

Tuesday 17 January 2012 – Afternoon

GCSE DESIGN AND TECHNOLOGY Industrial Technology

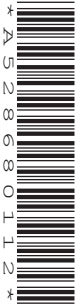
A544/01 Technical Aspects of Designing and Making

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
None

Duration: 1 hour 15 minutes



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions in Section A **and** Section B.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- All dimensions are in millimetres.
- Your Quality of Written Communication will be assessed in questions marked with an asterisk (*).
- This document consists of **12** pages. Any blank pages are indicated.

Section A

Answer **all** questions.

- 1 Some materials used to manufacture products are listed below.

ABS	copper	polycarbonate
brass	high speed steel	polyethylene
bronze	mild steel	polypropylene
carbon fibre	nylon	stainless steel

- (a) (i) Complete the table below by selecting a suitable material for the products given.

The material must be from the list above and each material can only be used once.

The first one has been done for you.

Product	Material
Plastic milk bottle	Polyethylene
Kitchen knife	
Washing-up bowl	
Electrical wire	
School coat hook	
Racing car bodywork	

[5]

- (ii) Give **two** materials from the list above that are **non-ferrous** metals.

1

2 [2]

(b) Explain, giving **one** example, what is meant by the term 'composite material'.

.....
.....
.....
..... [3]

(c) Describe, using an example, the use of a 'Smart' material in a product.

.....
.....
.....
..... [2]

[Total: 12]

2 Fig. 1 shows two garden wheelbarrows.

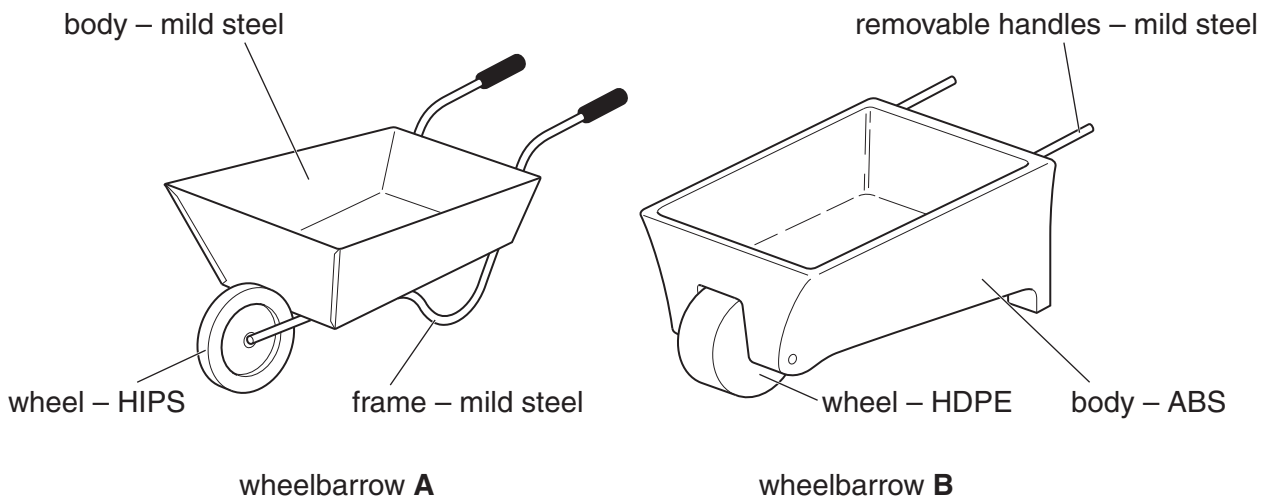


Fig. 1

(a) Give **one** reason why the body of wheelbarrow **A** has been galvanised.

..... [1]

(b) Give **two** advantages to the user of wheelbarrow **B** compared with wheelbarrow **A**.

1

2 [2]

(c) Give **three** reasons why wheelbarrow **B** would be more suitable for high-volume production than wheelbarrow **A**.

1

.....

2

.....

