



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education  
Advanced Subsidiary Level and Advanced Level

**DESIGN AND TECHNOLOGY**

**9705/33**

Paper 3

**October/November 2011**

**3 hours**

Additional Materials: Answer Booklet/Paper  
A range of design drawing equipment  
A3 Drawing paper (5 sheets)



**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.

**Section A**

Answer any **two** questions from **one** of the Parts **A, B** or **C**.

**Section B**

Answer **one** question.

All dimensions are in millimetres.

The instruction 'discuss' denotes that you should:

- examine critically the issues raised by the question;
- explain and interpret these issues as appropriate;
- introduce evidence wherever possible to support conclusions of arguments.

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 **10** printed pages and **2** blank pages.

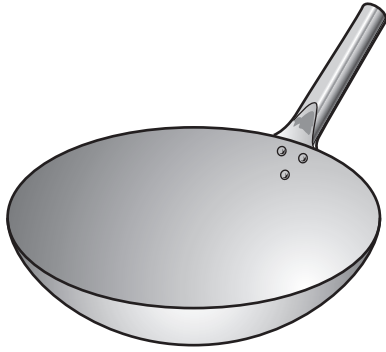


Section A

Answer **two** questions from **one** of the Parts A, B or C.

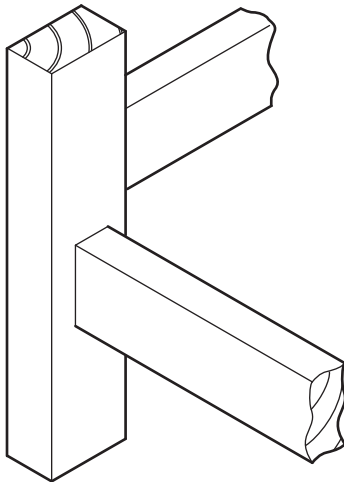
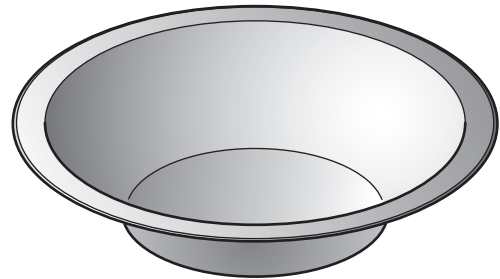
Part A – Product Design

1



**item:** wok  
**process:** riveting

**item:** bowl  
**process:** compression moulding



**item:** table frame  
**process:** joining with mortice and tenon joint

Fig. 1

Choose **two** of the items shown in Fig. 1 and for each:

- (a) use notes and sketches to describe the manufacturing process named; [7 × 2]
- (b) explain why the process is particularly suitable for the production of the item. [3 × 2]

