

X211/201

NATIONAL
QUALIFICATIONS
2009

FRIDAY, 22 MAY
1.00 PM – 2.30 PM

PRODUCT DESIGN
INTERMEDIATE 2

50 marks are allocated to this paper.

Where appropriate you may use sketches to illustrate your answer.

Within each question, marks will not be awarded for repetition.



Attempt all questions

SECTION A

1. A mass produced wooden training bicycle for a 2–4 year old child is shown below.



- (a) (i) State a suitable material for the tyres and state a reason why this material is suitable. 2
- (ii) State **two** reasons why beech plywood is a suitable material for the frame of the bicycle. 2
- (iii) State a suitable process for manufacturing the plywood parts of the frame and state a reason why this process is suitable. 2
- (iv) State a suitable clear finish for the frame and state a reason why a clear finish would be applied. 2
- (b) Describe **two** ways in which the design of the training bicycle shown above has been influenced by each of the following ergonomic aspects:
- (i) anthropometrics; 2
- (ii) physiology; 2
- (iii) psychology. 2
- (c) Describe **two** ways in which the design of the training bicycle shown above has been influenced by each of the following design issues:
- (i) function; 2
- (ii) safety; 2
- (iii) contrast. 2
- (Note: different descriptions should be given for each issue.)

Total for Section A (20)

SECTION B

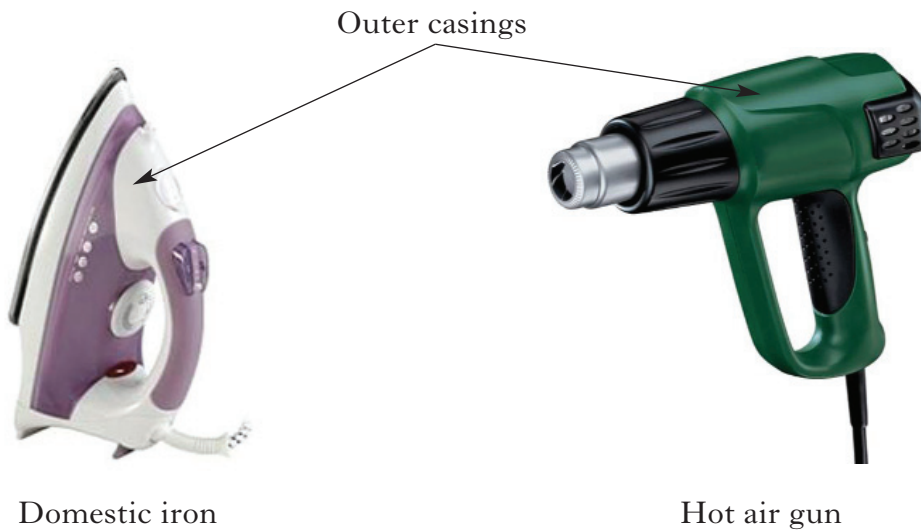
2. A pocket multi-tool manufactured from stainless steel is shown below.



- (a) With reference to the above multi-tool, describe the difference between *primary* and *secondary functions*. 2
- (b) Describe a technique that could be used to evaluate the *ease of use* of the multi-tool. 2
- (c) Describe the *aesthetic* qualities of the multi-tool. 2
- (d) State **two** reasons why the designer has chosen stainless steel for this product. 2
- (e) State **two** methods of applying a coloured finish to the handles. 2
- (10)

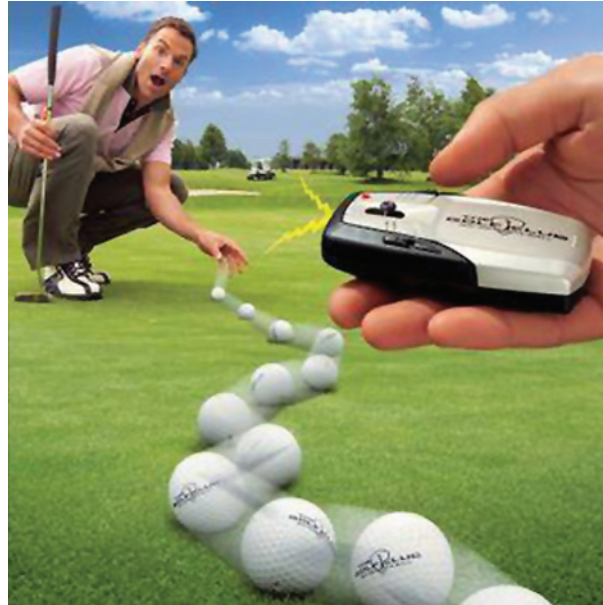
[Turn over

3. The outer casings of the two products shown below have been injection moulded.



- (a) (i) State **three** features which would confirm that injection moulding is the manufacturing process used for the outer casings. 3
- (ii) State **two** advantages to the manufacturer of using injection moulding to produce the outer casings. 2
- (b) State how the designer could find out the correct sizes for the handles of the two products **without** referring to anthropometric data tables. 1
- Both products were designed with *planned obsolescence*.
- (c) (i) State an advantage of planned obsolescence to the manufacturer. 1
- (ii) State **two** reasons why planned obsolescence is harmful to the environment. 2
- (9)**

4. A team of designers have developed a design proposal for a remote controlled golf ball.

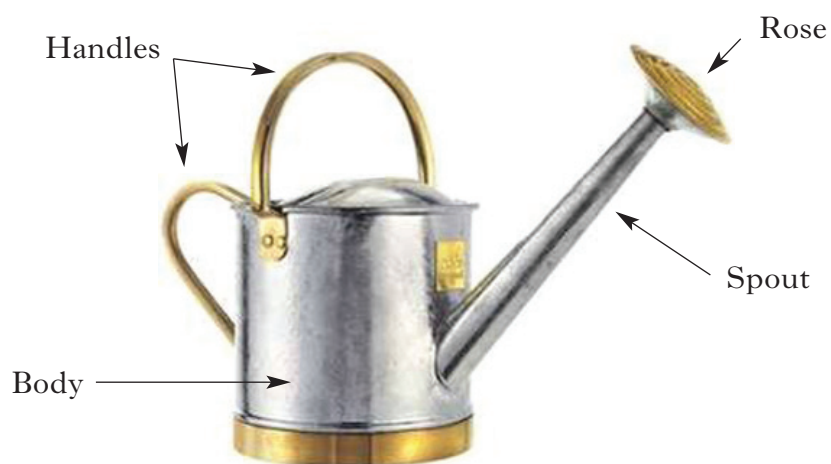


The designers want to protect their *intellectual property rights*.

- (a) (i) Explain the term intellectual property rights. 1
- (ii) Describe **two** ways in which the designers could protect their intellectual property rights. 2
- (b) **Before** going into production, describe how the designers could find out if the remote controlled golf ball was going to be a popular product. 2
- (5)**

[Turn over for Question 5 on Page six

5. A traditional watering can is shown below.



The watering can is made from galvanised mild steel and brass.

- (a) (i) State a functional reason for galvanising the mild steel. 1
- (ii) State **two** suitable methods of joining the handles to the body of the watering can. 2

Modern styles of watering can are usually manufactured from thermoplastics.

- (b) State **three** advantages for the consumer of using thermoplastics for this type of product. 3
- (6)**

Total for Section B (30)

[END OF QUESTION PAPER]

ACKNOWLEDGEMENTS

Section B Question 2—Picture of a Gerber multi-tool is reproduced by kind permission of Silva Ltd.

Section B Question 4—Picture of a Silverlit *Golf Club* is reproduced by kind permission of Silverlit Toys Manufactory Ltd.

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