# UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS General Certificate of Education Ordinary Level

## **DESIGN AND TECHNOLOGY**

6043/01

Paper 1 Technology

October/November 2006

2 hours 30 minutes

Additional Materials: Answer Booklet/Paper

Plain paper

Sketching equipment

## **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.

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

#### Part B

Answer four questions.

Answer **one** question from Section 1, **two** questions from Section 2, and **one** other question from either Section.

Use sketches where appropriate to help answer any question.

You are advised to spend no longer than 45 minutes on Part A and 1 hour 45 minutes on Part B.

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.

This document consists of 11 printed pages and 1 blank page.

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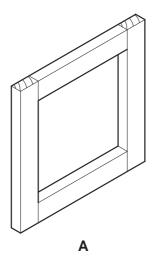
## Part A

You are advised to spend no more than 45 minutes on this part.

# Attempt all questions

1 Name the two forms of woodwork construction shown in Fig. 1.





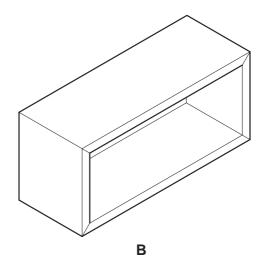


Fig. 1

2 Sketch a hand file and state the reason for it having one smooth edge.

[3]

3 Give two reasons why evaluation is important in design

[2]

4 Fig. 2 shows a cooking pan made entirely from metal.

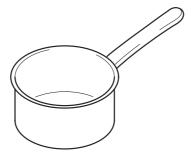


Fig. 2

- (a) State a suitable metal for the pan and give a reason.
- **(b)** Why could the metal handle be a problem?

[4]

5 State two precautions you should take when working with glass reinforced plastic [GRP]. [2]
6 Sketch cross-sections of the following processed boards.

(a) Plywood

(b) Chipboard

(c) Blockboard [3]
7 Give two reasons why PVC plastic would be a suitable material for the beach ball shown in Fig. 3. [2]

Fig. 3

- 8 State **two** properties that can help to identify a timber. [2]
- **9** Sketch the following fixings.
  - (a) wing nut
  - (b) panel pin [4]
- **10** Explain the term 'fluidization' as applied to plastics. [3]

#### Part B

You are advised to spend at least 1 hour 45 minutes on this part of the examination.

Attempt **four questions** including **one** from Section 1, **two from** Section 2 and **one further** question from either section.

All questions carry equal marks.

# Section 1 - Tools and Materials

11 Many measuring devices and testing methods are used to check work. Three are shown in Fig. 4.

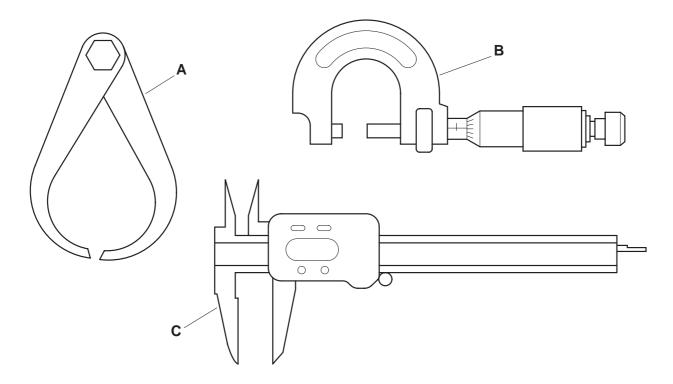


Fig. 4

- (a) Identify each of the measuring or testing devices shown in Fig. 4 and explain the purpose of each. [6]
- (b) Explain:
  - (i) how device A is used to take a measurement;
  - (ii) how device **B** measures an item and what system stops it being over-tightened;
  - (iii) how device **C** has ease of reading and what makes it multi purpose. [9]

(c) Explain why device **A** is the least accurate. [2]

12	Many projects fail because the designer does not consider the environment in which the r is to be used.			ıaterial
	(a)	Ехр	lain the effect of the following.	
		(i)	salt water on a softwood boat ladder	
		(ii)	a too high a wattage [or high power] light bulb on an acrylic shade	
	(	(iii)	a leaking lead acid battery on a mild steel support	[6]
	(b)	Usir	ng examples, explain how	
		(i)	water,	
		(ii)	heat,	
	(	(iii)	acid	
		can	each be used to advantage on materials.	[6]
	(c)	Ехр	lain how air helps in the following situations.	
		(i)	newly cut planks of timber	
		(ii)	hot metal casting	
	(	(iii)	making a plastic bottle	[5]

