OCR
RECOGNISING ACHIEVEMENT

Tuesday 4 June 2013 – 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

F 5 2 4 0 1

F5280306133

Candidate forename		Candidate surname	

Centre number						Candidate number				

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 **44** pages. Any blank pages are indicated.

A calculator may be used for this paper

1 Built Environment and Construction

Fig. 1 shows an external wall of a house.

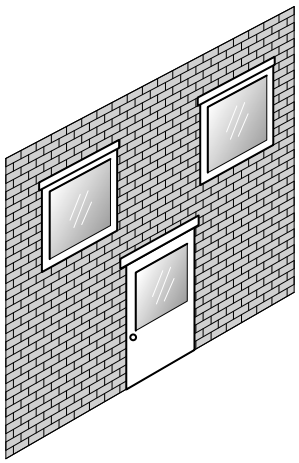

Fig. 1

(a) Give **four** justified design requirements for an external wall of the type shown in Fig. 1.

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[4]

(b) Describe **two** quality control checks that should be carried out during the construction of a wall of the type shown in Fig. 1.

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[4]

(c) Describe, using **two** examples, how a product used in the building industry can be designed to be more 'environmentally friendly'.

1 .....

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..... **[4]**

(d) Products used in the building industry are often manufactured using a Just-in-Time (JIT) system.
Explain **two** benefits of a JIT system.

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..... **[4]**

(e) **(i)** State a **suitable specific material** for use in the construction of the external wall.

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

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

(ii) Describe, in detail, one method of constructing the external wall.
Include details of how lateral stability of the wall is achieved.
Use a flow chart and/or annotated diagrams to support your answer. **[9]**

Question 1(f) begins on page 5

(f) Discuss the implications to manufacturers in the construction industry, of ensuring that their products are safe to use.

.... **[8]**

Question 1 Total [36]

2 Engineering

Fig. 2 shows a mounting bracket for a security camera.

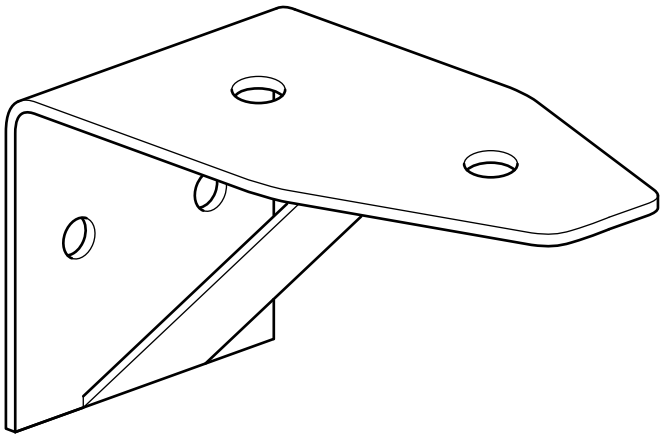

Fig. 2

(a) Give **four** justified design requirements for a mounting bracket of the type shown in Fig. 2.

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[4]

(b) Describe **two** quality control checks that should be carried out during the manufacture of a mounting bracket of the type shown in Fig. 2.

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[4]

(c) Describe, using **two** examples, how an engineered product can be designed to be more 'environmentally friendly'.

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[4]

(d) Engineered products are often manufactured using a Just-in-Time (JIT) system.
Explain **two** benefits of a JIT system.

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[4]

(e) Fig. 3 gives details of the mounting bracket shown in Fig. 2.

