

# X211/201

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NATIONAL  
QUALIFICATIONS  
2011

TUESDAY, 17 MAY  
1.00 PM – 2.30 PM

PRODUCT DESIGN  
INTERMEDIATE 2

50 marks are allocated to this paper.

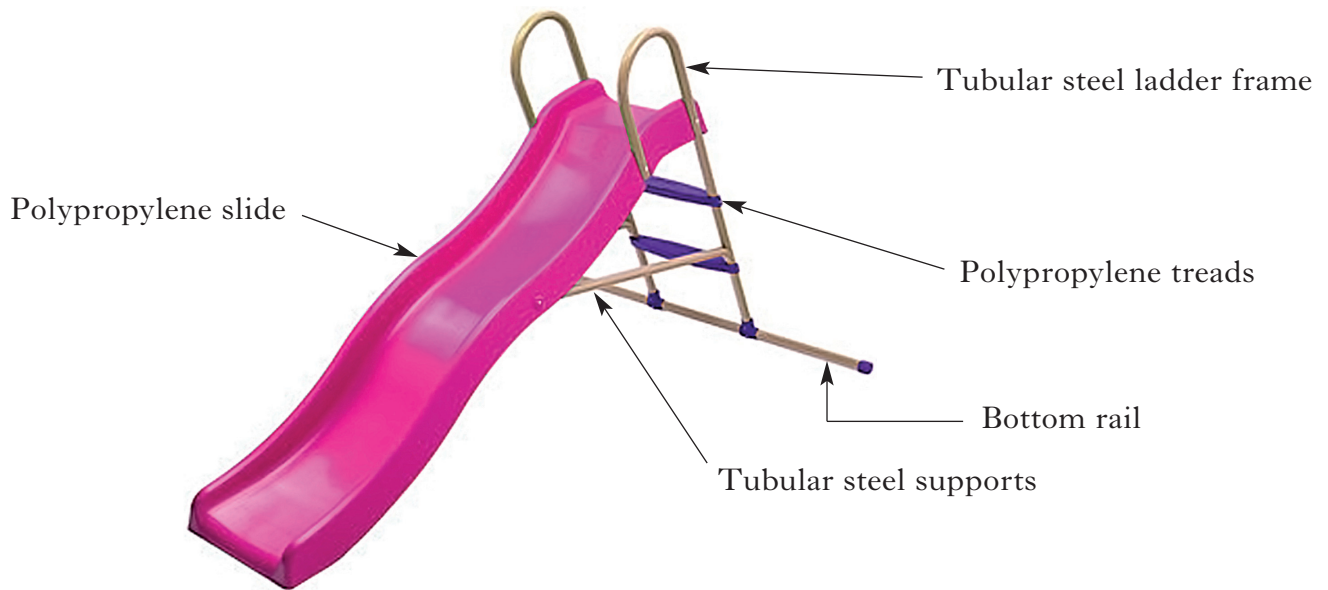
Where appropriate you may use sketches to illustrate your answer.

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



SECTION A

1. A child's activity toy is shown below.



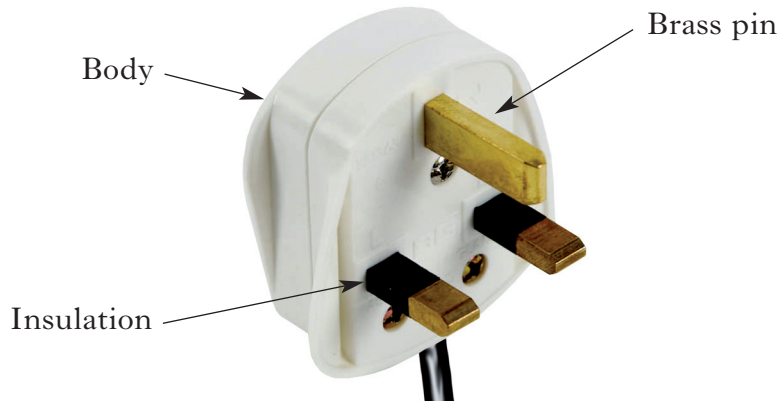
- (a) (i) State **two** reasons why polypropylene is a suitable material for the slide. 2
- (ii) State **two** reasons why steel tube is a suitable material for the frame of the ladder. 2
- (iii) State a suitable finish for the frame of the ladder and state a reason why this finish is appropriate. 2
- (iv) State a suitable method of fixing the tubular steel supports to the polypropylene slide and state a reason why this fixing method is appropriate. 2
- (b) Describe **two** ways in which the design of the activity toy 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 activity toy shown above has been influenced by each of the following design issues:
- (Note: different descriptions should be given for each design issue.)
- (i) safety; 2
- (ii) durability; 2
- (iii) contrast. 2

**Total for Section A (20)**

**SECTION B**

*Marks*

2. A three pin electrical plug is shown below.



- (a) (i) The alloy used to make the pins of the plug is brass.  
State the name of **two** other metal alloys. 2
- (ii) The symbol shown below can be found on the electrical plug.

