



Rewarding Learning

ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2009

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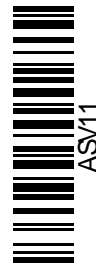
## Technology and Design

### Assessment Unit AS 1

*assessing*

Unit 1 – Product Design and Practice:  
Materials, Components and their Uses

[ASV11]



WEDNESDAY 27 MAY, MORNING

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#### TIME

1 hour 30 minutes.

#### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number on the Answer Booklet provided and on the A3 pro forma answer page provided.

Answer **all seven** questions.

Answers to Question **1(b)** in Section A should be made on the A3 pro forma answer page provided.

You are provided with an insert for use with Questions **1, 3** and **5**.

Do not write your answers on this insert.

#### INFORMATION FOR CANDIDATES

The total mark for this paper is 60, including a maximum of 3 marks for quality of written communication.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

At the conclusion of the examination, attach the A3 pro forma answer page securely to the Answer Booklet with the treasury tag supplied.

A materials data sheet is provided.

## Section A

Answer the **one** question in this section.

You are advised to spend approximately **45 minutes** on this section.

**1** The portable bench, as shown in **Fig. 1** to **Fig. 6** on the insert sheet, is a useful product for the enthusiastic home improver.

(a) With reference to **Fig. 1** to **Fig. 6** on the insert sheet, complete the following:

(i) Give **two** main reasons for each of the following:

- Why box section steel is used for the legs (**Fig. 1**)
- Why chipboard/melamine composite is used for the worktop (**Fig. 1**) [4]

(ii) Give **one** main reason for each of the following:

- Why the plastic feet are used on the ends of the legs (**Fig. 6**)
- Why the rivet is used on the folding arm (**Fig. 4**) [2]

(iii) Common forms and sizes of materials are used for the parts on this product.

Briefly outline **two** main benefits associated with using common forms and sizes of materials. [2]

(iv) State **two** manufacturing processes required to produce the support strut. (**Fig. 2**) [2]

(v) Briefly describe **one** process other than painting that could be used to protect the legs while offering good aesthetic appeal. (**Fig. 6**) [2]

(vi) Suggest a suitable manufacturing process for each of the parts below and give **one** reason why each is suitable.

- The vice stud (**Fig. 5**)
- The plastic jaws (**Fig. 3**) [4]

**(b)** With the aid of detailed sketches, using the blank A3 pro forma answer page (answer number **1(b)**), suggest appropriate improvements for the following:

**(i)** a design that will enable the user to quickly lock the legs together in the storage or carrying position at A–A (**Fig. 6**), but will be secured to the product to prevent it from being lost. [6]

**(ii)** a design that will enable the user to quickly secure a thin metal plate to the surface of the bench top when the plastic jaws are removed, in order to protect it when working with soiled materials. (**Fig. 1**) [6]

## Section B

Answer **all** questions in this section.

You are advised to spend approximately **45 minutes** on this section.

- 2** Smart wire and polymorph are considered novel materials. Briefly outline **two** main characteristics for both polymorphs and smart wire. [4]
- 3** **Fig. 7** shows a battery-powered buggy used by shoppers.
- (i) State **two** types of batteries that are commonly used for a range of products. [2]
- (ii) Select the most appropriate battery for the buggy and give **one** main reason for your answer. [2]
- 4** Many food and confectionery trays used in packaging are manufactured by the process of vacuum forming.
- (i) Suggest a suitable material for the vacuum forming process. [1]
- (ii) Give **two** main reasons why vacuum forming is the most suitable process for the manufacture of these trays. [2]
- (iii) With the aid of an annotated sketch, describe the vacuum forming process. [3]

- 5 **Fig. 8** shows signs made from corrugated plastic to display information to the public.
- (i) With the use of an annotated sketch, briefly explain how the structural properties of the plastic have been improved by corrugation. [2]
- (ii) Briefly outline **three** specific characteristics which make plastic suitable for this type of display. [3]
- 6 A company manufacturing cast aluminium alloy car wheel rims has decided to investigate the use that can be made of Information and Communication Technology (ICT).  
For each of the following below, briefly outline **one** main way in which the company can make use of ICT.
- Modelling
  - Process control
  - Stock control
  - CAD/CAM
  - Costing. [5]
- 7 A poultry processing plant is planning to install a fully automatic system, which will replace the sixty employees currently operating the processing lines.
- (i) Outline **two** changes to the pattern of employment that would result if the plan was implemented. [2]
- (ii) Outline **two** economic considerations for the employer and **one** lifestyle change for the employee if the plan was implemented. [3]

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**THIS IS THE END OF THE QUESTION PAPER**

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(for use with Question 1)

