

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

DESIGN AND TECHNOLOGY

9705/01

Paper 1

May/June 2005

2 hours 30 minutes

Additional Materials: Answer Booklet/Paper

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet. Write your answers and working on the separate Answer Booklet/Paper provided. Write your name, Centre number and candidate number on all the work you hand in. Write in dark blue or black pen on both sides of the 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.

Section A

Answer **all** questions.

Section B

Answer any **two** questions.

Section C

Answer any **two** questions.

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. 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.

This document consists of **13** printed pages and **3** blank pages.



Section A

Answer **all** questions.

- 1 Fig. 1 shows a picnic table which is designed for both wheelchair and able-bodied users.

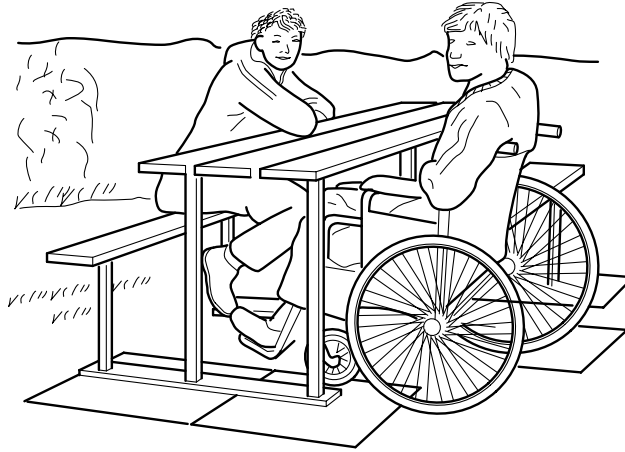


Fig. 1

- (a) Identify **three** pieces of anthropometric data which would have been used in the design of the picnic table. [3]
- (b) State which **three** features of the picnic table would have been designed based on the data identified in (a). [3]