13 Fig. 5 shows three products which have had their basic materials modified during manufacture.

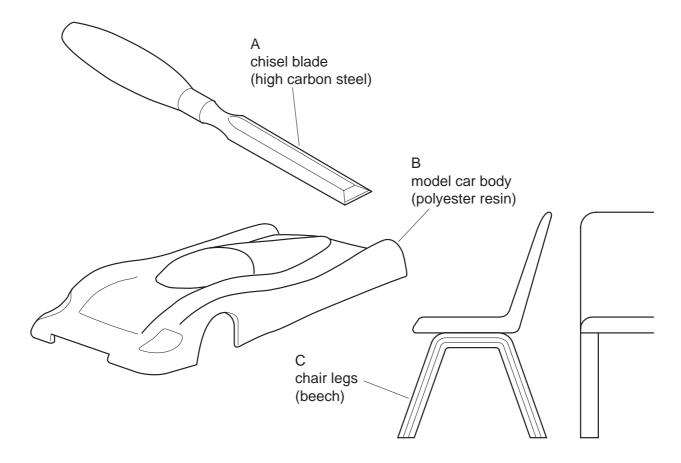


Fig. 5

- (a) State briefly how each of the materials has been modified to improve strength. [6]
- **(b)** Explain the following.
  - (i) Why regrinding a chisel blade can affect the strength of the cutting edge.
  - (ii) How the smooth outside surface is achieved on the model car body.
  - (iii) How a former is used in the making of the chair legs.
- (c) State briefly how the following materials are improved by the addition of the second material.

[6]

[5]

- (i) mild steel with carbon powder
- (ii) polyester resin with an accelerator
- (iii) blockboard with melamine

## Section 2 - Processes

**14** Fig. 6 shows details of a control unit for a string puppet that is made up from **two** parts joined together.

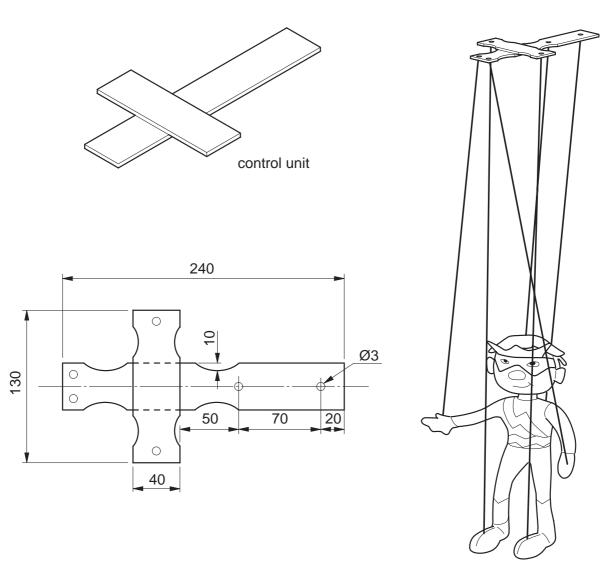


Fig. 6

- (a) State a suitable material for the control unit and sketch a method of joining that would allow the two parts to pivot. [3]
- **(b)** For the construction method you have given in answer to **(a)**, use notes and sketches to fully describe how to:
  - (i) mark out the material;
  - (ii) drill the string holes;
  - (iii) cut to shape;
  - (iv) join the two parts together.

[14]

15 The outline design of a kneeler / seat for a gardener is shown in Fig. 7.

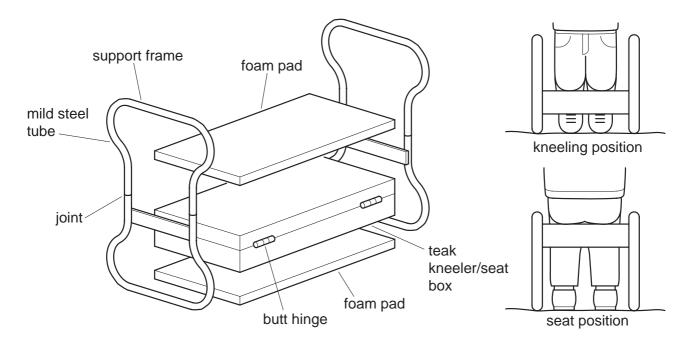


Fig. 7

- (a) Describe, with the aid of notes and sketches, two of the following processes.
  - (i) brazing the two parts of one of the mild steel support frames together
  - (ii) fitting the butt hinges to the teak kneeler/seat box
  - (iii) fitting and fixing one of the foam pads and a P.V.C. covering to the teak kneeler / seat box  $[2 \times 7]$
- **(b)** Describe the application of a suitable finish for the mild steel support frame. [3]

**16** Fig. 8 gives details of a teaching clock. It is made up of three main parts, a clock face, removable number discs and a support stand.

