

Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE
General Certificate of Secondary Education



CYD-BWYLLGOR ADDYSG CYMRU
Tystysgrif Gyffredinol Addysg Uwchradd

273/02

**GCSE
DESIGN AND TECHNOLOGY**

SHORT COURSE

FOCUS AREA: SYSTEMS AND CONTROL TECHNOLOGY

(Higher Tier - Grades D to A*)

P.M. TUESDAY, 5 June 2007

(1 Hour)

	Leave Blank
Question 1	
Question 2	
Question 3	
Question 4	
TOTAL MARK	

ADDITIONAL MATERIALS

You will need basic drawing equipment and coloured pencils for this examination.

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. Where the space is not sufficient for your answer, continue the answer at the back of the book, taking care to number the continuation correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

No certificate will be awarded to a candidate detected in any unfair practice during the examination.

Answer all questions in the spaces provided.

1. (a) A designer needs to carry out research before designing a new toy for a three-year-old child.



Some research activities are shown in the table below. Complete the table by stating what important information can be found from these activities. *One example has been done for you.* 3 × [2]

Research Activity	Outcomes of research
Talk to a three-year-old child	<i>To establish the types of activities that are popular with three-year-olds.</i>
Look at anthropometric data
Read a book on child development
Look at a materials properties website

(b) Give **three** safety concerns that a parent may have when buying a toy. 3 × [1]

Concern 1:

.....

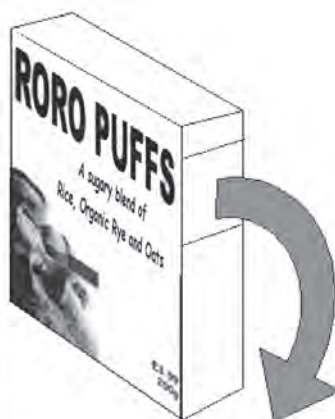
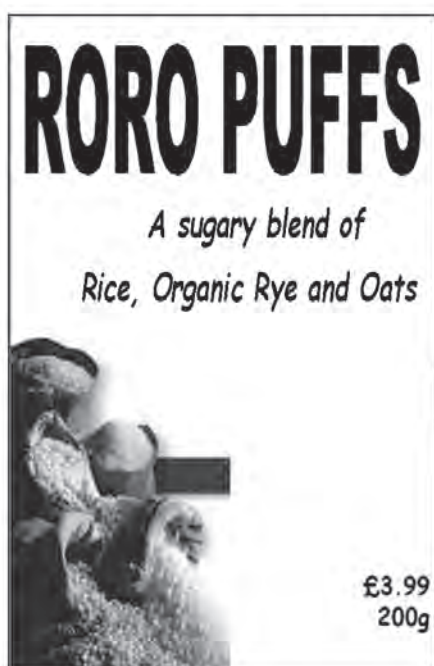
Concern 2:

.....

Concern 3:

.....

2. Sales of the breakfast cereal shown below are falling.



Ingredients: Rice, rye, oats, honey, sugar, salt.			
	Guideline daily amount	Each serving with milk	% guideline daily amount
Calories	2000kcal	170kcal	8%
Sugar	90g	27.8g	30%
Salt	6g	0.8g	14%
Saturated fat	20g	2.4g	12%
Fat	70g	4.0g	6%

- (a) Study the pictures shown and give **two** reasons why you think sales of this cereal have fallen. 2 × [2]




Reason 1:

.....

Reason 2:

.....

(b) The pictures below show three kettles.

			
Kettle	A	B	C
Cost	£4.99	£19.99	£37.99
Materials	White Plastic	Stainless Steel	Thermochromic Plastic
Where made	China	Europe	UK
Water capacity	1.5 Litres	1 Litre	2.3 Litres

- (i) Even though it is expensive, some people would decide to buy kettle C. Give **one** reason for this. [2]

.....
.....

- (ii) Give **two** reasons why kettle A can be sold at this price. $2 \times [2]$

Reason 1:

.....

Reason 2:

.....

- (iii) Kettle C uses a thermochromic plastic. Give **two** benefits of using this material. $2 \times [2]$

Benefit 1:

.....

Benefit 2:

.....

3. (a) One part of the design process is called *development*. One development activity might be to consider a range of possible colours for a product. List **three** other activities that are part of development. 3 × [1]

Activity 1:

Activity 2:

Activity 3:

- (b) Name a specific ICT/CAD package and explain how it could be used to help with the development of a new product.

