OCR
RECOGNISING ACHIEVEMENT

Wednesday 15 May 2013 – Morning

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	

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 **60**.
- 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 **12** pages. Any blank pages are indicated.

SECTION A

Answer **all** questions.

1 Fig. 1 shows a variety of pre-manufactured components used when assembling metal parts.

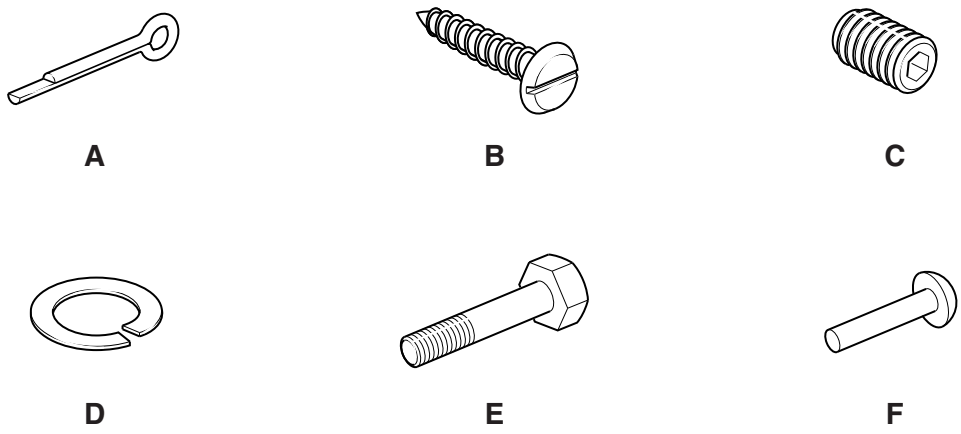


Fig. 1

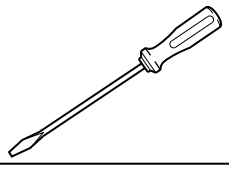
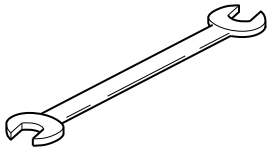
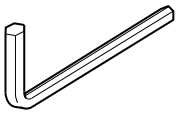
(a) (i) Complete the table below by giving the correct name for each component. One has been done for you.

Component	Name
A	**Split pin**
B	
C	
D	
E	
F	

[5]

(ii) The table below shows three tools used with components shown in Fig. 1.

Complete the table by naming each tool and giving the component it is used with. One has been done for you.

Tool	Name	Used With
	Screwdriver	**B**
		
		

[4]

(b) Give **three** benefits of using pre-manufactured components when making products.

1 .....

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2 .....

.....

3 .....

.....

[3]

[Total: 12]

2 A list of materials is given below.

ABS	**high speed steel**
brass	**lead**
carbon fibre	**mild steel**
cast iron	**polycarbonate**
copper	**stainless steel**

(a) Choose **two** materials from the list that are **ferrous** metals.

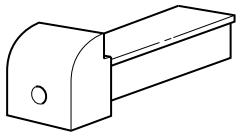
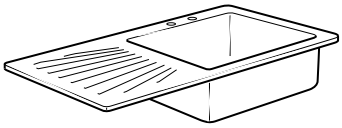
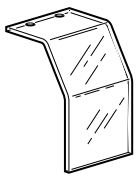
1 .....

2 .....

[2]

(b) Complete the table below by choosing a suitable material from the list above for each product shown.
Give a reason for your choice of material.

Each material can only be used once.

	Product	Material	Reason
	Twist drill	High speed steel	It stays hard when it gets hot.
	Bench vice jaw		
	Kitchen sink		
	Lathe chuck guard		

[6]

(c) Choose **one** product from the table in part **(b)**.

Product .....

Name **one** industrial process used to manufacture the product in large quantities.

.....

[1]

(d) Explain, using **one** example, what is meant by the term 'smart material'.

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

[Total: 12]