3

2 Fig. 2 shows a photo holder.

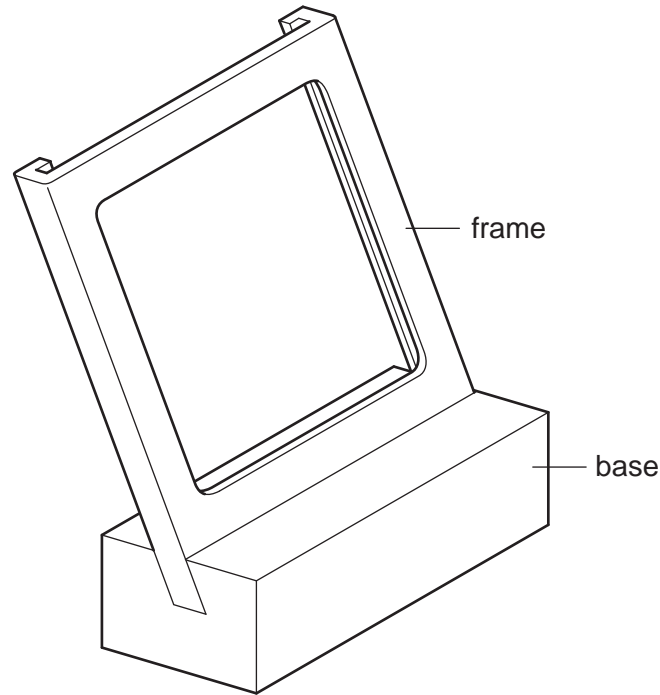


Fig. 2

- (a) State a suitable material for the frame of the photo holder and give **two** reasons for your choice. [3]
- (b) Describe, using notes and sketches, how you would make the frame of the photo holder. [9]
- (c) Explain the changes which may be necessary to the design, the manufacturing method used and in the material selected if 500 were required. Use notes and sketches to support your answer. [8]
- 3 (a) Use notes and sketches to describe **two** methods of seasoning wood. [10]
- (b) Discuss the implications of using manufactured (processed) boards in the manufacture of furniture. [10]

Part B – Practical Technology

- 4 (a) Use sketches and notes to define what is meant by the term *reinforcement of materials*.  
 (b) Explain, using **two** examples from different products, the importance of alloying to a design. Give details of the specific materials used in your examples. [14]

- 5 (a) Fig. 3 shows two forces acting on a point on a beam.

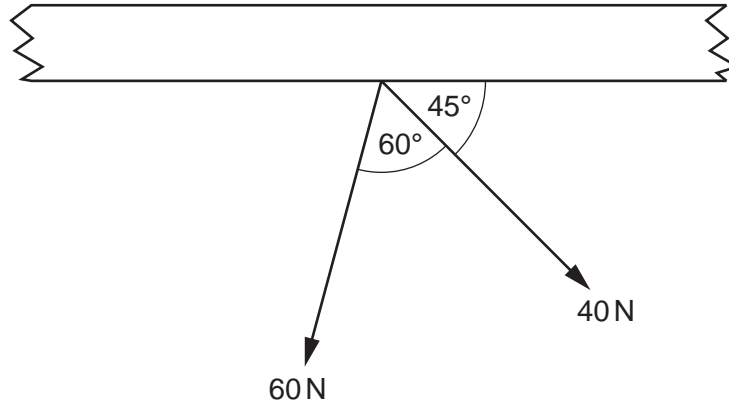


Fig. 3

Determine the direction and magnitude of the resultant force. [3]

- (b) Fig. 4 shows a loaded roof truss.

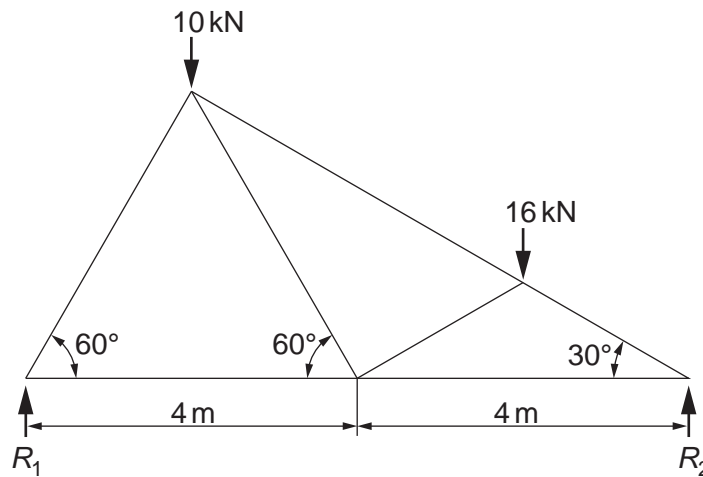


Fig. 4

- (i) Determine the reactions at  $R_1$  and  $R_2$ . [3]  
 (ii) Determine the magnitude of the forces in all of the members, stating whether they are ties or struts. [14]

- 6 Discuss the impact of the following with reference to the development of products:

- invention;
- innovation;