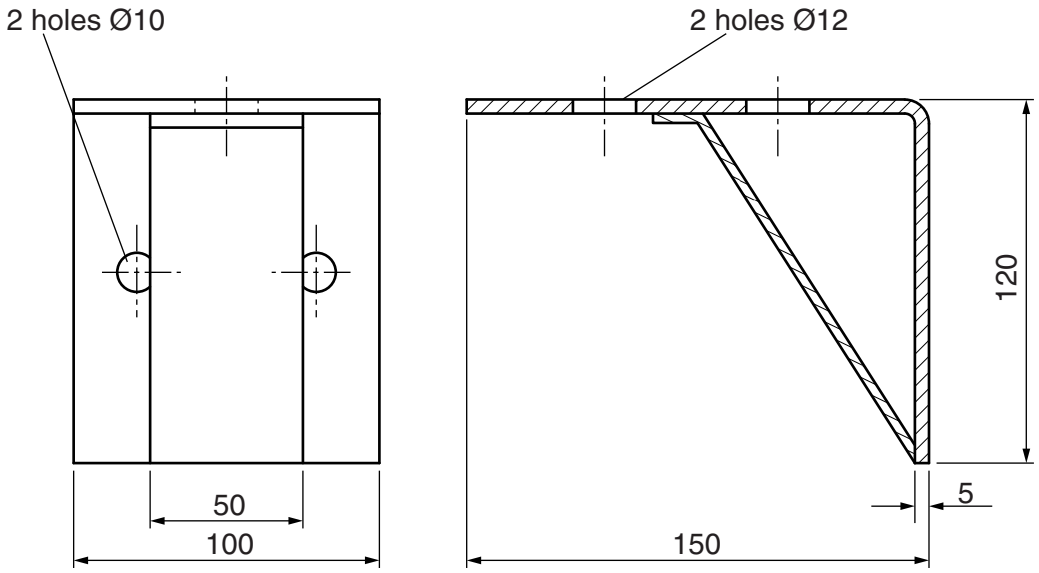

Fig. 3

(i) State a **suitable specific material** for the mounting bracket.
Give **two** properties or characteristics that make the material suitable for this use.

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

(ii) Describe, in detail, how the bracket 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]**

Question 2(f) begins on page 10

(f) Discuss the implications to manufacturers in the engineering industry, of ensuring that their products are safe to use.

.... **[8]**

Question 2 Total [36]

3 Food

Fig. 4 shows a Victoria sandwich cake filled with jam and cream.

Fig. 4

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

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[4]

(b) Describe **two** quality control checks that should be carried out during the manufacture of the Victoria sandwich cake shown in Fig. 4.

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[4]

(c) Describe, using **two** examples, how food products can be designed to be more 'environmentally friendly'.

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[4]

(d) Food products are often manufactured using a Just-in-Time (JIT) system.
Explain **two** benefits of a JIT system.

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[4]

(e) (i) The Victoria sandwich cake shown in Fig. 4 consists of layers of sponge cake.
State a **suitable specific ingredient** of the sponge cake layer.
Give **two** properties that make the ingredient suitable for this use.

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

Question 3(e)(ii) begins on page 14

(ii) Describe, in detail, how the Victoria sandwich cake would be manufactured as a batch of 3000.
Include details of all processes and the scientific principles underlying the process.
Use a flow chart and /or annotated diagrams to support your answer. **[9]**

Question 3(f) begins on page 15

(f) Discuss the implications to manufacturers in the food industry, of ensuring that their products are safe.

.... **[8]**

Question 3 Total [36]

4 Graphic Products

Fig. 5 shows an Estate Agent's sign.

Fig. 5

(a) Give **four** justified design requirements for a sign of the type shown in Fig 5.

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[4]

(b) Describe **two** quality control checks that should be carried out during the manufacture of a sign of the type shown in Fig. 5.

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[4]

(c) Describe, using **two** examples, how graphic products can be designed to be more 'environmentally friendly'.

1 .....

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2 .....

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[4]

(d) Graphic products are often manufactured using a Just-in-Time (JIT) system.
Explain **two** benefits of a JIT system.

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[4]

(e) (i) State a **suitable specific material** for the Estate Agent's sign shown in Fig. 5.
Give **two** properties or characteristics that make the material suitable for this use.

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Question 4(e)(ii) begins on page 19

(ii) Describe, in detail, how the lettering would be printed onto a batch of 150 signs.
Include details of all pre-press stages.
Use a flow chart and/or annotated diagrams to support your answer. **[9]**

Question 4(f) begins on page 20

(f) Discuss the implications to manufacturers in the graphics industry, of ensuring that their products are safe to use.

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Question 4 Total [36]

5 Manufacturing

Fig. 6 shows parts of an adjustable shelving system.