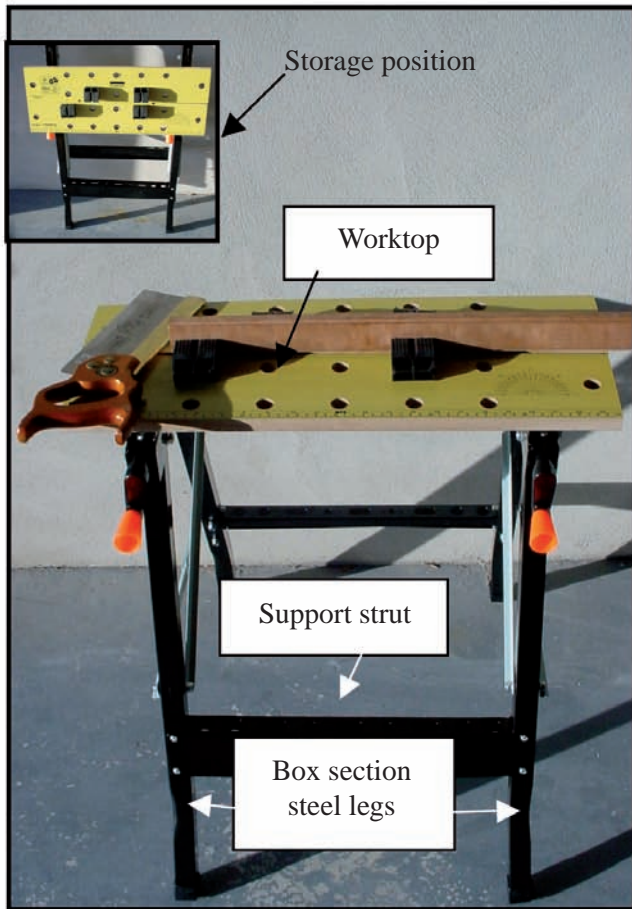


Fig. 1



Fig. 3



Fig. 4

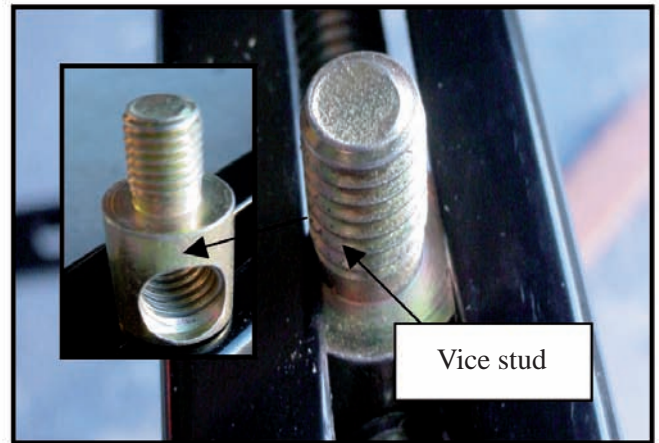


Fig. 5

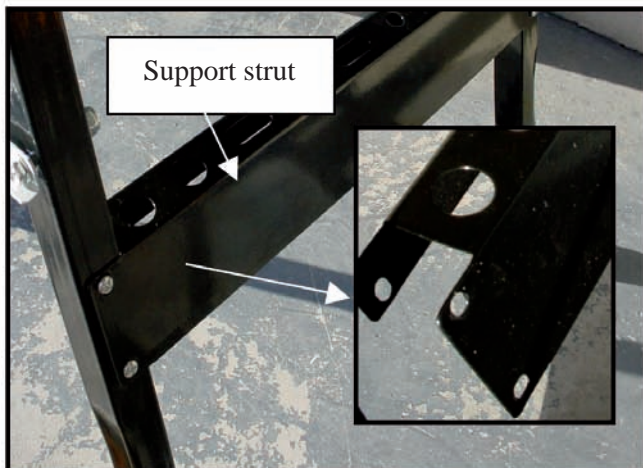


Fig. 2

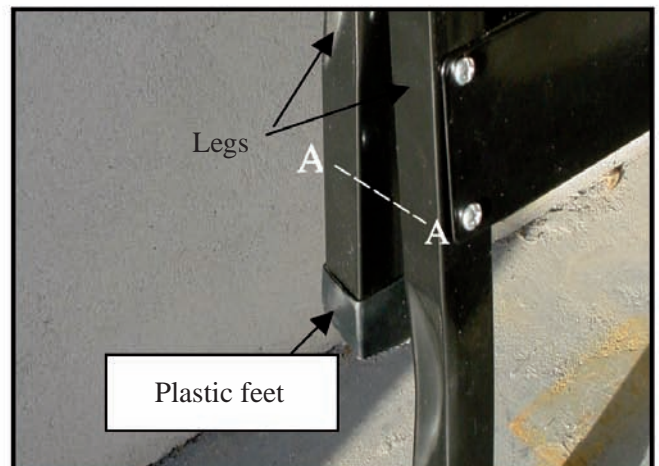


Fig. 6

[Turn over



(for use with Question 3 and Question 5)



Fig. 7



Fig. 8