Part C – Graphic Products

7 Fig. 5 shows the parts of an adjustable spanner.

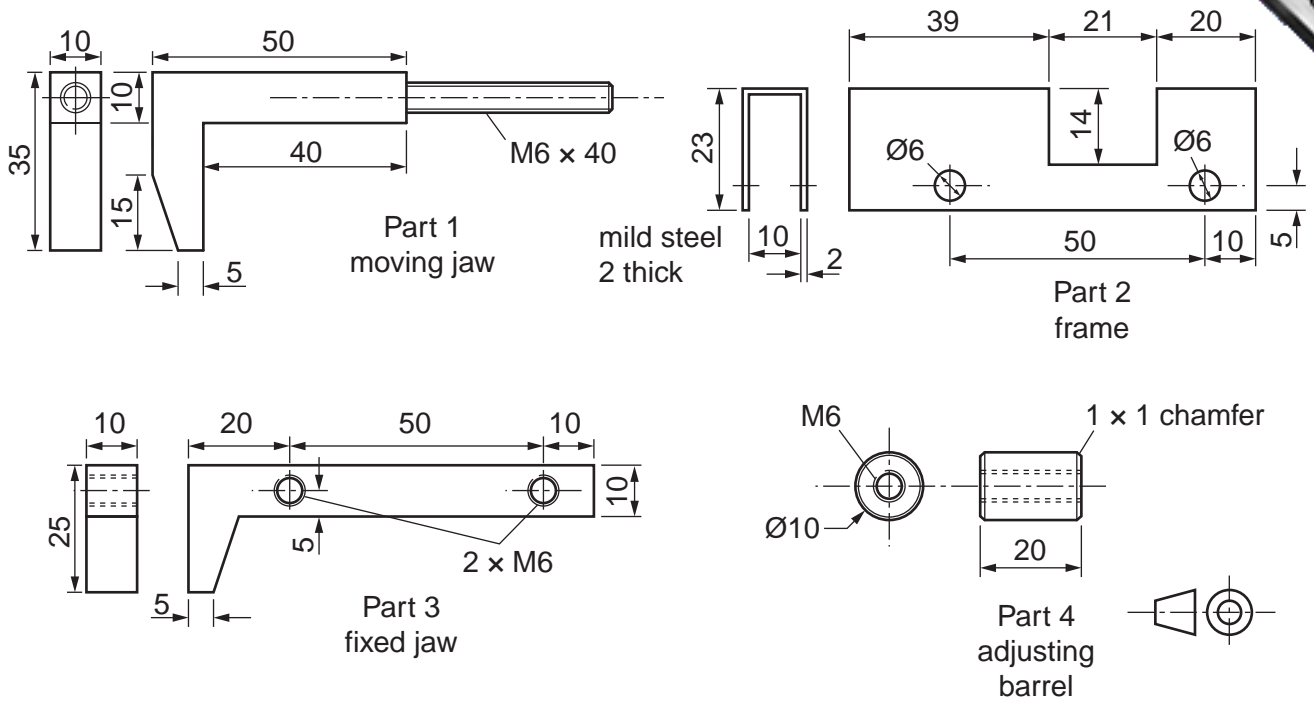


Fig. 5

The adjustable spanner is assembled using 4 M6 x 6 round head machine screws.

Draw two, full size, orthographic views of the assembled spanner.

Draw the spanner with the jaws closed.

[20]

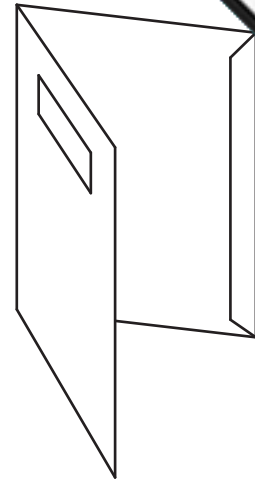
8 Fig. 6 shows three graphic products.



simple architectural card model



credit card



A4 presentation folder

Fig. 6

Compare and contrast the production and printing methods which would be used when making **two** of the following:

- a simple one-off architectural card model;
- a batch of 50 000 credit cards
- a batch of 20 000 A4 presentation folders.

