

Centre Number	Candidate Number	Name
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**DESIGN AND TECHNOLOGY** **0445/01**

Paper 1 Common Core May/June 2005

**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.

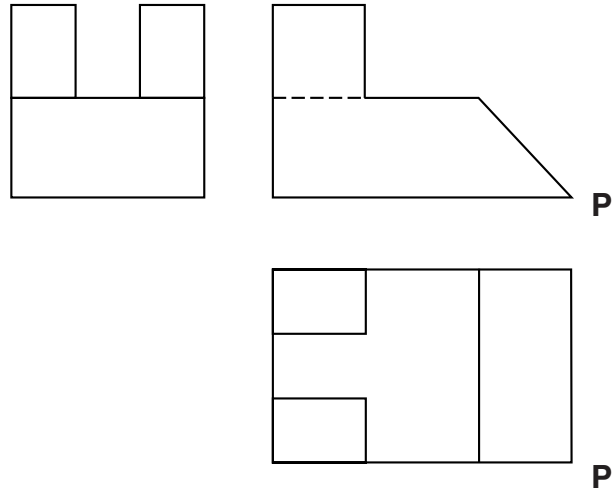
Stick your personal label here, if provided.

For Examiner's Use	
<b>Part A</b>	
<b>Part B</b>	
<b>Total</b>	

## Part A

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

- 1 Fig. 1 shows orthographic drawings of a small metal casting.



**Fig. 1**

Make a freehand isometric view of the casting in the space below.  
Point **P** has been drawn for you.



[5]

2 Safety is an important consideration when using machinery.

(a) State **two** safety hazards when using a wood turning lathe.

(1) .....

(2) ..... [2]

(b) Give the **two** safety precautions that should be taken to remove these hazards.

(1) .....

(2) ..... [2]

3 Complete the table below showing fastenings, materials on which they are used and tools required to fit them.

Fastening	Material	Tool
Nail	Wood	
	Steel	Spanner
Rivet		Rivet set
Screw	Wood	

[4]

4 Sources of energy can be converted into different forms in a variety of ways. Explain how each of the following energy sources could be converted into electricity.

(a) Coal.....

.....[2]

(b) Solar .....

..... [2]

(c) Water power .....

.....[2]

5 Fig.2(a) shows a toothbrush holder and Fig.2(b) a chopping board. Give an appropriate material from which each could be made and the reason for your choice.

(a) Toothbrush holder

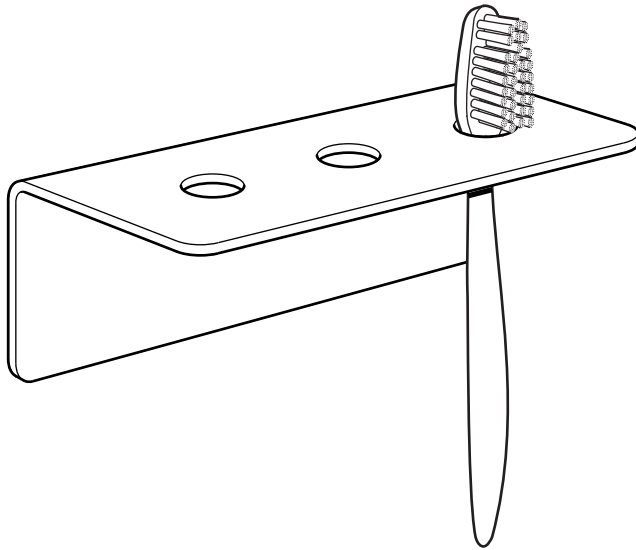


Fig.2(a)

Material ..... [1]

Reason ..... [1]

