

Centre Number	Candidate Number	Name
---------------	------------------	------

CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**DESIGN AND TECHNOLOGY**

**0445/01**

Paper 1 Common Core

May/June 2003

**1 hour 45 minutes**

Additional Materials:  
A3 Drawing paper  
Standard drawing equipment

**To be taken together with the optional paper for which you have been entered in one session of 2 hours 45 minutes.**

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen in the spaces provided on the Question Paper.  
You may use a soft pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

**Part A**

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

**Part B**

Answer **one** question.

Write or draw your answer on the A3 drawing paper provided.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.  
You may use a calculator.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

**For Examiner's Use**

**Part A**

**Part B**

**Total**

## Part A

Answer **all** questions in the spaces provided.

- 1 Fig. 1 shows a small clock.  
Colour and/or shade the drawing to show that the body is made from an opaque plastic and the dial has a transparent acrylic cover.

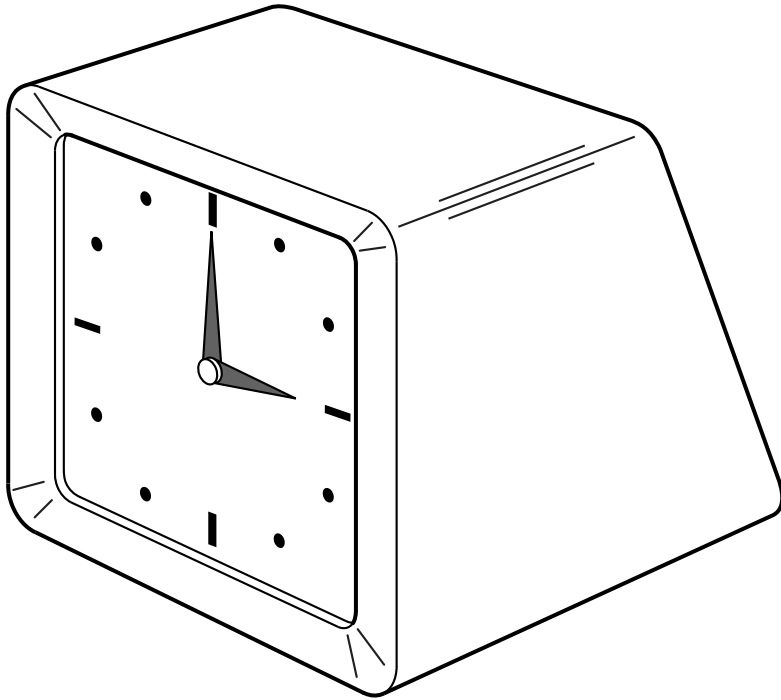


Fig. 1

[6]

2 Fig. 2 shows the drive mechanism on a bicycle.

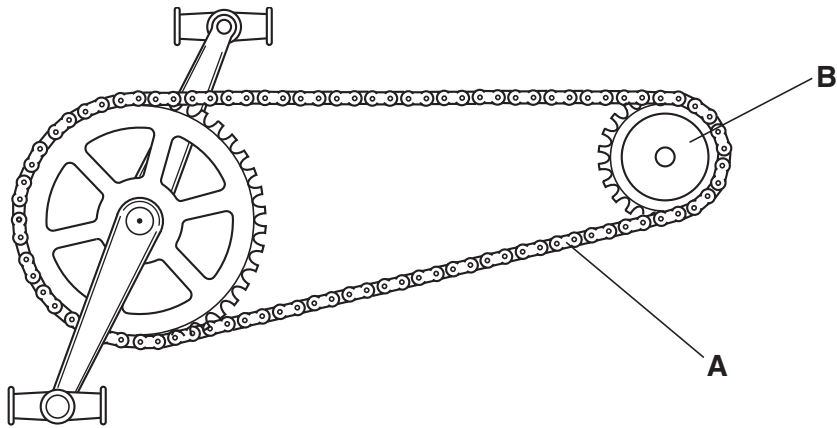


Fig. 2

(a) Name parts **A** and **B**.

**A**..... [1]

**B**..... [1]

(b) Explain why a belt and pulley system would not be such an efficient method.

.....

.....

.....[2]

3 State **one** safety hazard to the operator when using a strip heater to bend acrylic sheet and give a safety precaution to control the risk.

Hazard .....[2]

Safety Precaution .....[2]

4 (a) Explain the difference between ferrous and non-ferrous metals.