[20]

9 Fig. 7 shows the plan of a kitchen.

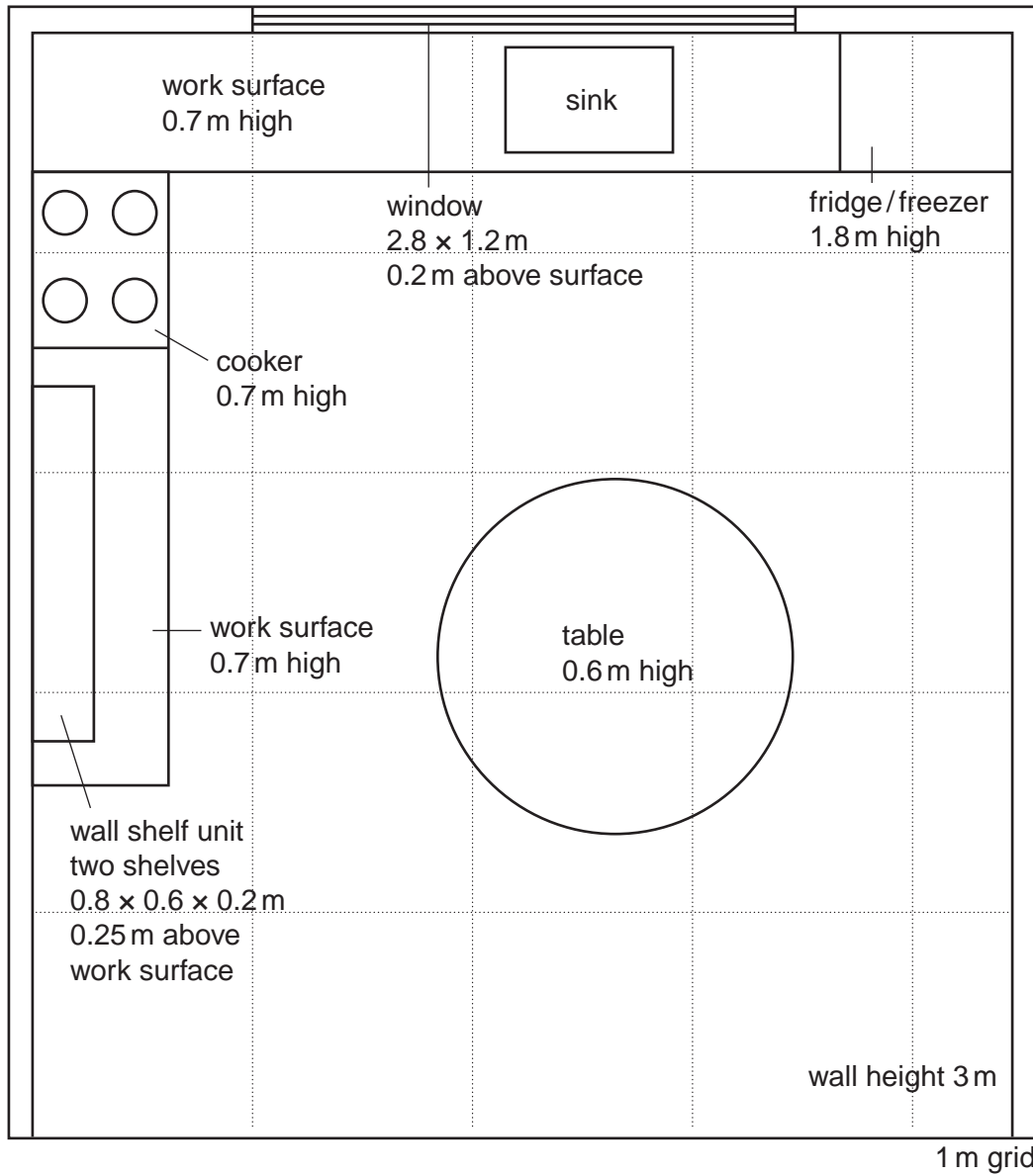


Fig. 7

Draw to an approximate scale, a one-point perspective view of the kitchen.