2 The working conditions shown in Fig. 2 are dangerous.

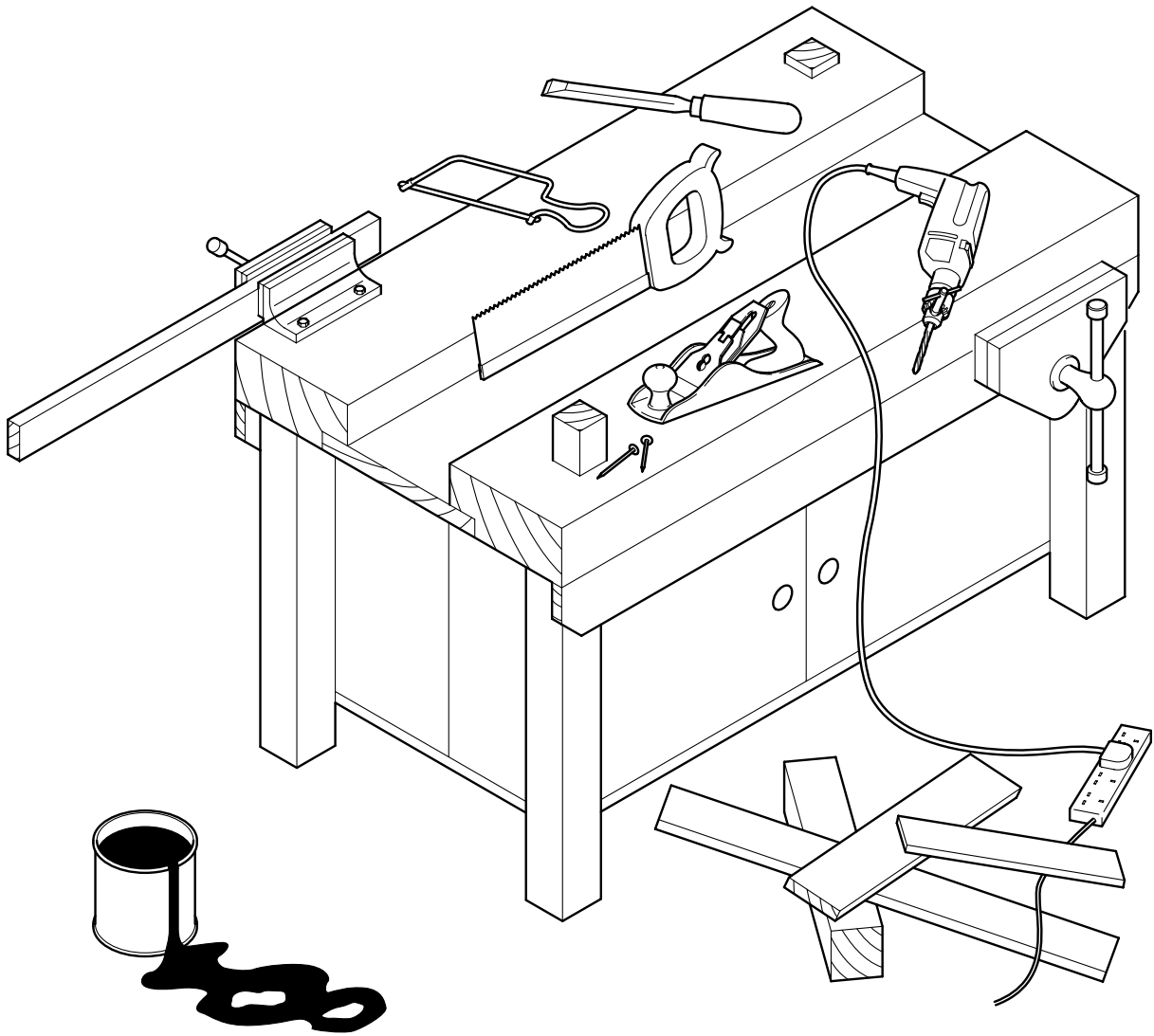


Fig. 2

(a) Identify and explain **three** of the dangers. [6]

(b) State **four** safety rules which help good workshop practice when using machines. [4]

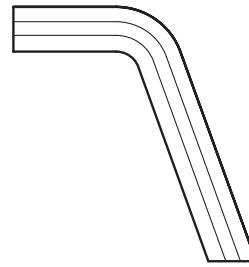
3



stool

3 legs made up of
thin strips of wood

4



detail of leg shape

Fig. 3

- (a) Name the production method that has been used to make the legs of the stool shown in Fig. 3. [1]
- (b) State, and explain, **one** reason why this method of construction has been used. [3]
- (c) Use a sketch and notes to explain how a former would be used in the production of one of the legs for the stool. [4]