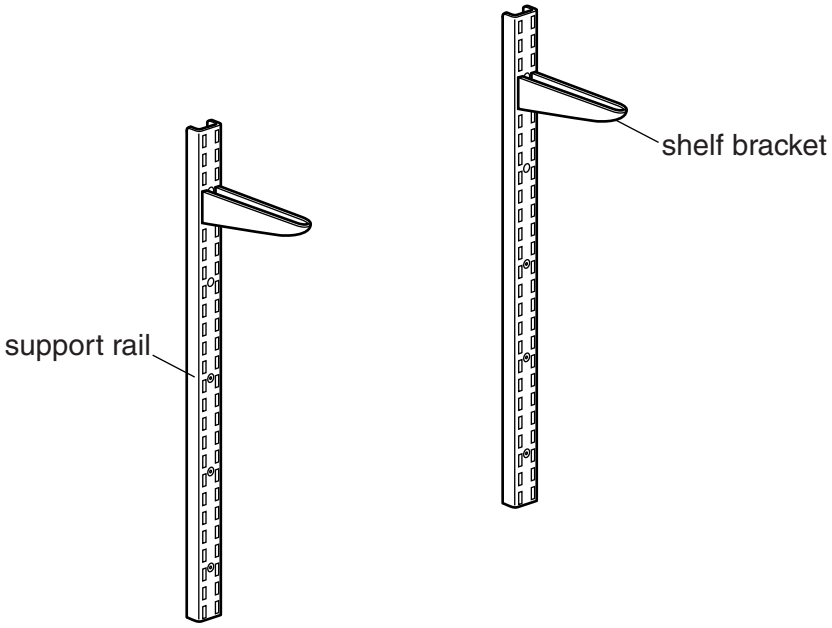

Fig. 6

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

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[4]

(b) Describe **two** quality control checks that should be carried out during the manufacture of a shelving system of the type shown in Fig. 6

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[4]

(c) Describe, using **two** examples, how a manufactured product can be designed to be more 'environmentally friendly'.

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[4]

(d) Manufactured products are often produced using a Just-in-Time (JIT) system.
Explain **two** benefits of a JIT system.

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[4]

(e) Fig. 7 shows one of the support rails shown in Fig. 6.

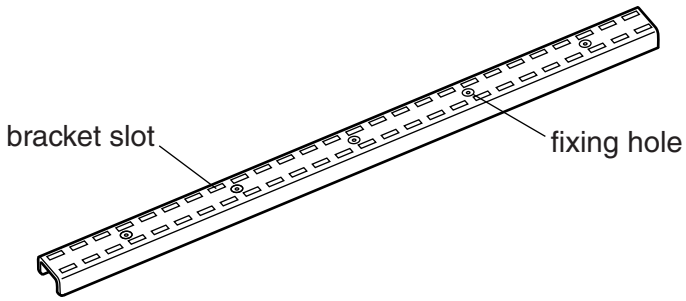

Fig. 7

(i) State a **suitable specific material** for the support rail.
Give **two** properties or characteristics that make the material suitable for this use.

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(ii) Describe, in detail, how the support rail would be manufactured as a batch of 50 000.
Include details of specialist tools and equipment used.
Use a flow chart and/or annotated diagrams to support your answer. **[9]**

Question 5(f) begins on page 25

(f) Discuss the implications to the manufacturing industry, of ensuring that their products are safe to use.

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Question 5 Total [36]

6 Resistant materials

Fig. 8 shows a toy storage unit.

