

**ADVANCED SUBSIDIARY GCE
DESIGN AND TECHNOLOGY**

Unit 3: Product Design 1

2520/02

QUESTION BOOKLET

This question booklet is to be retained in the Centre.

**Thursday 8 January 2009
Morning**

Duration: 48 minutes



INSTRUCTIONS TO CANDIDATES

- You are required to answer **two** questions only.
- Write your answers in the 2520/02 answer booklet.

INFORMATION FOR CANDIDATES

- This document consists of **8** pages. Any blank pages are indicated.

- 1** Fig. 1 shows a pepper mill made from a hardwood.

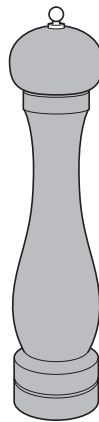


Fig. 1

- (a) (i)** Name **two** suitable hardwoods for the pepper mill shown in Fig. 1. **[2]**
- (ii)** State **two** design constraints that a designer would have to consider when designing a pepper mill. **[2]**
- (b)** The pepper mill in Fig. 1 is produced in batches of 10,000 using CAD/CAM. Describe in detail the process of manufacturing the pepper mill using CAD/CAM. Use sketches where appropriate. **[8]**
- (c)** Discuss the sustainability issues associated with wooden products. **[6]**

2 Fig. 2 shows a bicycle lock made from high carbon steel and aluminium alloy.

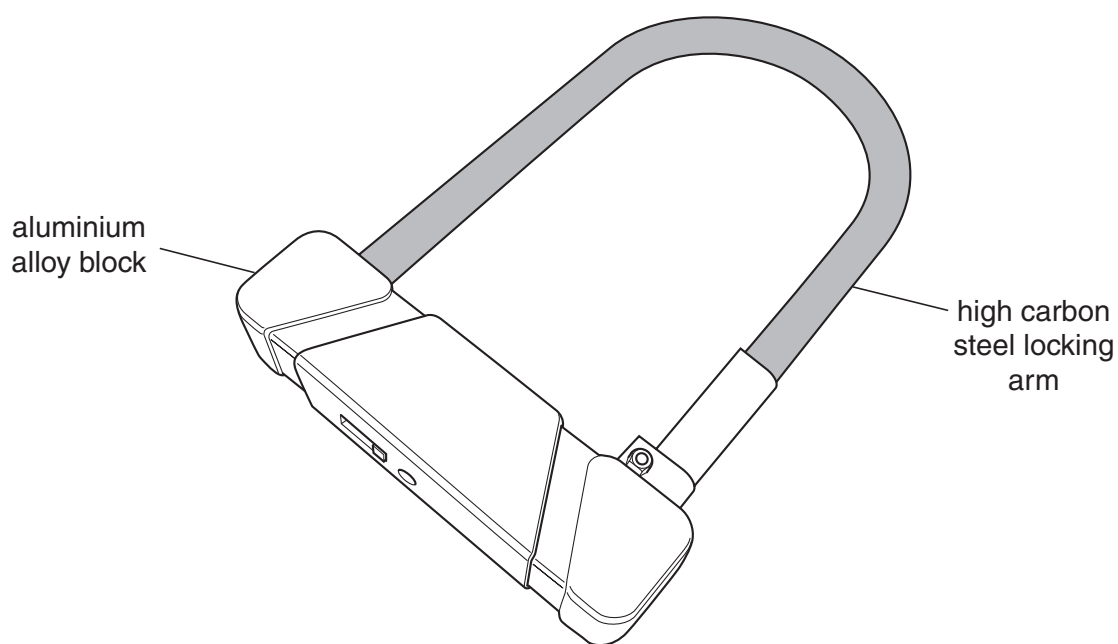


Fig. 2

- (a) (i) State **two** properties of high carbon steel. [2]
- (ii) Give **one** reason why aluminium alloy has been used for the block rather than high carbon steel. [2]
- (b) The locking arm is manufactured from 10 mm diameter high carbon steel bar.

