

Draft - subject to accreditation and change

Paper Reference(s)

**XX/XXXX**

**Edexcel GCSE**  
**Manufacturing (Double Award)**  
**Engineering (Double Award)**  
Unit 3: Application of Technology  
Paper 4: Engineering Fabrication

Time: 1½ hours

**Materials required for examination**

Notes and sketches collected during  
your Pre-release research.  
Ruler, Pen, Pencil, Rubber.

**Items included with question papers**

Nil

**Instructions to Candidates**

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In the boxes above, write your centre number, candidate number, your surname, initials and signature.  
Check that you have the correct question paper.

Answer **ALL** the questions. Write your answers in the spaces provided in this question paper.

Indicate which questions you are answering by marking the box ([X]).

If you change your mind, put a line through the box ([X]) and then indicate your new question with a cross ([X]).

**Information for Candidates**

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The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).

There are 13 questions in this question paper. The total mark for this paper is 110.

There are 18 pages in this question paper. Any blank pages are indicated.

**Advice to Candidates**

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Quality of written communication will be taken into account in the marking of your responses to Questions 7, 9, 10, 11, 12 and 13. These questions are indicated with an asterisk. Quality of written communication includes clarity of expression, the structure and presentation of ideas and grammar, punctuation and spelling.

**NXXXXXX**

W850/.../57570

**Answer ALL questions in Section A and Section B**

**SECTION A**

**Answer ALL questions in this section. Write your answers in the space provided.**

1. All of the products listed below belong to an engineering sector.

(a) Tick **two** boxes below where the products belong to the **engineering fabrication** sector.

Products	Tick <b>two</b> boxes below
Sun-tan lotion	
Door handles	
Calculator	
Modular climbing frames	
Street maps	
Football shin pads	

(2)

(b) Tick **two** boxes below where the products belong to the **engineering fabrication** sector.

Products	Tick <b>two</b> boxes below
Filing cabinets	
Mouthwash	
Fuel injection systems	
Shopping trolley	
High energy snack bar	
Leather wallet	

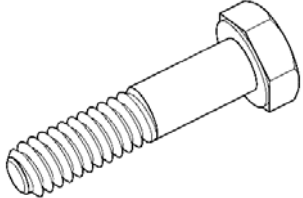
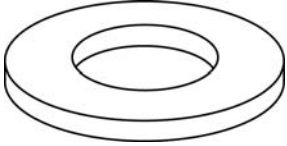
(2)

**(Total 4 marks)**

2. The tables show some components used in the engineering of products.

(a) Complete Table 1 by naming each component.



Table 1

Component	Component name	Use
		A rotating fastener used to bind two materials together.
		Used with a rotating fastener to spread the load

(2)

b) Complete Table 2 by explaining what each component is used for.

Table 2

Component	Component name	Use
	Nut	
	Pop Rivet	

(4)

**(Total 6 marks)**

3. Draw a straight line to link each Term listed below to the correct Key Area.  
Each Key Area can be used more than once.

**Term**

**Key Area**

Shape memory alloy

Modern materials

Computer-integrated manufacture (CIM)

Internet Sites

Control technology

Titanium

Carbon Fibre

Information and Communications Technology (ICT)

Process Control

Spreadsheets

(7)

**(Total 7 marks)**

4. Paper hole punches belong to the engineering fabrication sector.

(a) Name **one** other product from this sector, apart from a paper hole punch, that utilises control technology and modern materials in its manufacture.

.....  
(1)

(b) (i) State **one** modern material used in the manufacture of the product you named in 4(a).

.....  
(1)

(ii) Explain **two** benefits to the **manufacturer** of using this material.

Benefit 1 .....  
.....

Benefit 2 .....  
.....  
(4)

(c) (i) State **one** type of control technology used in manufacturing.

.....  
(1)

(ii) Explain **one** advantage to the **manufacturer** of using control technology.

.....  
.....  
(2)

(iii) Explain **one** disadvantage to the **manufacturer** of using control technology.

.....  
.....  
(2)

**(Total 11 marks)**

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5. Computer-aided design (CAD) and Computer-aided manufacture (CAM) are both used by manufacturers of fabricated products.

(a) Describe **one** use of CAM when manufacturing products.

.....  
.....  
(2)

(b) (i) State **two** benefits to the **consumer** of using CAM when manufacturing.

1.....  
2.....  
(2)

(ii) Explain **two** benefits to a **manufacturer**, of using computer-aided design (CAD).

benefit 1.....  
.....  
(2)

benefit 2.....  
.....  
(2)

**(Total 8 marks)**

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6. Communications technologies is widely used by manufacturers.