(b) Chopping board

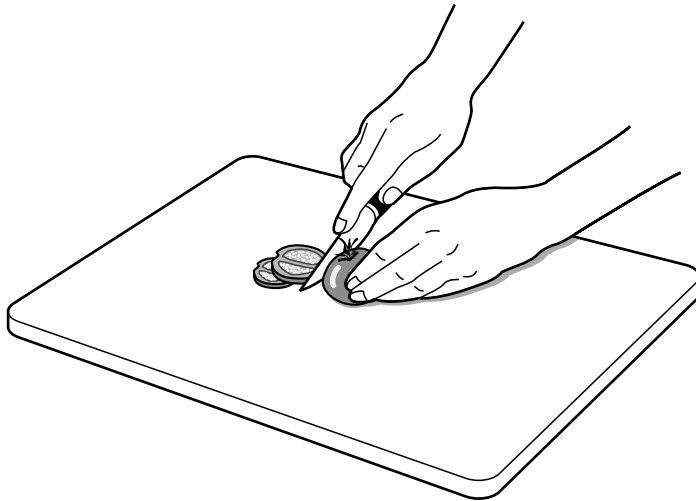


Fig.2(b)

Material ..... [1]

Reason ..... [1]

- 6 Fig. 3 shows a square metal frame with a horizontal force acting on it. Add one additional member to the frame that would prevent it changing shape under these conditions. [2]

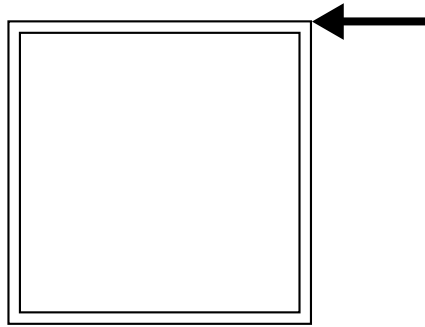


Fig.3

- 7 Fig. 4 shows **two** types of gear system that transfer rotary motion through 90°.

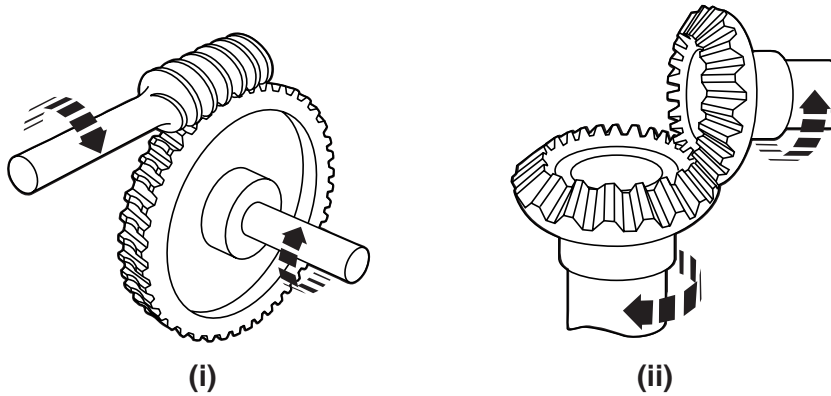


Fig. 4

- (a) Name the **two** types of gear system shown.

(i) .....

(ii) ..... [2]

- (b) Give **one** advantage of type (i) over type (ii).

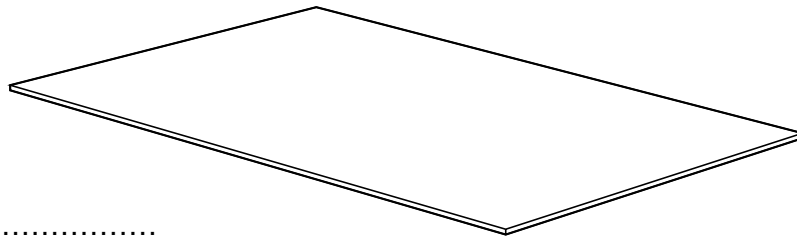
.....