3 Fig. 2 shows a line diagram of an injection moulding machine.

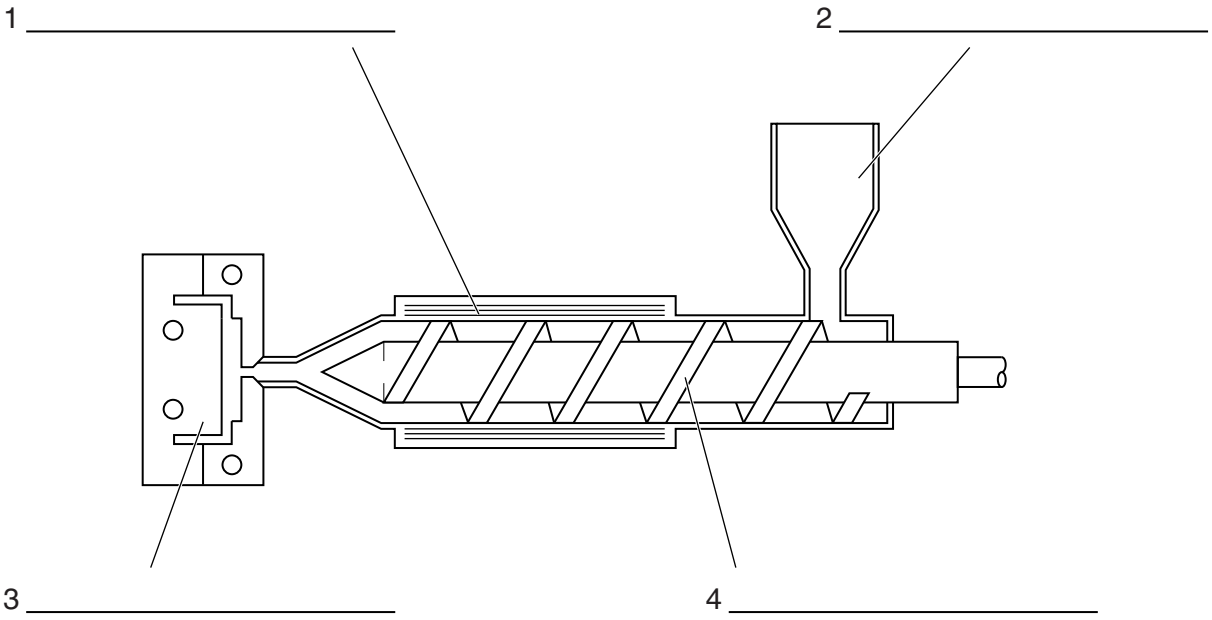

Fig. 2

(a) (i) Complete Fig. 2 by labelling the **four** parts of the injection moulding machine. **[4]**

(ii) Name **two** other plastics moulding processes.

1 .....

2 .....

[2]

(b)* Explain the benefits of making products using plastics moulding processes.

Marks will be awarded for the quality of written communication in your answer.

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[Total: 12]

SECTION B

Answer **all** questions.

4 Fig. 3 shows a coat hook made in a school workshop from 5 mm thick aluminium alloy.

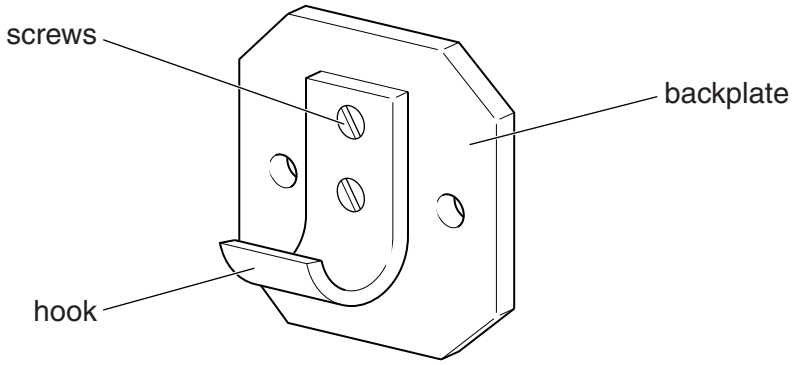


Fig. 3

(a) The hook is fixed to the backplate using M4 countersunk screws.

Complete the table below by giving the processes and tools needed to cut the M4 threads in the backplate.

Stages	Process	Tools
1	Mark out position of holes	Try square and scriber
2		
3	Drill holes for threads	Ø3.3 drill
4		
5	Clean off burrs and sharp edges	

[5]

(b) (i) State **one** other method of fixing the hook to the backplate without using heat.

..... **[1]**

(ii) Name **two** industrial processes that could be used to cut out the backplate.

1 .....

2 .....

[2]

(c) The coat hook shown in Fig. 3 is to be made in batches of 50.

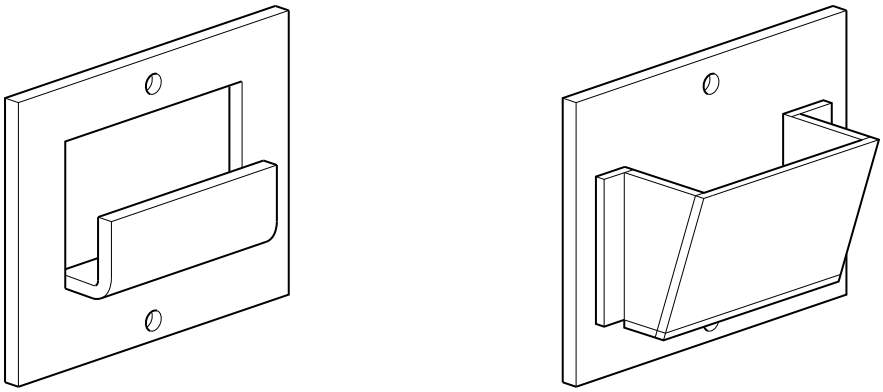
Design a jig that could be used when bending the hooks.

The jig must:
- locate the metal accurately
- hold the metal securely for bending
- allow the hook to be bent easily
- ensure that all the hooks produced are identical.

[4]

[Total: 12]

5 Fig. 4 shows two display units for brochures and leaflets.
Both of the display units are made from acrylic sheet.



A **B**

Fig. 4

(a) (i) Give **two** benefits to the user of display unit **A** compared with display unit **B**.

1 .....

2 .....
[2]

(ii) Give **two** benefits to the manufacturer of producing display unit **A** rather than display unit **B**.

1 .....

2 .....
[2]

(b) Acrylic is a thermoplastic material.

Explain why it is better for the environment to make products from thermoplastics rather than thermosetting plastics.

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

(c)* Explain the advantages and disadvantages of using the 'just in time' (JIT) manufacturing system.

Marks will be awarded for the quality of written communication in your answer.

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[Total: 12]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE