THIS IS A NEW SPECIFICATION

OCR
RECOGNISING ACHIEVEMENT

ADVANCED GCE

DESIGN AND TECHNOLOGY

Product Design: Component 1

F524/01

Candidates answer on the Question Paper

OCR Supplied Materials:
- None

Other Materials Required:
- A calculator may be used

Friday 25 June 2010
Morning

Duration: 1 hour

OCE/16655

F5240 1

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- 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.
- Do **not** write in the bar codes.
- 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.
- This document consists of **40** pages. Any blank pages are indicated.

A calculator may be used for this paper

1 Built Environment and Construction

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

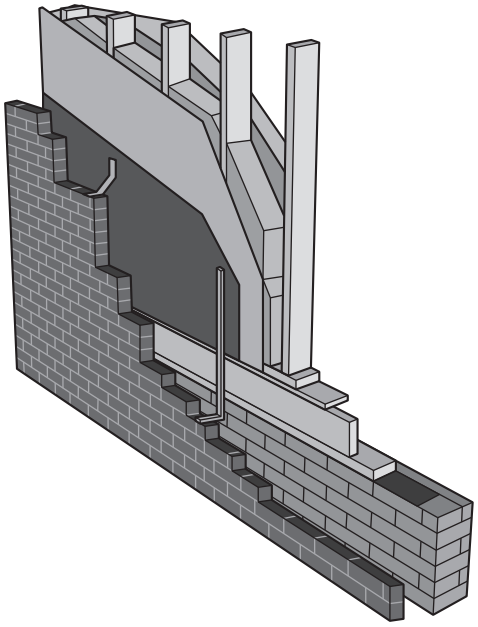

Fig. 1

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

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[4]

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

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[4]

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

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[4]

(d) Explain the key stages in the Life Cycle Assessment (LCA) of a product utilised within the construction industry.

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(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.

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..... **[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]

(f) Discuss the implications of energy conservation in the design of domestic dwellings.

.... **[8]**

Question 1 Total [36]

2 Engineering

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

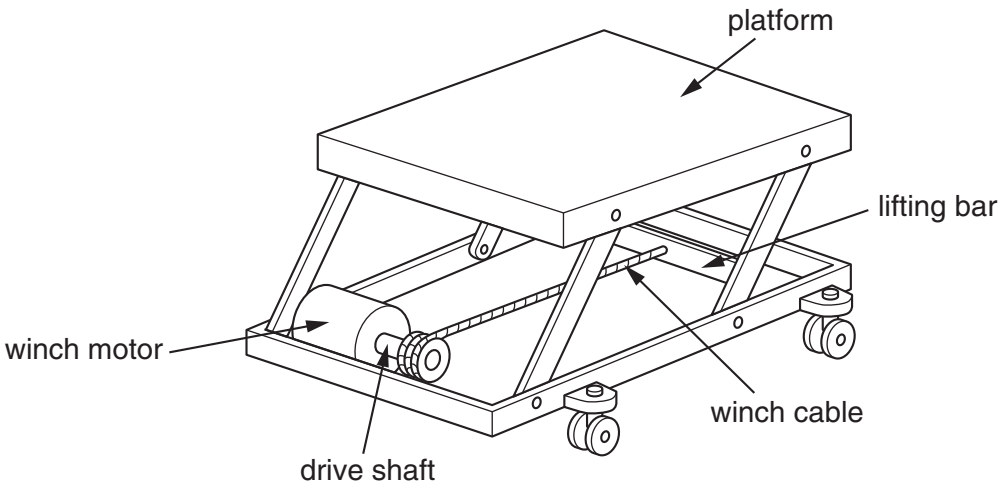

Fig. 2

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

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[4]

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

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[4]

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

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[4]

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

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

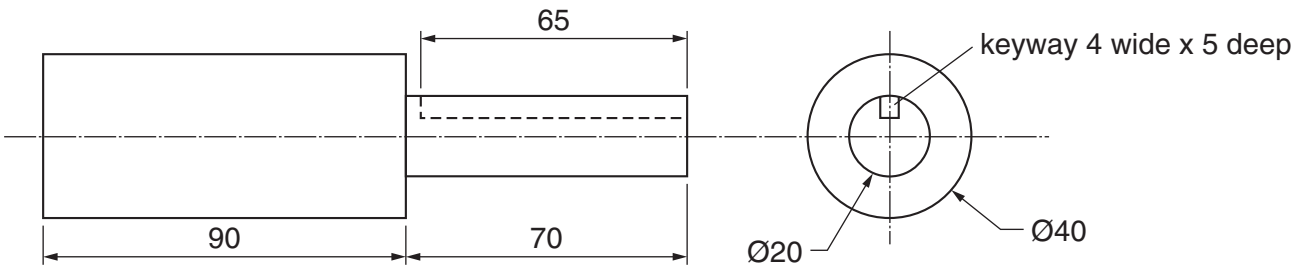

Fig. 3

(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.