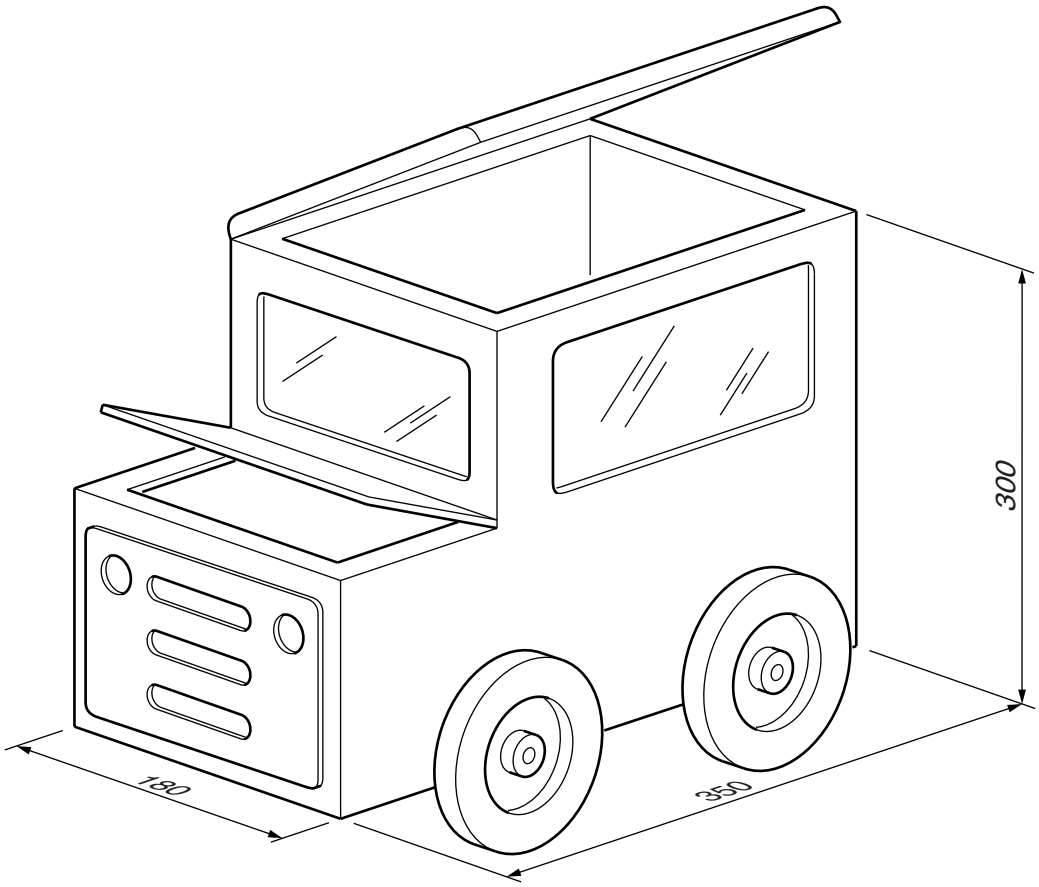

Fig. 8

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

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[4]

(b) Describe **two** quality control checks that should be carried out during the manufacture of a toy storage unit of the type shown in Fig 8.

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[4]

(c) Describe, using **two** examples, how a resistant materials product can be designed to be more 'environmentally friendly'.

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[4]

(d) Toy storage units for children are often manufactured using a Just-in-Time (JIT) system. Explain **two** benefits of a JIT system.

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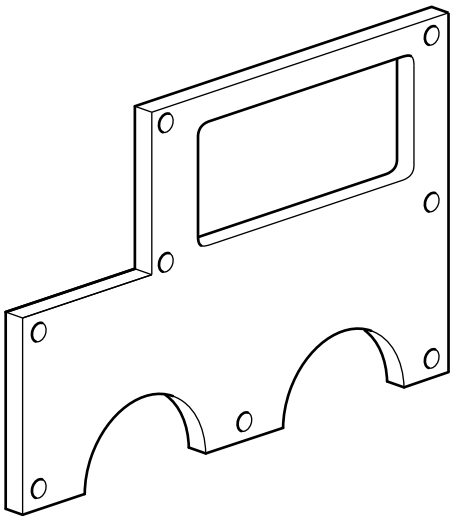
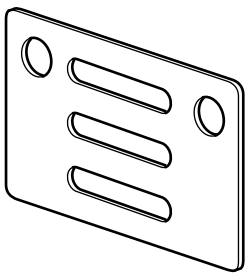
[4]

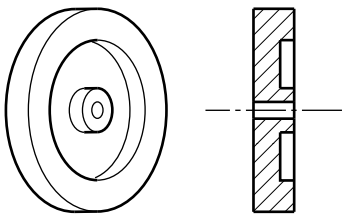
(e) Fig. 9 shows parts of the toy storage unit.