Describe in detail the process of making the locking arm in a school workshop. Use sketches where appropriate. [8]

- (c) Discuss the implications of using modern high performance materials in products. [6]

3 Fig. 3 shows a child's play slide.

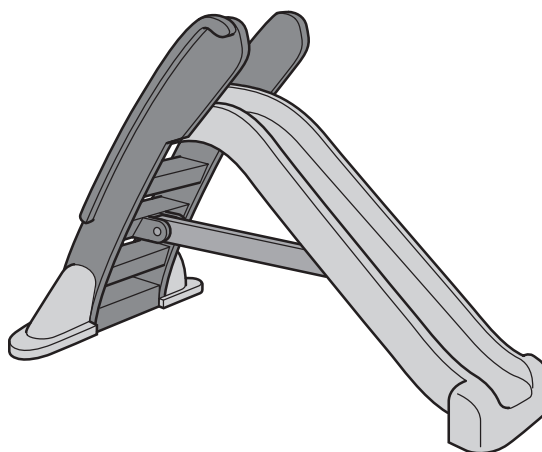


Fig. 3

- (a) (i) Give **two** reasons why thermoplastics are suitable for the play slide shown in Fig. 3. [2]
- (ii) Name **two** thermoplastics for the play slide shown in Fig. 3. [2]
- (b) Describe in detail the process of injection moulding one part of the play slide.
Use sketches where appropriate. [8]
- (c) Discuss the extent to which international safety standards influence the design of products. [6]

- 4 Fig. 4 shows a pen. The body of the pen is made from recycled paper.



Fig. 4

- (a) (i) Give **two** benefits of using recycled paper for the body of a pen. [2]
- (ii) State **one** commercial printing method that could be used to print the text on the pen. Give a reason for your choice. [2]

- (b) The text for the pen could be produced using a computer controlled vinyl cutter.

Describe in detail the process by which the text could be produced using a computer controlled vinyl cutter and then applied to the pen.

Use sketches where appropriate. [8]

- (c) Discuss the value of ethical design to manufacturers. [6]

- 5 Fig. 5 shows an external sign used by an estate agent.



Fig. 5

- (a) (i) Name **two** suitable materials for the external sign shown in Fig. 5. [2]
- (ii) Give **two** reasons for your choice of materials in (a)(i) above. [2]
- (b) Estate agents' signs are often produced using the screen printing process.
- Describe in detail the process of screen printing.
- Use sketches where appropriate. [8]
- (c) Discuss the extent to which computer design software has changed the work of graphic designers. [6]

6 Fig. 6 shows a child's play-suit.



Fig. 6

- (a) (i) Name **one** suitable fabric for a child's play-suit. [1]
- (ii) Give **one** reason for your choice. [1]
- (b) Give **two** safety features that should be considered when designing a child's play-suit. [2]
- (c) The design on the front of the child's play-suit has been produced by transfer printing.
- Describe in detail the process of transfer printing the design onto the front of the child's play-suit.
- Use sketches where appropriate. [8]
- (d) Discuss the factors that influence the choice of fabric when designing garments. [6]

7 Fig. 7 shows a mattress with a quilted mattress cover.

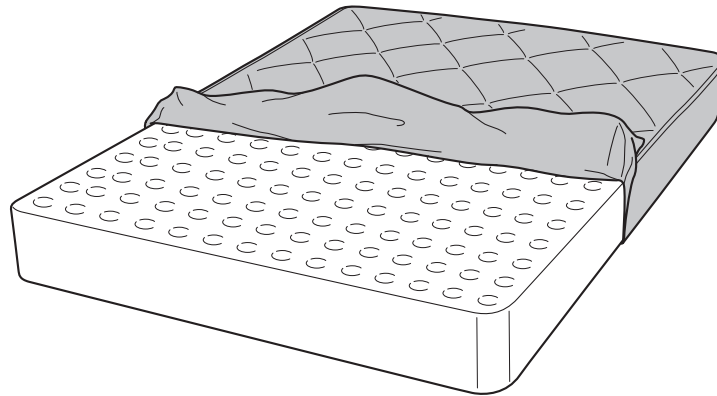


Fig. 7

- (a) (i) Give **two** performance characteristics of the fabric used for the mattress cover. [2]
- (ii) Explain why quilting is a suitable technique for the mattress cover. [2]
- (b) Calendering has been used to produce the sheen on the mattress fabric.
Describe in detail the process of calendering.
Use sketches where appropriate. [8]
- (c) Discuss the implications to textile manufacturers of consumer protection legislation. [6]