4 Fig. 4 shows a compact disc (CD) storage rack.

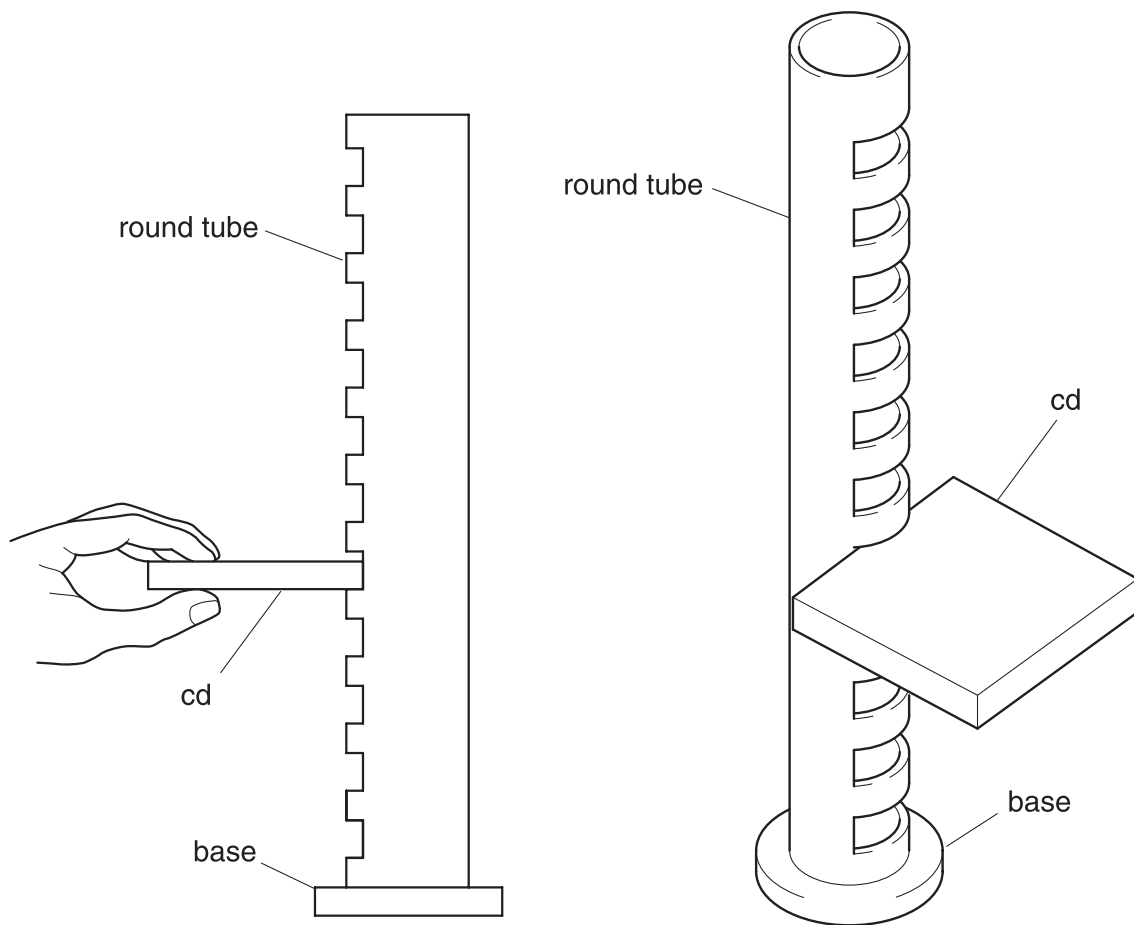


Fig. 4

(a) Tests have shown that CDs can very easily fall out of the storage rack.

Make a drawing to show how the design of the tube could be changed to help stop the CDs falling out. Label your drawing to explain how and why you have changed the design. [4]

(b) The storage rack is likely to fall over when filled with CDs.

(i) Explain why this might happen. [2]

(ii) Using a sketch and notes, explain how the design of the base could be changed to make the storage rack more stable. [2]

- 5 Fig. 5 shows a pictorial view of a toy helicopter made from wood. As the toy is pushed along the ground the rotor blade turns as shown by the arrows.

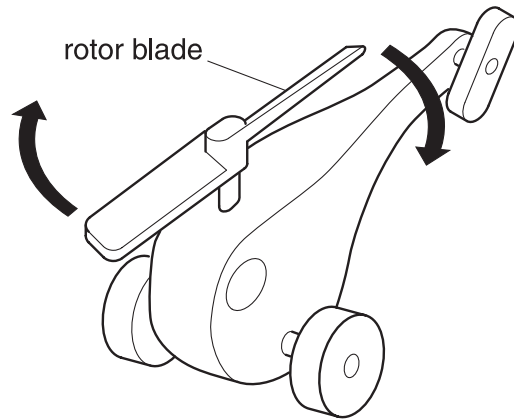


Fig. 5

- (a) Name the type of motion made by the rotor blade. [1]
- (b) Draw a mechanism that would make the rotor blade turn when the helicopter is pushed along. Clearly label your drawing to explain how the mechanism works and to show the direction of the moving parts. [6]
- (c) State the name of the mechanism that you have drawn in part (b). [1]

Section B

Answer **two** questions from this section.