..... [2]

8 Fig. 5 shows **three** forms of material.  
Write the name of each form of material in the spaces provided.

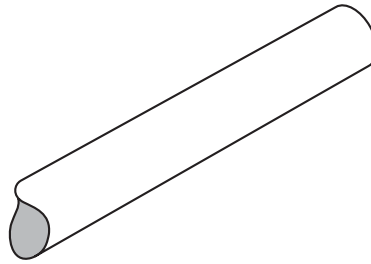
[3]

(a)



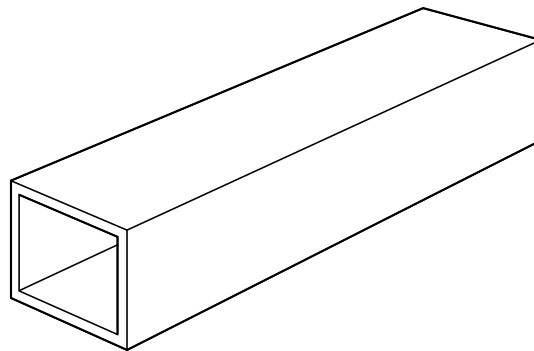
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(b)



.....

(c)



.....

**Fig.5**

9 List **four** design specification points for an artefact that is to be used by pupils for carrying sheets of drawing paper to school.

(1) .....

(2) .....

(3) .....

(4) ..... [4]

10 Explain how resources can be managed so that there will always be a sufficient supply of timber in the world.

.....

.....

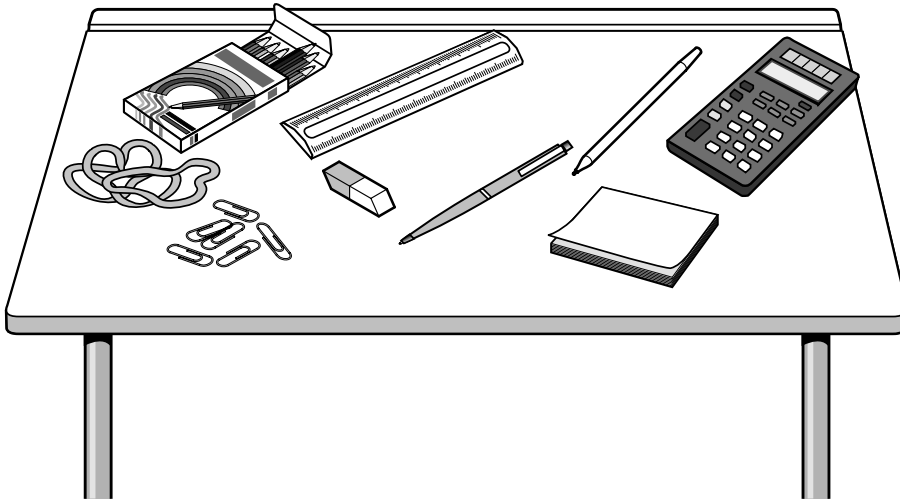
.....

..... [4]

## Part B

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

11



Desks can soon become cluttered and items can be misplaced when there is nowhere to store the equipment being used.

A storage system for items similar to those shown in the drawing above would be very useful for most people.

- (a) List **four** points about the function of such a storage system that you consider to be important. [4]
- (b) List **four** points about the appearance of such a storage system that you consider to be important. [4]
- (c) Develop and sketch ideas for the storage system. [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 a method used to manufacture **one** part of your solution in the school workshop. [7]