.....  
.....  
.....  
.....[2]

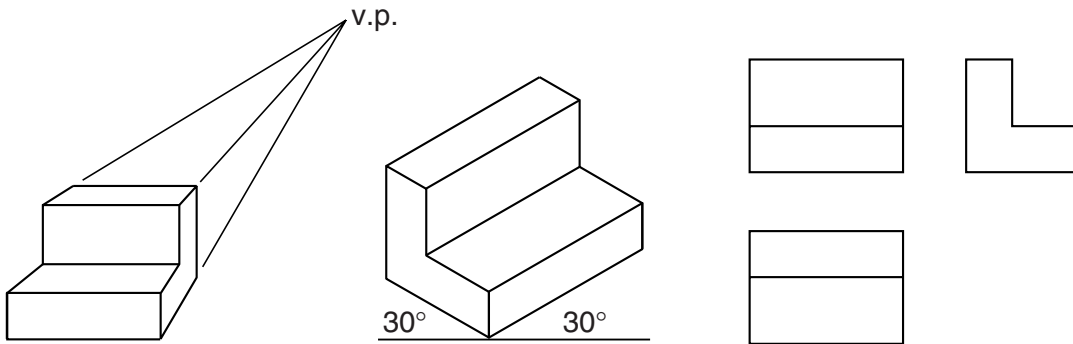
(b) Name **one** ferrous metal.

.....[1]

(c) Name **one** non-ferrous metal.

.....[1]

5 (a) Name the three types of projection shown in Fig. 3.



1 ..... 2 ..... 3 ..... [3]

Fig. 3

(b) Explain why projection type 3 is seen to be the most suitable type of projection for producing working drawings.

.....  
.....[3]

6 (a) Name **two** natural structures.

(1) .....

(2) .....

[1]

(b) Name **two** man-made structures.

(1) .....

(2) .....

[1]

[1]

7 The conversion of energy is not 100% efficient.

(a) Name **two** ways in which energy can be lost during the conversion process.

(1) ..... [1]

(2) ..... [1]

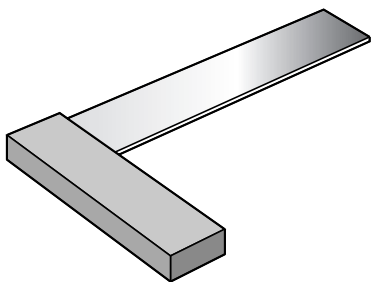
(b) Name **one** fossil fuel.

..... [1]

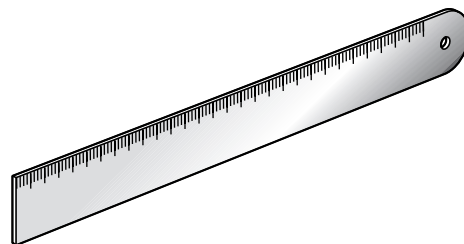
(c) Name **one** renewable energy source.

..... [1]

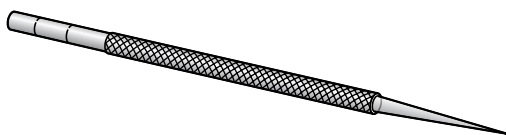
8 Name the four marking out tools shown in Fig. 4.



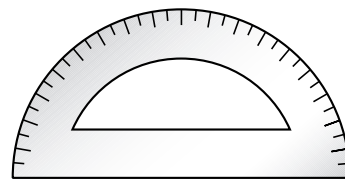
(a) .....



(b) .....



(c) .....



(d) .....

Fig. 4

[4]

9 Describe **one** suitable method that a manufacturer might use to evaluate the prototype of a new product.

.....  
.....  
.....[2]

10 Re-arrange the following production plan into the correct sequence.

- Assembly
- Purchase materials
- Cut to size
- Mark out

Correct sequence:

1 .....

2 .....

3 .....

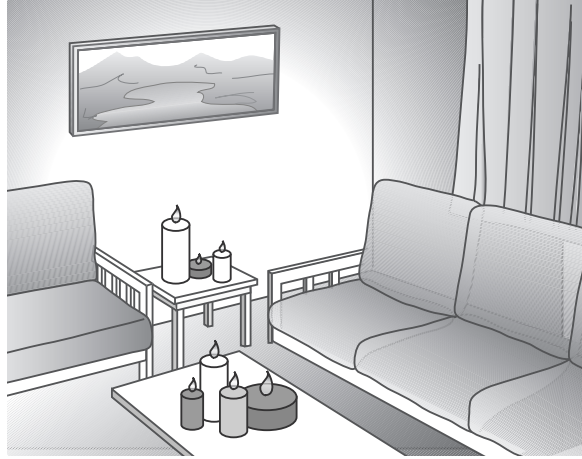
4 .....

[2]