[20]

**Section B**

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

You should approach the design question of your choice in the following manner:

**Analysis**

Produce an analysis of the given situation/problem, which may be in written or graphical form. [5]

**Specification**

From the analysis produce a detailed written specification of the design requirements.

Include at least five specification points other than those given in the question. [5]

**Exploration**

Use bold sketches and brief notes to show your exploration of ideas for a design solution, with reasons for selection. [25]

**Development**

Show, using bold sketches and notes, the development, reasoning and composition of ideas into a single design proposal. Give details of materials, constructional and other relevant technical details. [25]

**Proposed solution**

Produce drawings of an appropriate kind to show the complete solution. [15]

**Evaluation**

Give a written evaluation of the final design solution. [5]

[Total: 80]



9

- 10 A school garden requires regular watering.  
Design a product that would collect rainfall, and dispense water where required.

The product must:

- be easily moved around the garden;
- hold a minimum of 25 litres of water.

- 11 Many schools are becoming Eco Schools. One of the criteria to be an Eco School is that each classroom must have at least one plant.

Design a product that would indicate that the soil/compost was drying out and that the plant needs to be watered.

The product must:

- have a visual and/or audible alarm;
- be easily produced as a batch of 50.

To assist you in your answer, details of a rechargeable 9 volt battery are given in Fig. 8.

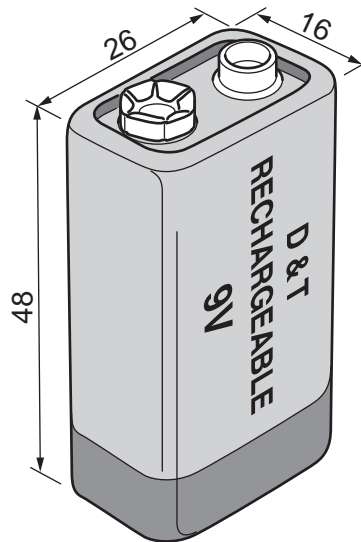


Fig. 8

12 A school wishes to sell produce from its Garden Shop.

You are to design a packaging system that would enable customers to take seedlings (plants) home in any combination of 4, 8 or 12.

The packaging must include a name of your choice for the Garden Shop and a simple logo.

To assist you in your answer, details of the seedlings are given in Fig. 9.

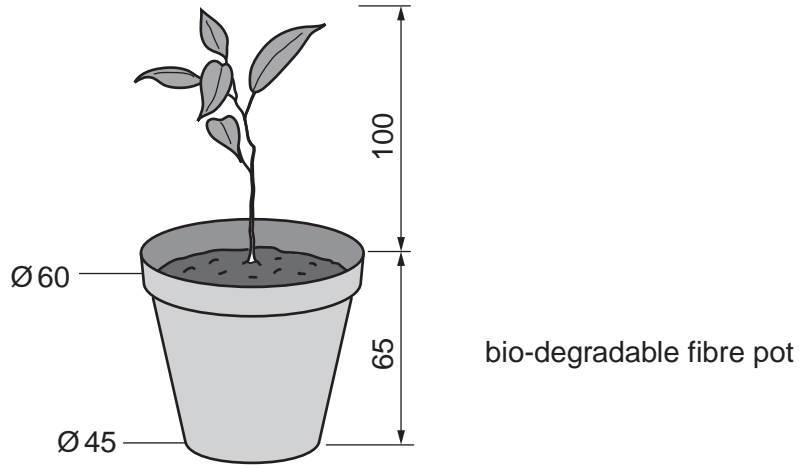


Fig. 9



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