Side 18 mm thick



Grill 1 mm thick



Wheel Ø50 mm

Fig. 9

Choose **one** of the parts shown in Fig. 9.

Chosen part ……..

(i) State a **suitable specific material** for the part that you have chosen.
Give **two** properties or characteristics that make the material suitable for this use.

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

Question 6(e)(ii) begins on page 30

(ii) Describe, in detail, how the part you have chosen would be manufactured as a batch of 2500.
Include details of any jigs or specialist equipment used.
Use a flow chart and/or annotated diagrams to support your answer. **[9]**

Question 6(f) begins on page 31

(f) Discuss the implications to manufacturers using resistant materials, of ensuring that their products are safe to use.

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Question 6 Total [36]

7 Systems and Control

Fig. 10 shows electronic kitchen scales.

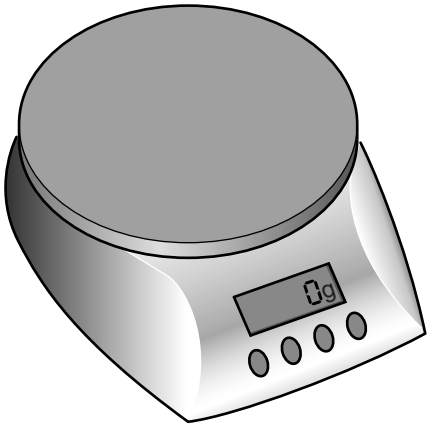

Fig. 10

(a) Give **four** justified design requirements for electronic kitchen scales of the type shown in Fig. 10.

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[4]

(b) Describe **two** quality control checks that should be carried out during the manufacture of electronic kitchen scales of the type shown in Fig. 10.

1 .....

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2 .....

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[4]

(c) Describe, using **two** examples, how a systems and control product can be designed to be more 'environmentally friendly'.

1 .....

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2 .....

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[4]

(d) Electronic kitchen scales may be manufactured using a Just-in-Time (JIT) system.
Explain **two** benefits of a JIT system.

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2 .....

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[4]

(e) (i) Name a **suitable specific sensor** which could be used in electronic kitchen scales to measure weight.
Use a diagram to show how the sensor would be used. **[3]**

Question 7(e)(ii) begins on page 35

(ii) Draw a labelled circuit diagram to show how the signal from the sensor you identified in part **(e)(i)** would be processed to provide a readout of weight on a display of your choice.

[9]

Question 7(f) begins on page 36

(f) Discuss the implications to manufacturers of electrical and mechanical goods, of ensuring that their products are safe to use.

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Question 7 Total [36]

8 Textiles

Fig. 11 shows a shirt.

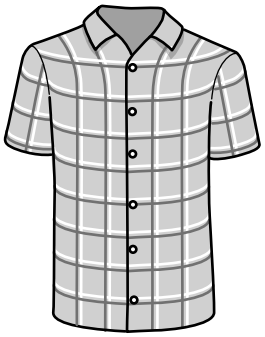

Fig. 11

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

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4 .....

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[4]

(b) Describe **two** quality control checks that should be carried out during the manufacture of a shirt of the type shown in Fig. 11.

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2 .....

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[4]

(c) Describe, using **two** examples, how a textiles product and its manufacture can be made as 'environmentally friendly' as possible.

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2 .....

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[4]

(d) Textiles products are often manufactured using a Just-in-Time (JIT) system.
Explain **two** benefits of a JIT system.

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[4]

(e) **(i)** The shirt shown in Fig. 11 is manufactured in two colour checked linen fabric.
Give **three** performance characteristics of linen fibres that make the fabric suitable for the shirt.

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

(ii) Describe, in detail, how the two colour checked linen fabric would be manufactured from raw materials.
Use a flow chart and /or annotated diagrams to support your answer. **[9]**

Question 8(f) begins on page 40

(f) Discuss the implications to manufacturers in the textiles industry, of ensuring that their products are safe to use.

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Question 8 Total [36]

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