- 6 Fig. 6 gives details of a scoop for a toy bulldozer. The scoop is made in one piece from thin plastic sheet using vacuum forming.

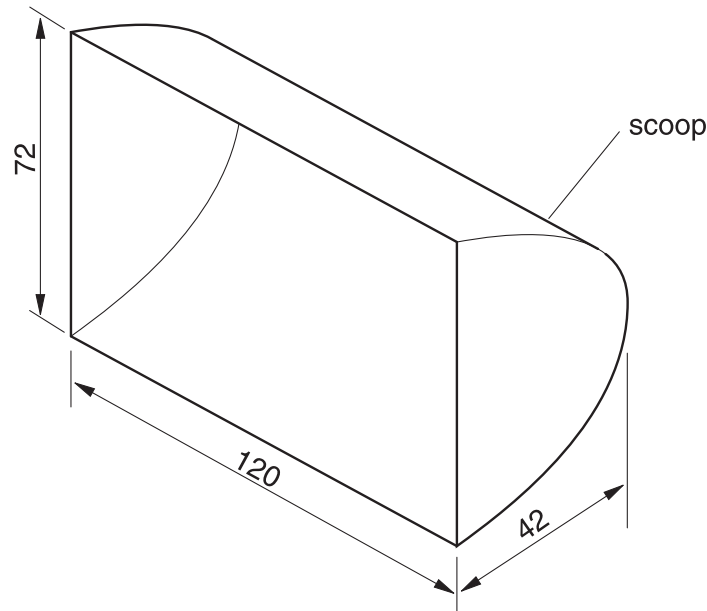


Fig. 6

- (a) Explain why acrylic would not be a suitable plastic from which to make the scoop. [2]
- (b) Name a sheet plastic that would be suitable for the manufacture of the scoop and explain **one** reason for your choice. [2]
- (c) Use sketches and notes to describe the major stages of marking out, cutting and shaping the wooden former that would be used when vacuum forming the scoop. You must give details about the tools and equipment used. [8]
- (d) Use sketches and notes to describe how the scoop would be vacuum formed. [8]

7 Fig. 7 shows the basic frame of a low foot stool together with the main sizes.

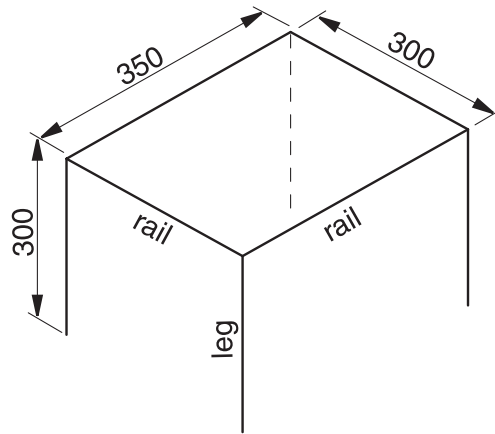


Fig. 7

- (a) Name a metal from which the stool frame could be made and explain **two** reasons for your choice. [3]
- (b) Different cross-sections of metal are to be used for the rails and the legs.
Draw, full size, suitable cross-sections for:
- (i) a rail; [2]
- (ii) a leg. [2]
- (c) Use sketches and notes to describe how the rails could be joined to the legs to make the frame of the stool. [5]
- (d) Name a suitable material for the top of the stool and explain **two** reasons for your choice. [3]
- (e) Use sketches and notes to describe how the top and the frame of the stool could be joined together. [5]

- 8 Fig. 8 shows a wooden storage unit to hold compact discs (CDs). The unit is capable of holding 35 CDs.

