

A-level

DESIGN AND TECHNOLOGY PRODUCT DESIGN (3-D DESIGN)

Unit 3 Design and Manufacture

Friday 10 June 2016

Morning

Time allowed: 2 hours

Materials

For this paper you must have:

- an AQA 12-page unlined answer book, which is provided separately
- normal writing and drawing instruments.

Instructions

- Use black ink or black ball-point pen. Use pencil and coloured pencils only for drawing.
- Write the information required on the front of your answer book. The **Paper Reference** is PROD3.
- Answer **three** questions.
- Answer **one** question from **each** of Sections 1 and 2 and **one other** question from **either** section.
- If you choose to answer a question which has several parts, you should answer **all** parts of the question.
- Do all rough work in your answer book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 84.
- There are 28 marks for each question.
- You will be marked on your ability to:
 - use good English
 - organise information clearly
 - use specialist vocabulary where appropriate.

Advice

- Illustrate your answers with sketches and/or diagrams wherever you feel it is appropriate.

Answer **three** questions.

Answer **one** question from each of Sections 1 and 2 and **one** other question from either Section.

For each question that you answer, you should answer **all** parts of that question.

Section 1

Question 1 Answer both parts of this question.

0	1
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Explain when and why a designer and/or manufacturer may use each of the following communication methods in the design process.

- Sectional views
- 3D Computer Aided Design (CAD) renderings
- Exploded views
- Scale 1:10 model

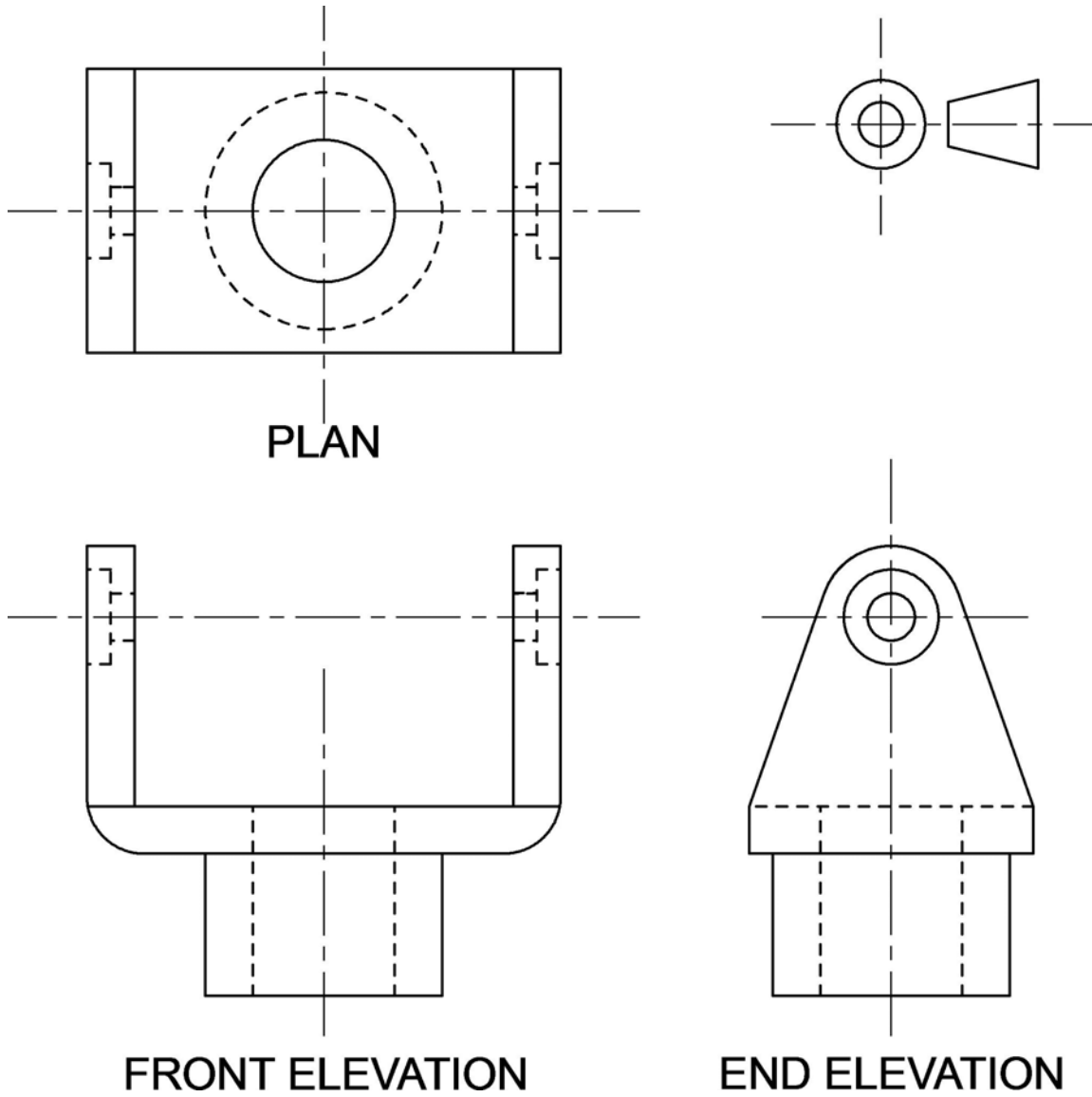
[4 x 5 marks]