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(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.

[9]

(f) Discuss the implications of introducing robotics into an engineering company's production facility.

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Question 2 Total [36]

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3 Food

Fig. 4 shows a bread product.

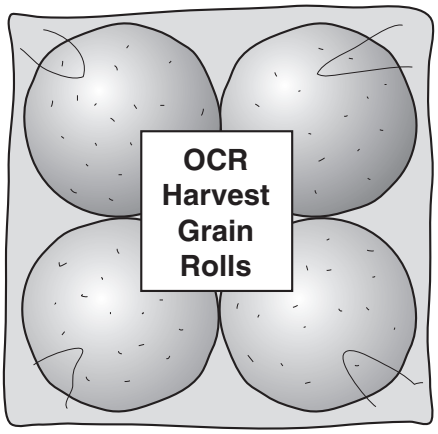

Fig. 4

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

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[4]

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

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[4]

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

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[4]

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

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(e) (i) State a suitable flour for making the bread product shown in Fig. 4 and give **two** properties of the flour that make it suitable for this use.

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..... **[3]**

(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]

(f) Discuss the implications of the changing pattern of food consumption in the UK.

.... **[8]**

Question 3 Total [36]

4 Graphic Products

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

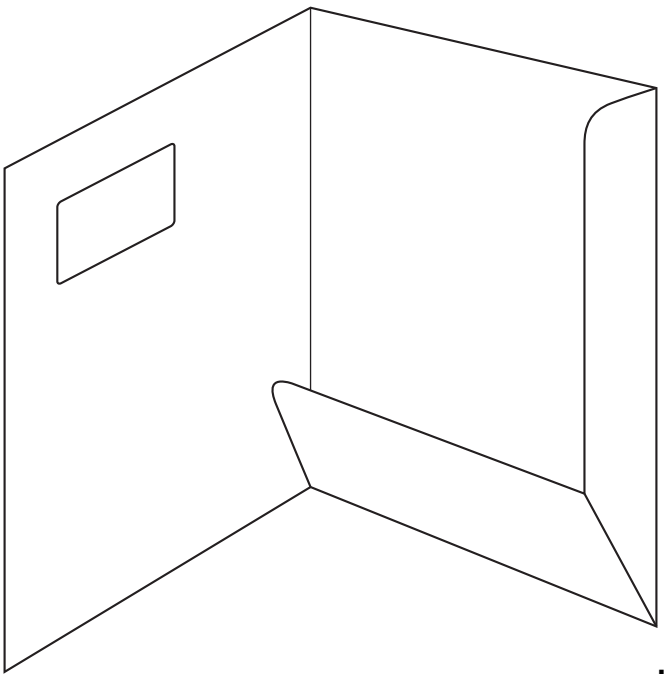

Fig. 5

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

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[4]

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

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2 .....

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[4]

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

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2 .....

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[4]

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

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(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.

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(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.

[9]

(f) Discuss the environmental implications of the use of new technologies within the print industry.

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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.

