii) The user of the exercise bike shown in Fig. 9 has to pedal against a mechanical resistance. This resistance can be adjusted electronically by a control on the display panel.**

Use a flowchart and/or annotated diagrams to show a method of producing a mechanical pedalling resistance, which can be adjusted electronically.

[8]

Question 7 Total [36]

8 TEXTILES

Fig. 10 shows a quilted oven mitt.

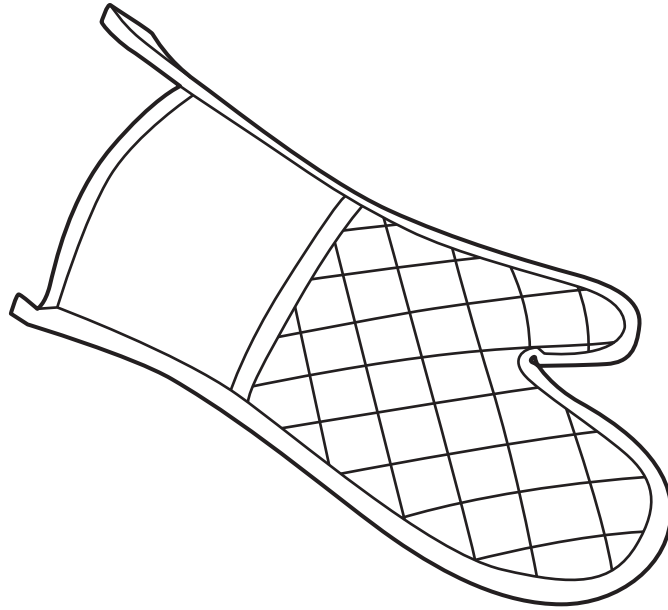


Fig. 10

(a) Give FOUR justified design requirements for the oven mitt shown in Fig. 10.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO ways in which the needs of the consumer are identified when designing textile products.

1 _____

2 _____

[4]

(c) Describe TWO ways in which the safety of textile products is ensured.

1 _____

2 _____

[4]

- (ii) Describe, in detail, how the oven mitt shown in Fig. 10 would be manufactured in a batch of 10,000.**

Include details of the quilting.

Use a flowchart and/or annotated diagrams to support your answer.

[8]

Question 8 Total [36]



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