3

..... [3]

3 Fig. 2 shows a belt and pulley drive system on a drilling machine.

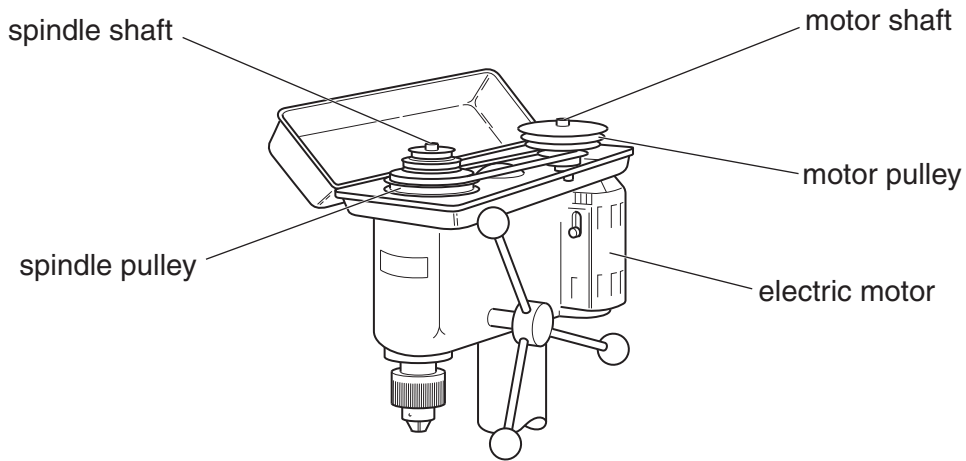


Fig. 2

(a) (i) Give **two** advantages of using a belt and pulley drive system on a drilling machine rather than a gear system.

1

2 [2]

(ii) Describe how the drilling machine shown in Fig. 2 would be set to its fastest speed.

.....

.....

..... [2]

(b) The spindle pulley shown in Fig. 2 is made from aluminium alloy and needs to be a sliding fit on the spindle shaft.

(i) Describe **one** method of producing a smooth and accurately sized hole in the spindle pulley.

.....

.....

..... [2]

(ii) Explain, using **one** example, what is meant by the term 'tolerance' when making parts for engineering assemblies.

.....
.....
.....
..... [3]

(c) Many products use pre-manufactured standard components in their assembly.

Explain why manufacturers often use pre-manufactured standard components when assembling their products.

.....
.....
.....
..... [3]

[Total: 12]

Section B

Answer **all** questions.

- 4 Fig. 3 shows a support bracket for a fire extinguisher. The bracket is made from mild steel.

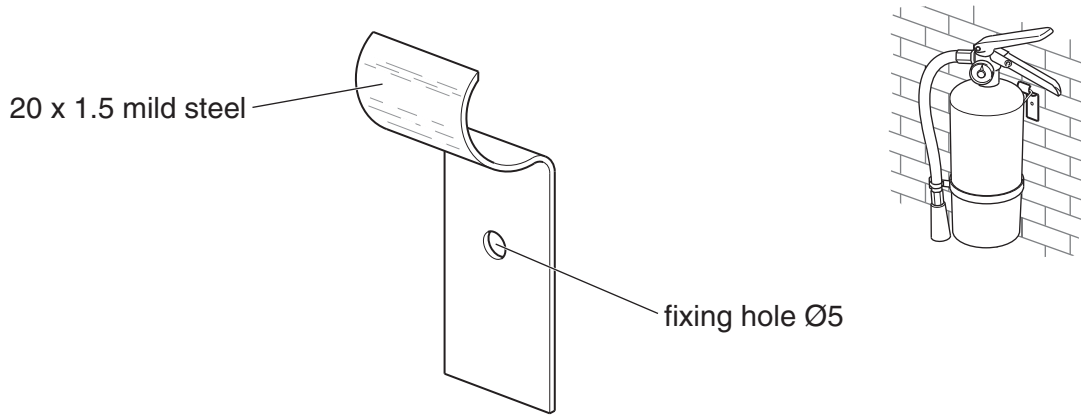


Fig. 3

- (a) Give **two** reasons why mild steel is a suitable material for the support bracket shown in Fig. 3.

1

2 [2]

- (b) The support bracket shown in Fig. 3 has a number of design faults.

Give **three** design faults in the support bracket and, in each case, state how the design could be improved.

Fault 1

Improvement

Fault 2

Improvement

Fault 3

Improvement [6]

(c) The support bracket shown in Fig. 3 will be manufactured in batches.

Use sketches and notes to design a jig to use when drilling the $\text{Ø}5$ fixing hole.

The jig must:

- locate the bracket accurately
- hold the bracket firmly for drilling
- allow the bracket to be drilled quickly
- be safe to use.

[4]

[Total: 12]

5 (a) A variety of workshop processes are listed below.

brazing drilling centre lathe turning milling finishing/sanding

Choose **one** of the processes from the list and give **three** safety precautions that are specific to that process.

Chosen process

Specific safety precautions

1

2

3 [3]

(b) Manufacturers are required to carry out risk assessments in their factories.

Give the **three** key stages of carrying out a risk assessment.

1

.....

2

.....

3

..... [3]

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