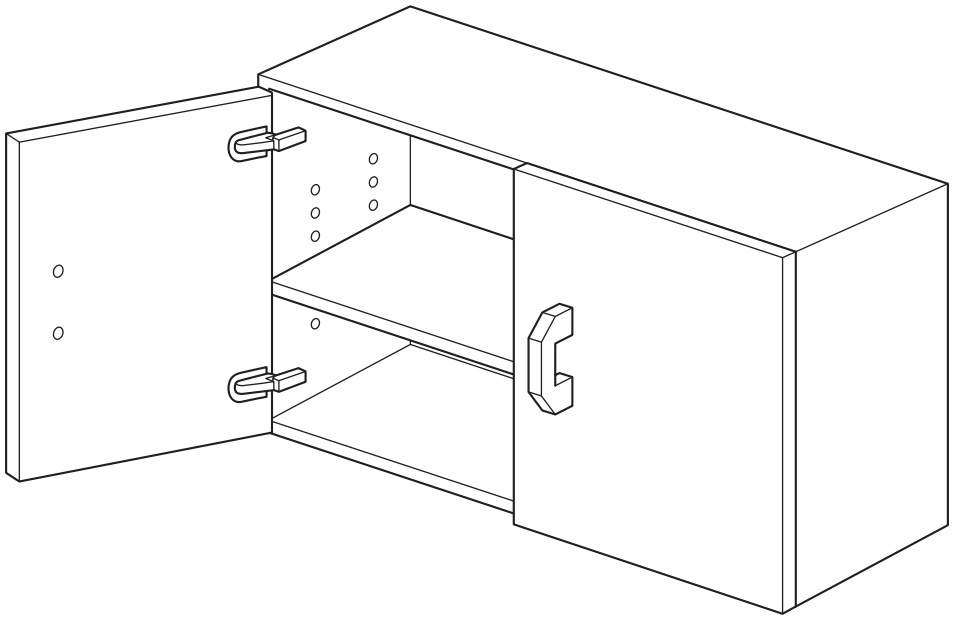

Fig. 6

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

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[4]

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

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2 .....

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[4]

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

1 .....

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[4]

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

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Fig. 7 shows an injection moulded cupboard handle.

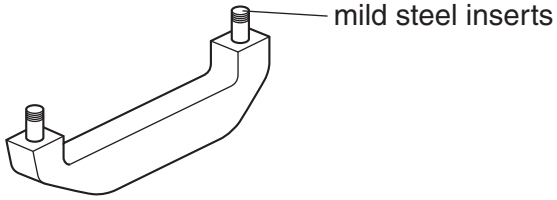

Fig. 7

(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.

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(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]

(f) Discuss the implications to a company of introducing Computer Integrated Manufacturing (CIM).

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Question 5 Total [36]

6 Resistant materials

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

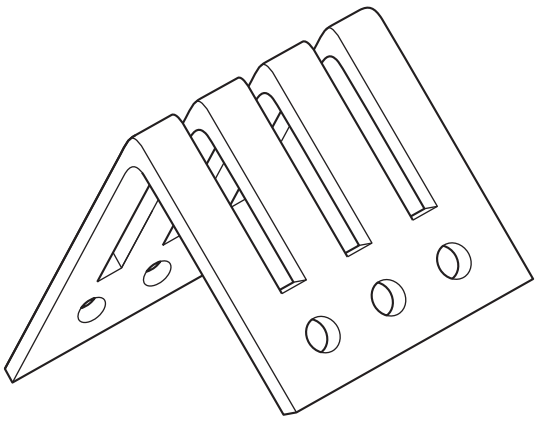

Fig. 8

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

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[4]

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

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[4]

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

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[4]

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

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(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.

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(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.

[9]

(f) Discuss the implications to manufacturers of introducing a sustainable design strategy.

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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.

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[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.

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2 .....

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[4]

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

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2 .....

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[4]

(d) Explain the key stages in the Life Cycle Assessment (LCA) of a product that involves the use of systems and control.

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(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.

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[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.

[9]

(f) Discuss the ethical responsibilities for designers of fitness equipment.

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Question 7 Total [36]

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8 Textiles

Fig. 10 shows a quilted oven mitt.

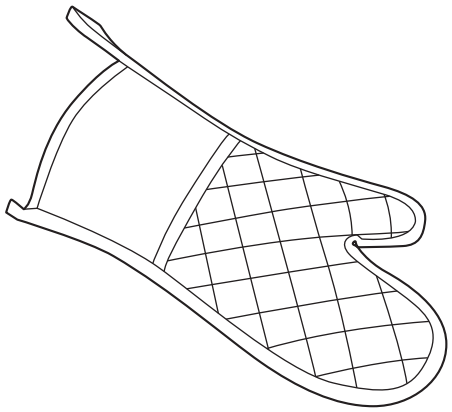

Fig. 10

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

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[4]

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

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2 .....

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[4]

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

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[4]

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

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(e) (i) State a **suitable specific fabric** for making the oven mitt shown in Fig. 10 and give **two** performance characteristics of the fabric that make it suitable for this use.

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..... **[3]**

(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.

[9]

(f) Discuss the environmental implications of textile production.

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Question 8 Total [36]

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