Name of package [1]

Use in development [2]

.....
.....
.....

- (c) For a product of your choice, describe **two** benefits of using CAM (computer aided manufacturing) to make the product. 2 × [1]

Product

Benefit 1:

Benefit 2:

- (d) Describe **two** environmental issues that should be taken into account when *designing* products. 2 × [2]

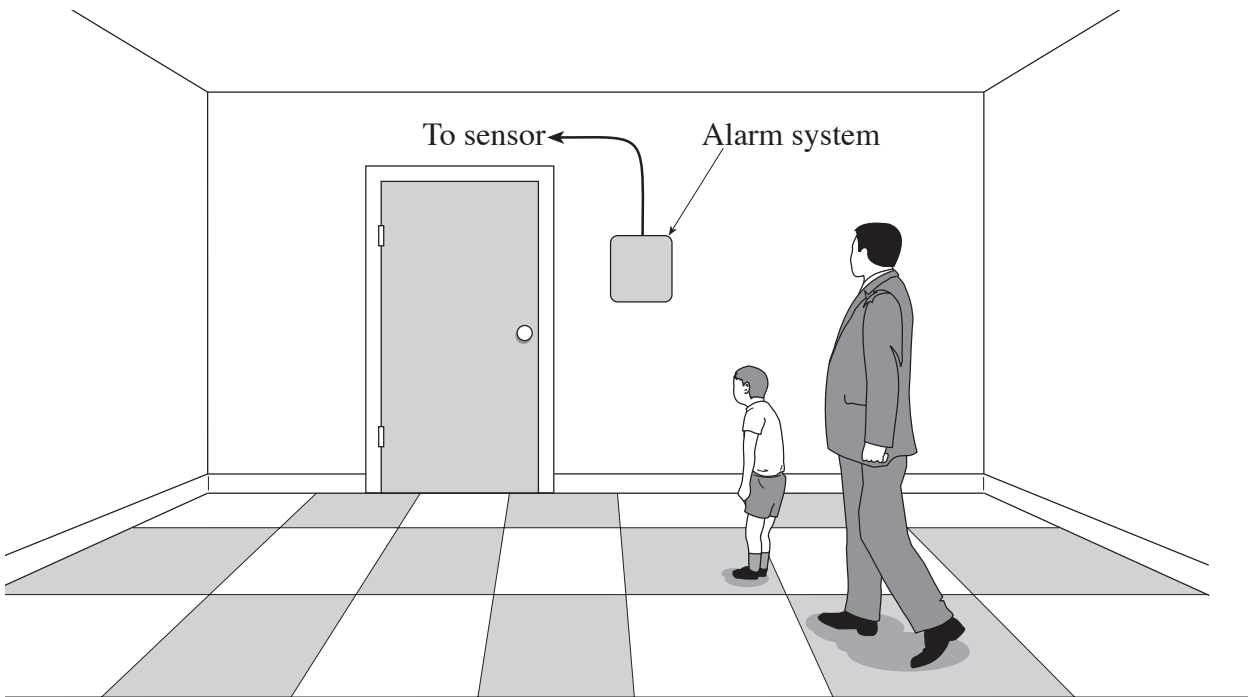
Issue 1:

.....

Issue 2:

.....

4. The owner of a local nursery group has asked you to design a latching alarm system that will warn the nursery teacher that the nursery room door has been opened by a child or other person.



SPECIFICATION

The alarm must:

- warn the teacher that the door has been opened;
- be battery powered;
- latch on until reset;
- be able to be armed and disarmed by the teacher but not by a child in the group;
- be securely cased and fixed in an appropriate position.

Sketch your design in the boxes on the following pages.

Marks will be awarded for:

- | | | |
|-------|--|-----|
| (i) | a clear block diagram based on INPUT, PROCESS and OUTPUT of the control system for the latching alarm; | [4] |
| (ii) | fully labelled details of the electronic circuit used in the alarm; | [6] |
| (iii) | clear details of how the alarm is triggered by the door opening; | [4] |
| (iv) | clear details to show how the system fits into a simple case; | [3] |
| (iv) | details of how the alarm cannot be armed or disarmed by a child; | [2] |
| (v) | quality of communication. | [6] |

(i) Draw a block diagram of your system.

(ii) Draw a labelled circuit diagram of your system.

(iii) Draw details of how the alarm will be triggered when the door is opened.

(iv) Draw designs for a suitable case for the alarm showing how the circuit fits into it and show how the alarm cannot be altered by a child.