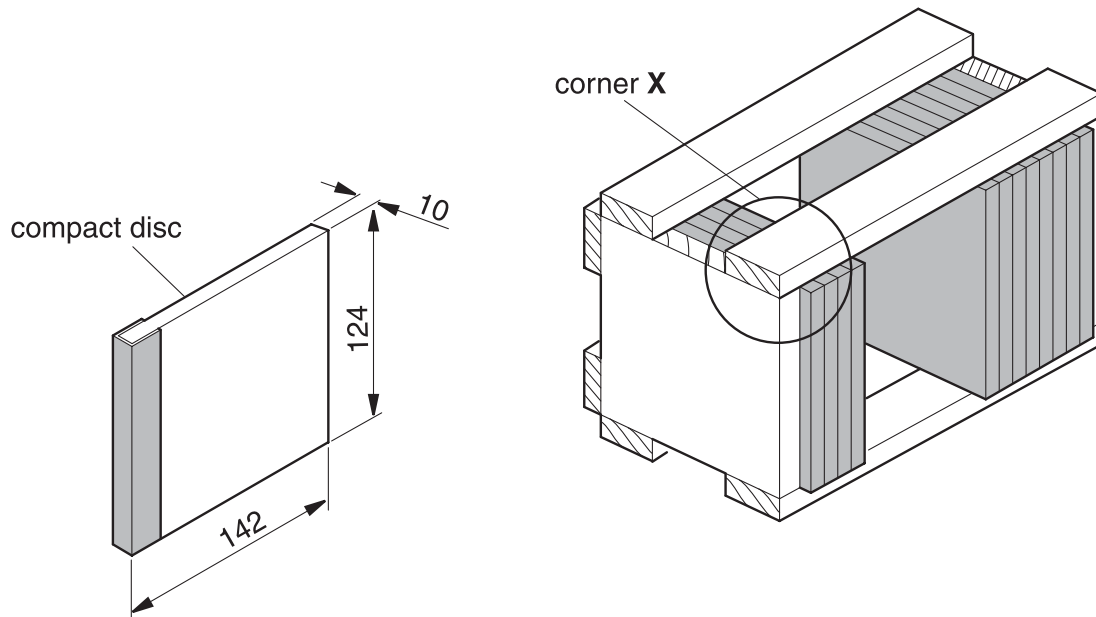


Fig. 8

- (a) Name a suitable wood for the storage unit and explain **two** reasons for your choice. [3]
- (b) Use sketches and notes to describe a suitable method of joining the two pieces at corner X. [4]
- (c) Produce a cutting list which details the size of the eight pieces required to make the unit. [6]
- (d) Specify a suitable finish that could be applied to the storage unit. [1]
- (e) Describe how the finish identified in (d) would be applied to the storage unit. Give details about the working environment and how the equipment would be cleaned after use. [6]

Section C

Answer **two** questions from this section.

- 9 Fig.9 shows a 'crab clamp' which is described by the manufacturers as 'A new concept in clamping'. The manufacturers state that 'It is designed to perform a variety of holding functions and outdates the G clamp'.

