



Wednesday 4 June 2014 – Morning

GCSE DESIGN AND TECHNOLOGY Industrial Technology

A545/01 Sustainability and Technical Aspects of Designing and Making

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

None

Duration: 1 hour 30 minutes



Candidate forename		Candidate surname	
Centre number		Candidate number	

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 **80**.
- All dimensions are in millimetres.
- The quality of your written communication will be taken into account in marking your answers to the questions marked with an asterisk (*).
- This document consists of **16** pages. Any blank pages are indicated.

SECTION A

Answer **all** questions.

You are advised to spend 40 minutes on this section.

On questions 1 – 5 circle your answer.

1 The 6R rethink means:

- (a) To think if a product can be used for a different purpose
- (b) To think how a product can do its job better
- (c) To think how a product can be exported
- (d) To think how a product can be sold for more profit

[1]

2 Solar power is:

- (a) A renewable energy source
- (b) A non-renewable energy source
- (c) A recyclable form of energy
- (d) A non-recyclable form of energy

[1]

3 Conversion of waste products into new materials is called:

- (a) Green energy
- (b) Recycling
- (c) Incineration
- (d) Material waste

[1]

4 On which material is the following recycling symbol found?



- (a) Polystyrene
- (b) Polyvinyl chloride
- (c) Polypropylene
- (d) Low density polyethylene

[1]

5 Measures taken by companies to reduce their carbon footprint are called:

- (a) Risk assessment
- (b) Reforestation
- (c) Carbon assessment
- (d) Carbon offsetting

[1]

3

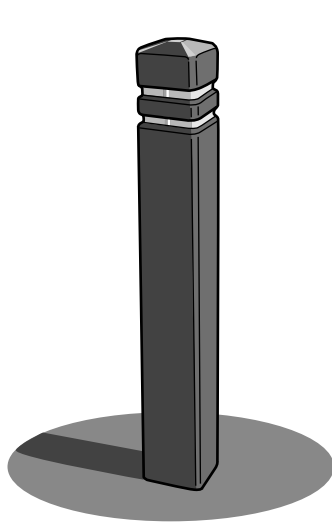
- 6 Name the type of recycling that involves the second-hand use of a product.
 [1]
- 7 Name the term used to describe the stages a product goes through from conception to decomposition.
 [1]
- 8 State **one** way in which burning fossil fuels causes harm to the environment.
 [1]
- 9 Name the 6R that describes when a product is mended.
 [1]
- 10 Give the term that means a product is designed to minimise its environmental impact.
 [1]

Decide whether the statements below are **true** or **false**.

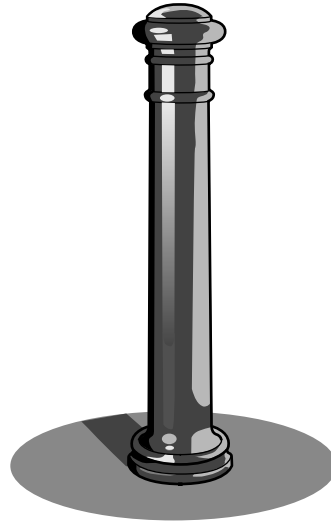
Tick (✓) the box to show your answer.

	True	False	
11 Reusing products is good for the environment.	☐	☐	[1]
12 The consumption of fossil fuels is likely to result in an energy crisis.	☐	☐	[1]
13 Hydro-power is non-renewable.	☐	☐	[1]
14 Built-in-obsolescence is environmentally friendly.	☐	☐	[1]
15 All thermoplastics can be recycled.	☐	☐	[1]

16 Fig. 1 shows two safety bollards.



Bollard A – made of plastic



Bollard B – made of cast aluminium

Fig. 1

- (a) (i) Bollard **A** is made from recycled plastic products.

State the term used to describe this type of recycling.

..... [1]

- (ii) Give **one** product that could be recycled to make Bollard **B**.

..... [1]

- (b) Fig. 2 shows a wooden bollard.

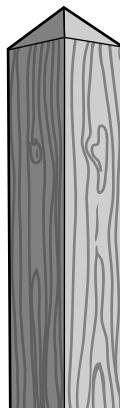


Fig. 2

- (i) Explain how wood can be sustainably sourced.

.....

 [2]

5

(ii) The wooden bollard is to be used in a children's playground.

Use sketches and notes to show design modifications that will improve its:

- safety
- visibility
- appearance.

[4]

6

- (c) Give **two** disadvantages of a wooden bollard compared to the plastic and aluminium bollards shown in Fig. 1.

1

.....

2

.....

[2]

- (d) (i) The wooden bollard is to be manufactured locally.

Explain the benefits of manufacturing locally.

.....

.....

.....

.....

.....

..... [3]

- (ii) Give **one** reason why a company might choose to manufacture its products in the Far East.

.....