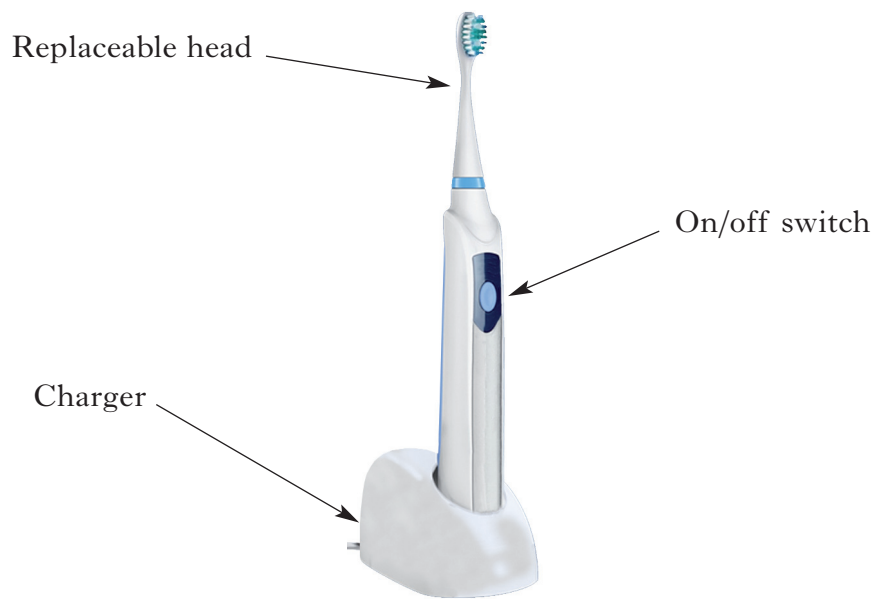


State the purpose of this symbol. 1

- (b) Portable electric tools can use either battery or mains power.
- (i) Explain the advantages of using battery power. 2
- (ii) Explain the advantages of using mains power. 2
- (7)**

**[Turn over**

3. An electric toothbrush with mains charger is shown below.



The manufacturer wishes to carry out an evaluation of the electric toothbrush.

Describe how the following methods could be used to evaluate aspects of the electric toothbrush:

*(Note: a different aspect must be used for each method.)*

- |                 |            |
|-----------------|------------|
| (a) User trial; | 2          |
| (b) Test rig;   | 2          |
| (c) Survey.     | 2          |
|                 | <b>(6)</b> |

4. A selection of plastic trays from the inside of chocolate boxes is shown below.



- (a) The plastic trays have been manufactured by vacuum forming.

Explain **why** the following features are found on vacuum formed products:

- (i) thinning;
- (ii) rounded internal corners;
- (iii) tapered surfaces.

3

*(Sketches may be used to illustrate your answers.)*

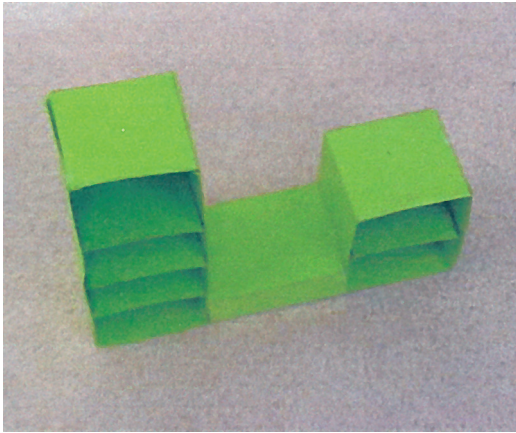
- (b) The plastic trays are made from a thermoplastic.

Describe the main differences between thermoplastics and thermosetting plastics.

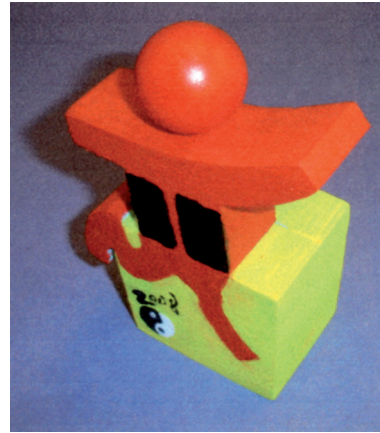
2

**(5)****[Turn over**

5. Designers make use of modelling at various stages of the design process. Four types of model are shown below.



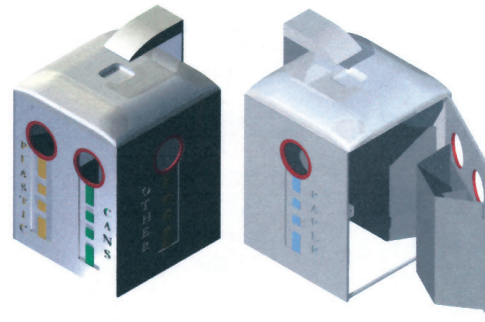
A Sketch model made from card



B Block model made from styrofoam



C Rapid prototype



D CAD model

For each type of model shown, state:

- (a) the stage in the design process when it would be used; and  
(b) the **advantages** to be gained by modelling at that stage.

4

4

(8)

6. Children's cutlery is shown below.



During the design of children's cutlery, the designer would consider the following areas:

*Ergonomics*

*Safety*

*Aesthetics*

*Materials.*

Explain why **each** of these areas is important in the design of children's cutlery. (4)

**Total for Section B (30)**

[END OF QUESTION PAPER]

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