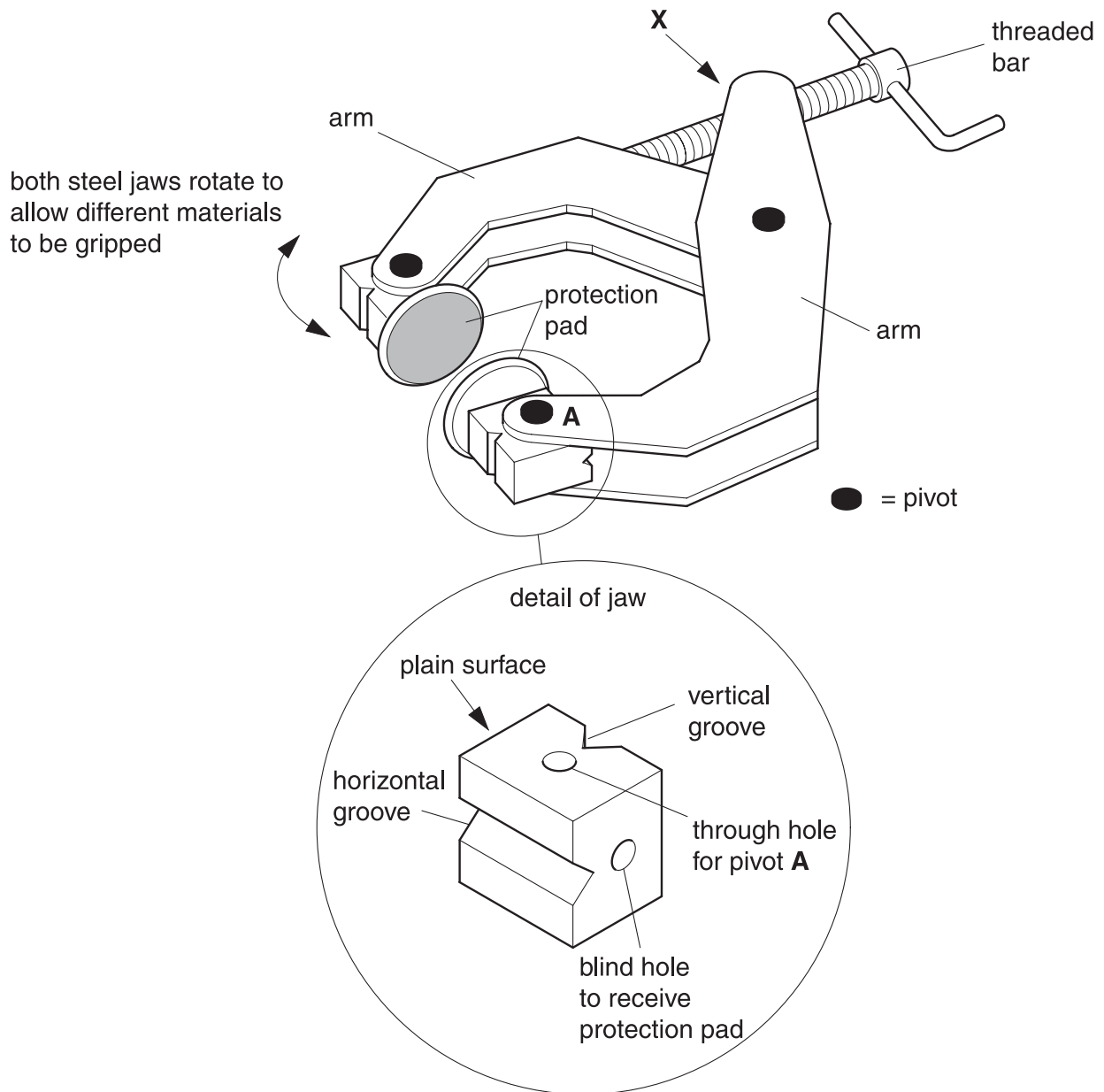


Fig. 9

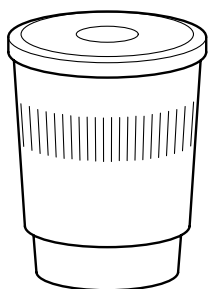
- (a) For each of the following forms of material identify the specific design feature which enables the jaws to grip the material firmly but without damaging it:
- (i) flat material with parallel sides; [1]
 - (ii) round bar material; [1]
 - (iii) soft material; [1]
 - (iv) flat material with tapering faces. [1]

(b) Use sketches and notes to describe:

- (i) the design feature at **X** which allows the threaded bar to rotate freely; [6]
- (ii) the design feature which allows the arms to open and close. [6]

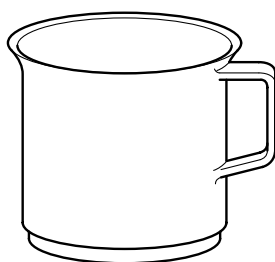
(c) Discuss why the manufacturers state that 'This is a new concept in clamping and outdates the G clamp'. [4]