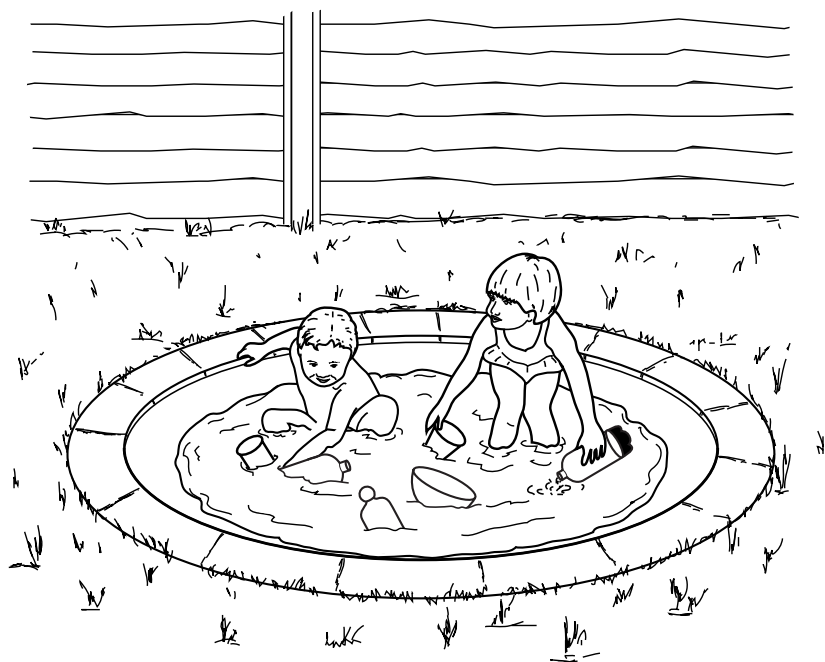


A chain of music shops is to promote the sale of a new compact disc produced by the group SMOOTH. They intend to have an advertising display in their shops.

A display is required that will stand on a shop counter in a range of positions and be made from card so that it can be folded easily and moved to different locations.

The display needs to hold just one CD.

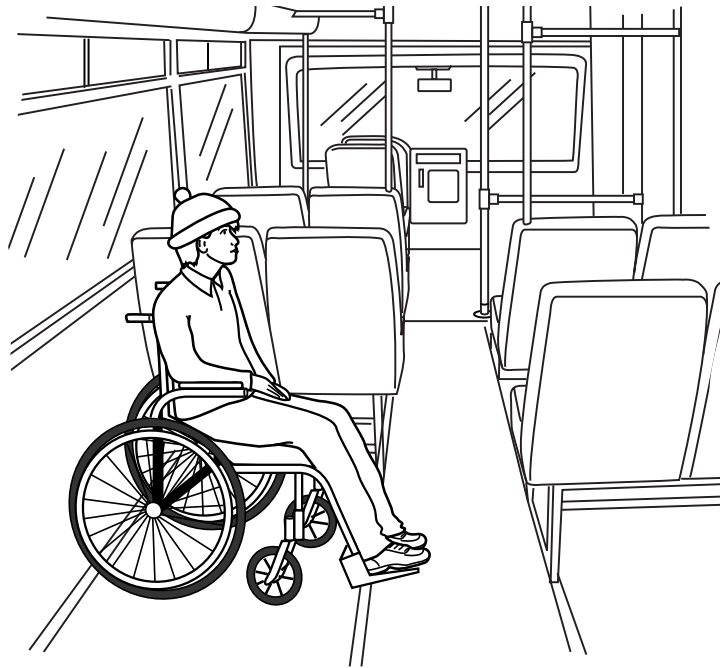
- (a) List **four** points about the appearance of such a display that you consider to be important. [4]
- (b) List **four** ways by which card could be joined together to allow for easy folding and assembly. [4]
- (c) Develop and sketch ideas for the display. [15]
- (d) Evaluate your ideas and justify 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) Explain how the use of computers could assist in the design of such a product. [4]
- (g) Use sketches and notes to describe a small item that could be given away in the shops to promote the sale of the new CD. [7]



Young children enjoy playing with water.

A manufacturer is looking for ideas for toys that could either be propelled by water or use water to create some form of movement.

- (a) List **four** points about the function of such a toy that you consider to be important. [4]
- (b) Describe, with notes or sketches, **two** mechanisms that could use water to provide movement. [4]
- (c) Develop and sketch ideas for the toy. [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 a method used to manufacture **one** part of your solution in the school workshop. [7]



People who have to use wheelchairs are becoming more mobile as public transport improves its services.

There is a danger of a wheelchair moving about on the bus even with its own brake locked.

A device is required that will hold a wheelchair in a fixed position while the bus is moving.

- (a) List **four** points about the function of such a device that you consider to be important. [4]
- (b) List **four** points about the safe use of the 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 a method used to manufacture **one** part of your solution in the school workshop. [7]

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