..... [1]

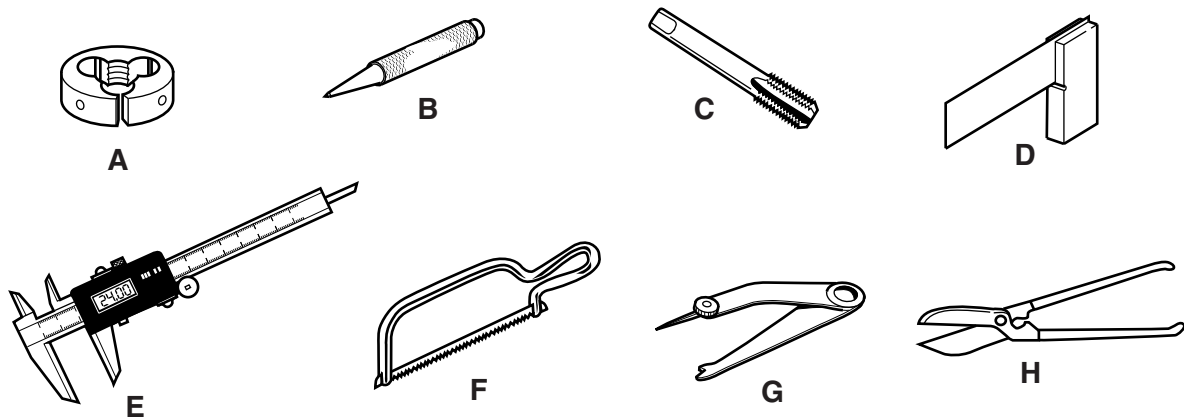
..... [6]

8

SECTION BAnswer **all** questions.

You are advised to spend 50 minutes on this section.

- 17 Fig. 3 shows a number of hand tools used in a school workshop.

**Fig. 3**

- (a) Complete the table below by showing which one of these tools should be used for each task.

The first one has been done for you.

Task	Tool used
Checking that the end of a piece of metal is square after filing it	D
Marking a line parallel to the edge of a piece of metal	
Cutting a thread in a hole	
Marking the position of a hole in a piece of metal before drilling it	
Cutting a piece off the end of a round metal rod 3mm thick	
Measuring the thickness of a piece of metal or plastic	

[5]

9

(b) Fig. 4 shows a centre lathe.

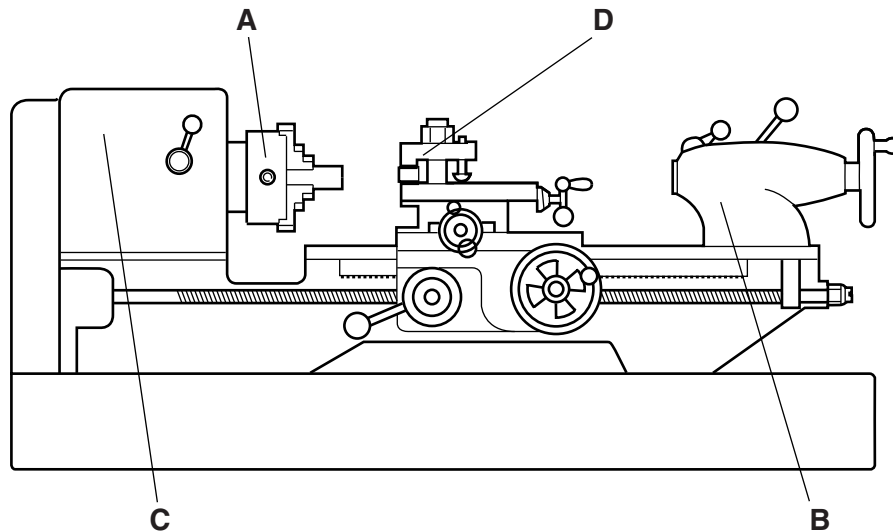


Fig. 4

(i) Name the **four** parts of the centre lathe labelled in Fig. 4.

- A
- B
- C
- D [4]

(ii) Give **three** safety precautions that should be taken when using a centre lathe.

- 1
- 2
- 3 [3]

(c) Explain the advantages of using Computer Numerically Controlled (CNC) machines compared with manually operated machines.

-
-
-
-
- [3]