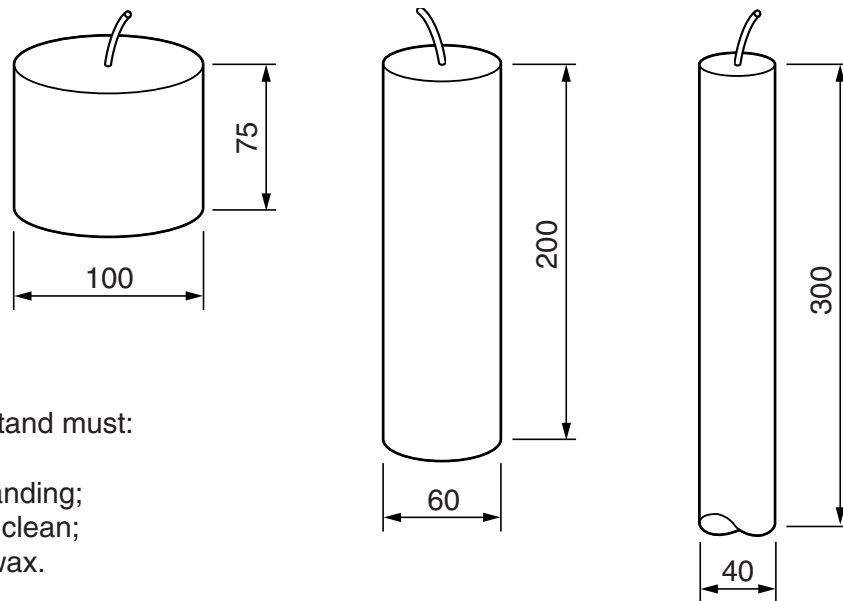
## Part B

Answer **one** question using the A3 paper provided.

11



Candles are popular methods of providing diffused and soft lighting in a room. They can be purchased in many sizes. The candle and holder can often be the centrepiece of a room's decoration. An attractive candle stand to hold any one of the following sized candles would be a popular product.



The candle stand must:

- be safe;
- be floor standing;
- be easy to clean;
- catch the wax.

- (a) List **four** points about the safety of such a product that you consider to be important. [4]
- (b) List **four** points about the appearance of such a product that you consider to be important. [4]
- (c) Develop and sketch ideas for the candle stand. [15]
- (d) Evaluate your ideas and justify why you have chosen one idea to develop more fully. [8]
- (e) Draw, using a method of your own choice, a full solution to your problem. [18]
- (f) Suggest suitable materials for your solution and give reasons for your choice. [4]
- (g) Outline the methods used to manufacture **one** part of your candle stand in a school workshop [7]



'Pet-Safe', a manufacturer of pet cages, is looking for a design for a simple pet carrier to transport small pets.

Your design must:

- be made from one piece of strong corrugated card or corrugated plastic;
- be lightweight;
- be collapsible and fold flat for storage;
- have an integral carrying handle;
- require no gluing or staples for assembly;
- allow adequate air flow to the animal;
- display the company name or logo.

- (a) List **four** points about the function of the pet carrier that you consider to be important. [4]
- (b) Develop and sketch ideas for the pet carrier. [15]
- (c) Evaluate your ideas and justify why you have chosen one idea to develop more fully. [8]
- (d) Draw, using a method of your own choice, a full solution to your problem. [18]
- (e) Explain **two** benefits of using computer aided techniques for designing such a product. [6]
- (f) State **one** method of professionally printing the company name or logo onto your carrier. [2]
- (g) The pet carrier will need to be assembled.  
Outline the steps required to fully assemble your pet carrier. [7]



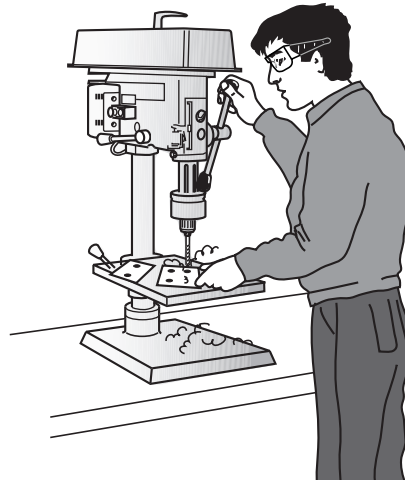


Young children often forget to clean their teeth in the morning or at bedtime. A unit to be placed in the bathroom that would encourage them to clean their teeth would be a good idea.

Your design should:

- encourage teeth cleaning on a regular basis;
- use a battery or mechanical power source;
- have either a visual or sound response to the toothbrush being used;
- be safe.

- (a) List **four** points about the safety of such a unit that you consider to be important. [4]
- (b) List **four** points about the appearance of such a unit that you consider to be important. [4]
- (c) Develop and sketch ideas for the unit. [15]
- (d) Evaluate your ideas and justify why you have chosen one idea to develop more fully. [8]
- (e) Draw, using a method of your own choice, a full solution to your problem. [18]
- (f) Suggest suitable materials for your solution and give reasons for your choice. [4]
- (g) Design a box in which the unit could be packaged for sale. [7]



Drilling small pieces of thin material such as plastic, metal or plywood on a pillar drill can be difficult. Traditional machine vices often do not hold the material firmly and clamping to the drilling table can be time consuming and difficult.

A simple hand held vice or 'gripper' to hold small thin pieces of material would be a good idea.

- (a) List **four** points about the function of such a device that you consider to be important. [4]
- (b) List **four** points about the safety of such a device that you consider to be important. [4]
- (c) Develop and sketch ideas for the device. [15]
- (d) Evaluate your ideas and justify why you have chosen one idea to develop more fully. [8]
- (e) Draw, using a method of your own choice, a full solution to your problem. [18]
- (f) Suggest suitable materials for your solution and give reasons for your choice. [4]
- (g) Outline the methods used to manufacture **one** part of your device in a school workshop. [7]