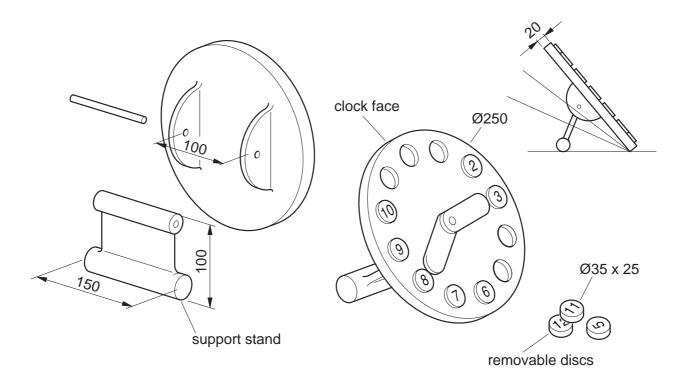


Fig. 8

- (a) Suggest a suitable material for the clock face and state the reason for your choice. [2]
- (b) Using notes and sketches, describe a method of manufacturing the clock face using the material given in answer to (a). [8]
- (c) Using a material of your own choice, describe a simple method of producing the removable discs. [The numbers are not required] [3]
- (d) With the aid of sketches, show how the support stand could be made to support the clock face at different angles. [4]

17 Fig. 9 shows three blanks and the resulting items to be produced by lathe work.

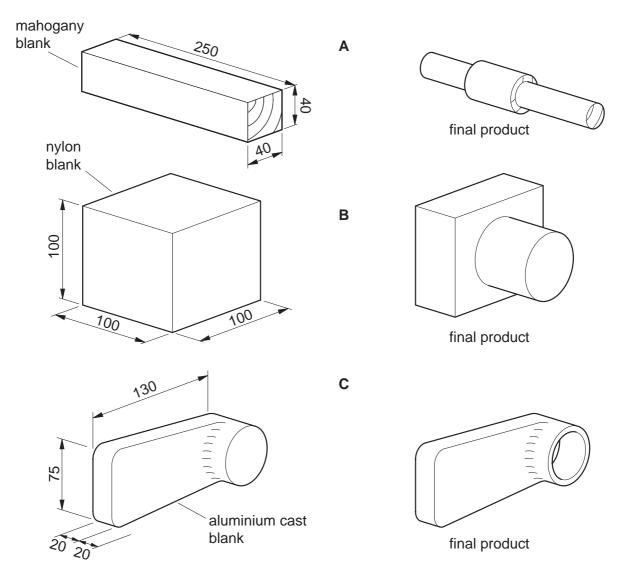


Fig. 9

- (a) State a suitable method of holding each blank on a lathe.
- **(b)** With the aid of notes and sketches, describe **two** of the following stages in making the final shapes.

[3]

- (i) preparing the mahogany blank A ready for holding
- (ii) setting the nylon blank B at centre height for turning
- (iii) holding and balancing the aluminium cast blank **C** ready for boring [14]

18 Fig. 10 shows the outline design for a scissor storage rack.

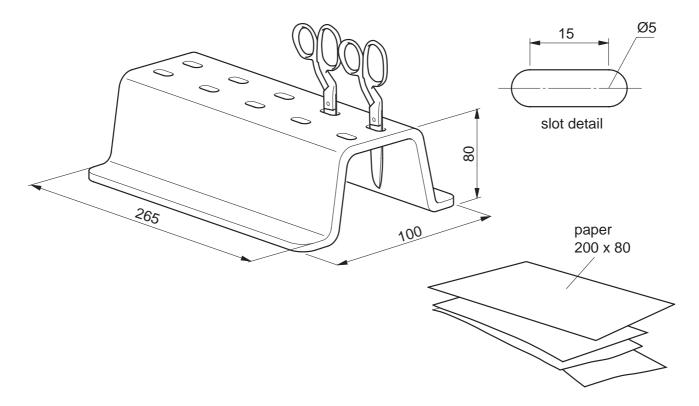


Fig. 10

- (a) State **two** properties of a suitable material for the scissor rack. [2]
- (b) Sketch the outline flat shape of the rack, after marking out, prior to cutting and shaping. [3]
- (c) Using notes and sketches describe how, from a flat material of your own choice,
  - (i) the scissor slots are cut out,
  - (ii) the final shape is formed. [10]
- (d) Show by means of a design sketch, how the rack could be modified to hold the sheets of paper shown. [2]

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