

General Certificate of Education
June 2007
Advanced Subsidiary Examination



DESIGN AND TECHNOLOGY: PRODUCT DESIGN PD1D
(3-D DESIGN)
Unit 1 Materials and Components

Tuesday 5 June 2007 9.00 am to 10.30 am

For this paper you must have:

- an unlined answer book (7024) which is provided separately
- normal writing and drawing instruments
- a colour Insert Sheet (enclosed).

Time allowed: 1 hour 30 minutes

Instructions

- Use blue or black ink or ball-point pen. Use pencil and coloured pencils only for drawing.
- Write the information required on the front of your answer book. The *Examining Body* for this paper is AQA. The *Paper Reference* is PD1D.
- Answer **three** questions.
Answer Question 1 and **two** other questions.
- Use the Insert Sheet included to help you answer Questions 1, 2 and 4.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 100.
Four of these marks will be awarded for using good English, organising information clearly and using specialist vocabulary where appropriate.
- There are 40 marks for Question 1 and 28 for each of Questions 2 to 4.

Advice

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

Answer Question 1.

- 1 (a) Study the photographs on the Insert Sheet provided (**Figures 1–3**).

Choose **two** products from the list below and answer the following questions.

- Metal torch (**Figure 1**)
- Wooden table (**Figure 2**)
- Plastic piggy bank (**Figure 3**)

- (i) Stating the **two** chosen products, name a suitable specific material used in their manufacture. *(2 × 2 marks)*
- (ii) Explain in detail what properties make the materials suitable for each of these **two** chosen products. *(2 × 6 marks)*
- (b) Using notes and diagrams, explain how **two** of the products listed in part (a) above are manufactured. *(2 × 9 marks)*
- (c) Jigs and fixtures are often used in industry to ensure accuracy and repeatability. Describe an example of where jigs and fixtures might be used in the manufacture of the UPVC window frame pictured in **Figure 4** on the Insert Sheet. *(6 marks)*

Answer any **two** questions from 2, 3 and 4.

2 Study the photograph of the games controller (**Figure 5**) on the Insert Sheet.

- (a) The casing of the games controller is made from Acrylonitrile Butadiene Styrene (A.B.S.). Explain in detail why this material is suitable. *(6 marks)*
- (b) Use notes and diagrams to describe in detail the injection moulding process. *(10 marks)*
- (c) Explain in detail why the injection moulding process is suitable for the manufacture of the games controller. *(6 marks)*
- (d) The casing is made up of two halves. Use notes and diagrams to describe in detail how the two halves of the casing could be joined together. *(6 marks)*

3 For each of the following materials, explain why they are suitable for the product listed.

| Material | Product |
|---------------------------------------|---------------------|
| (i) Expanded polystyrene (E.P.S.) | Cycle helmets |
| (ii) Stainless steel sheet | Electric kettle |
| (iii) Mild steel sheet | Car body panels |
| (iv) Chipboard | Flat-pack furniture |
| (v) Aluminium | Alloy wheels |
| (vi) High Impact Polystyrene (H.I.Ps) | Blister packaging |
| (vii) Beech | Kitchen utensils |

(7 × 4 marks)

Turn over for the next question

Turn over ▶

-
- 4 Study the CAD (Computer Aided Design) drawing in **Figure 6** on the Insert Sheet which shows a concept design for a child's electronic drawing toy.
- (a) Name a specific material that could be used to make a 3-D block model of the design. *(2 marks)*
 - (b) Explain in detail why this specific material is suitable. *(6 marks)*
 - (c) Use notes and diagrams to explain in detail how the 3-D block model could be made. *(10 marks)*
 - (d) Explain in detail how the 3-D block model could be finished to a high standard. *(5 marks)*
 - (e) Describe the health and safety precautions you would take when making and finishing the 3-D block model. *(5 marks)*

END OF QUESTIONS

Insert

For use with Questions 1, 2 and 4.

Figure 1 Metal torch



Figure 2 Wooden table



Figure 3 Plastic piggy bank

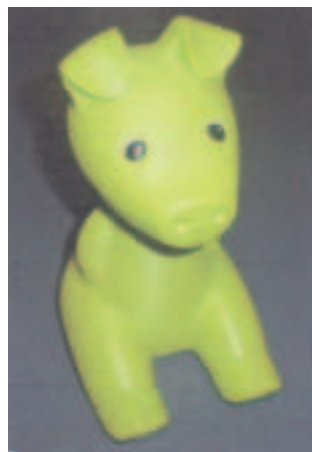


Figure 4 UPVC window frame



Figure 5 Games controller



Figure 6 CAD drawing of child's electronic drawing toy