10

18 Fig. 5 shows a menu holder with a vacuum formed plastic base.

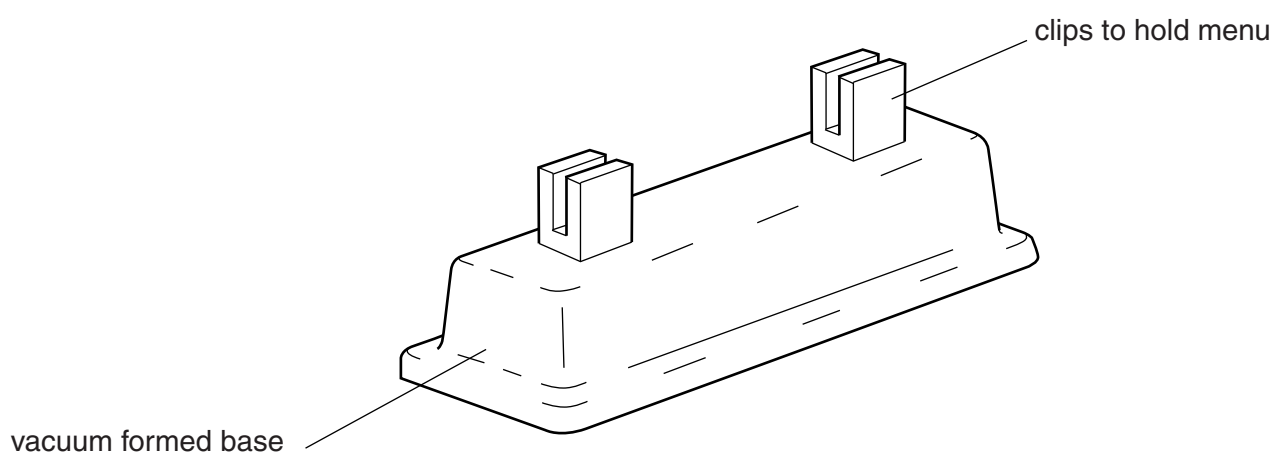


Fig. 5

(a) Complete the list below to give the stages needed to vacuum form the base shown in Fig. 5.

- | | |
|---------|---|
| Stage 1 | Place the mould in the vacuum forming machine |
| Stage 2 | Clamp a sheet of plastic in place |
| Stage 3 | |
| Stage 4 | |
| Stage 5 | |
| Stage 6 | |
| Stage 7 | Remove the finished vacuum formed base from the machine |
| Stage 8 | Cut excess plastic away from the base |

[4]

(b) Describe how CAD/CAM might be used to produce the mould for the vacuum formed plastic base.

.....

.....

.....

.....

.....

..... [3]

11

(c) Fig. 6 shows the finished base.

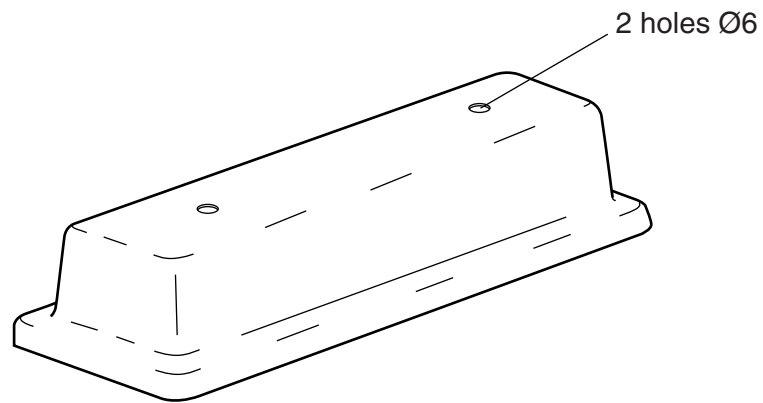


Fig. 6

Design a jig that could be used when drilling the Ø6 holes in the base.
The jig must:

- hold the base securely for drilling
- ensure that the holes are positioned accurately
- allow the holes to be drilled quickly and safely
- ensure that the base will not be damaged when being drilled.

[4]

12

(d) Fig. 7 shows another menu holder, also made of a thermoplastic material.

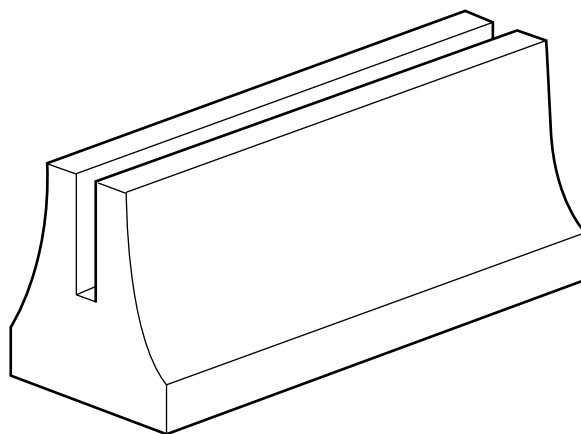


Fig. 7

- (i) Give **three** benefits to a manufacturer of producing the menu holder shown in Fig. 7 rather than the one shown in Fig. 5.

1

2

3 [3]

- (ii) Name **one** industrial process that could be used for high-volume production of the menu holder shown in Fig. 7.

..... [1]

19 A list of materials is given below.

Brass	GRP
Carbon fibre	HIPS
Cast iron	Polycarbonate
Copper	Stainless steel

(a) Choose a suitable material from the list to complete each of the following statements.

1 is a ferrous metal.

2 is an alloy.

3 is a composite.

[3]

(b) Explain what is meant by the term 'non-ferrous alloy'.

.....

.....

.....

.....

.....

..... [3]

(c)* Explain the advantages and disadvantages of making products from plastics rather than metals.

..... [6]

15

(d) Explain the benefits to a manufacturer of using the 'just in time' (JIT) system of manufacturing.

.....

.....

.....

.....

.....

..... [3]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.