10 Fig. 10, 11 and 12 shows three different types of cup.



Cup made from card used in a fast-food take-away restaurant

Fig. 10



Metal cup used when camping

Fig. 11



Plastic cup used in a restaurant

Fig. 12

- (a) Explain **one** disadvantage of using the cup shown in Fig.10 for hot drinks. [2]
- (b) Each cup is made from a different material. Explain **one** property that each material would need to have in order to make it particularly suitable for its specific purpose. [6]
- (c) Use sketches and notes to describe the design features of each cup which make it particularly suitable for its intended use. [6]
- (d) The cup shown in Fig. 10 is disposable. Discuss the problems that this creates for society. [6]

11 Fig. 13 shows three toy tractors. Each is made mainly from one material.

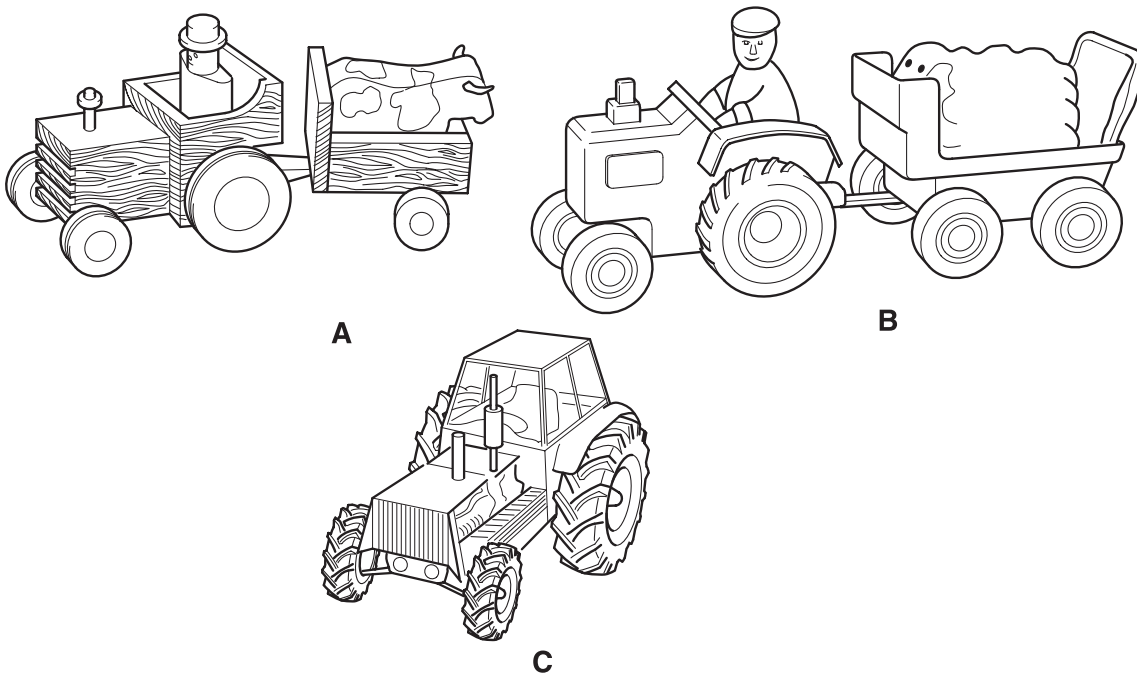


Fig. 13

- (a) Name the main material that each tractor is made from. [3]
- (b) Each tractor is designed for a particular age group.
- (i) Explain why none of the tractors are suitable for babies. [2]
- (ii) State the age range you think each tractor is suitable for and explain **one** reason for your choice. [6]
- (c) Each tractor is mainly manufactured using one production method. One is made using blow moulding, one by fabrication and one by die casting.

For each tractor:

- (i) name the main production method that has been used in its manufacture; [3]
- (ii) use sketches and notes to explain the features that have enabled you to identify the main production method that has been used in its manufacture. [6]

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