0 2

Produce a 3D sketch of the product shown in **Figure 1** below.

[8 marks]

Figure 1



Turn over ►

Question 2 Answer both parts of this question.

0 3

Figures 2 and 3 show a chair.

It is a single part injection moulded replica of a design by Verner Panton.

Describe in detail the procedure for forming a one-off prototype of the same product from a fibre composite material.

In your answer you should refer to:

- the specific composite material used
- how the chair is manufactured
- how reinforcement of the chair is achieved
- how a gloss finish is achieved.

[16 marks]

Figure 2



Figure 3



0 4

Some examples of socio-economic change are listed below:

- availability and use of resources
- changes in legislation
- the impact of conflict
- technological developments.

With reference to designer(s) or design movement(s) of your choice, explain how specific products have been influenced by socio-economic change.

[12 marks]

Question 3 Answer both parts of this question.

0	5
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Using annotated diagrams, describe **one** simple workshop test for toughness and **one** simple workshop test for hardness.

In your answer you should refer to:

- a definition of the property being tested
- how to make the test fair
- what will be measured
- how the results for different materials will be compared.

[2 x 8 marks]

0	6
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Using specific examples, explain how Computer Aided Design (CAD) software can be used to test a product before it is manufactured.

In your answer you may wish to refer to:

- material properties
- manufacturing methods
- components and assembly
- aesthetics.

[12 marks]

Turn over for Section 2

Turn over ►

Section 2

Question 4 Answer both parts of this question.

0	7
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Figures 4 and 5 show two fences, each with an applied finish.

Using diagrams where appropriate, describe the method of application for each finish.

Explain why the finish is suitable.

[2 x 8 marks]

Figure 4 Galvanised school fence



Figure 5 Pressure treated wooden garden fence



0	8
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Figure 6 shows a toothbrush.

Using diagrams where appropriate, critically evaluate the aesthetic and ergonomic features of the toothbrush.

[12 marks]

Figure 6



Question 5 Answer both parts of this question.

0 9

Using diagrams where appropriate, describe each of the permanent joining methods below.

Explain why each method is suitable for the application given.

- Metal Inert Gas (MIG) welding: mild steel chair frame
- soldering: Printed Circuit Boards (PCBs)

[2 x 8 marks]

1 0

Explain the benefits of temporary fabrication in flat pack furniture.

In your answer you should refer to:

- the consumer
- the manufacturer
- the use of specific knock down fittings.

[12 marks]

Question 6 Answer both parts of this question.

1 1

Using specific examples, explain how motor vehicle design and manufacture are influenced by the finite availability of crude oil.

[14 marks]

1 2

Describe how a range of smart materials can be used to reduce energy consumption and/or improve product safety.

You should refer to different products in your answer.

[14 marks]

END OF QUESTIONS

There are no questions printed on this page

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