(a) Explain the term 'communications technology'.

.....  
.....

(2)

(b) Mobile phones and email are examples of communications technologies.

(i) Name **one** other example of communications technology.

.....

(1)

(ii) Name the traditional communications method this has replaced.

.....

(1)

(iii) Explain **one** advantage to the manufacturer of using this replacement communications technology.

.....  
.....

(2)

(iv) Explain **one** disadvantage to the manufacturer of using the replacement communications technology.

.....  
.....

(2)

**(Total 8 marks)**

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7. Computer-integrated manufacturing systems (CIM) are used in the engineering of fabricated products.

(a) Describe **one** main feature of a CIM system.

.....  
.....  
.....  
.....

**(2)**

(b) Explain **two** benefits to the manufacturer of using CIM in the production of fabricated products.

Benefit 1 .....

.....  
.....  
.....

Benefit 2 .....

.....  
.....  
.....

**(4)**

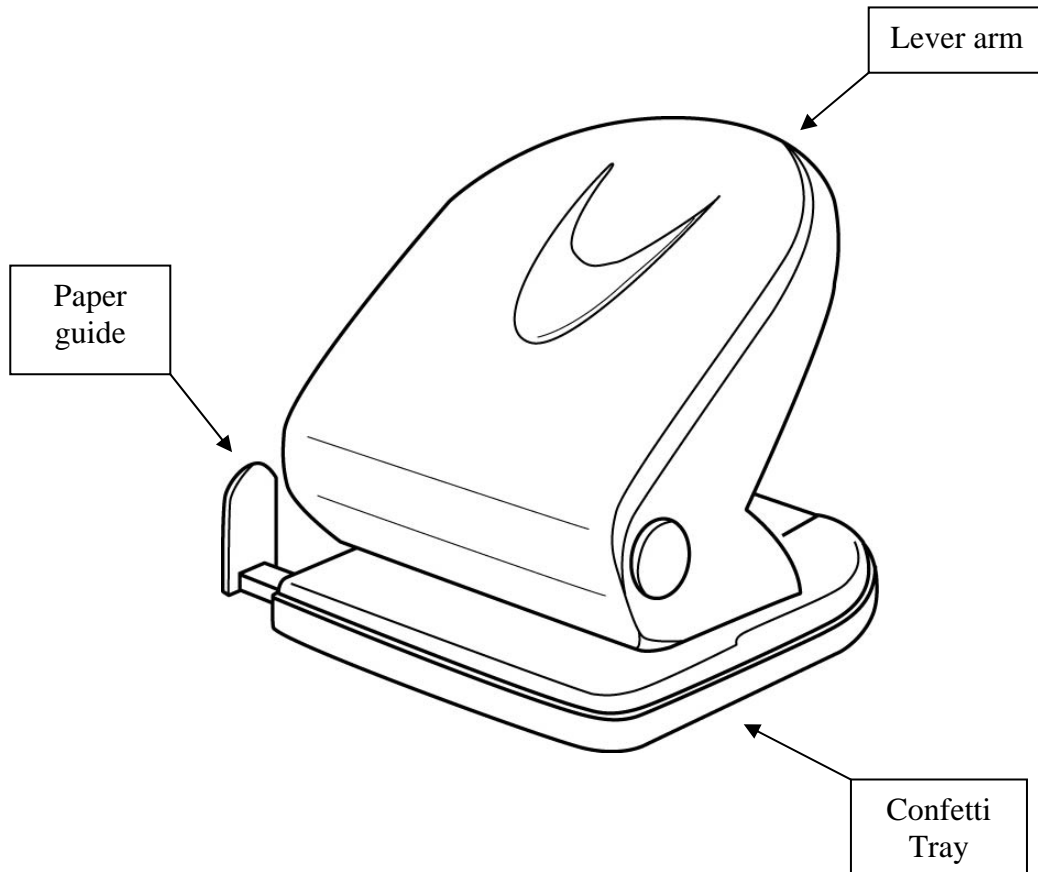
**(Total 6 marks)**

**TOTAL FOR SECTION A: 50 MARKS**

### SECTION B

Answer ALL questions in section B with reference to the manufacture of mass produced paper hole punches. Write your answers in the spaces provided.

The diagram below shows a **paper hole punch**.



8. Describe, using notes and sketches:

(a) the function of the paper guide.

Paper guide

(3)

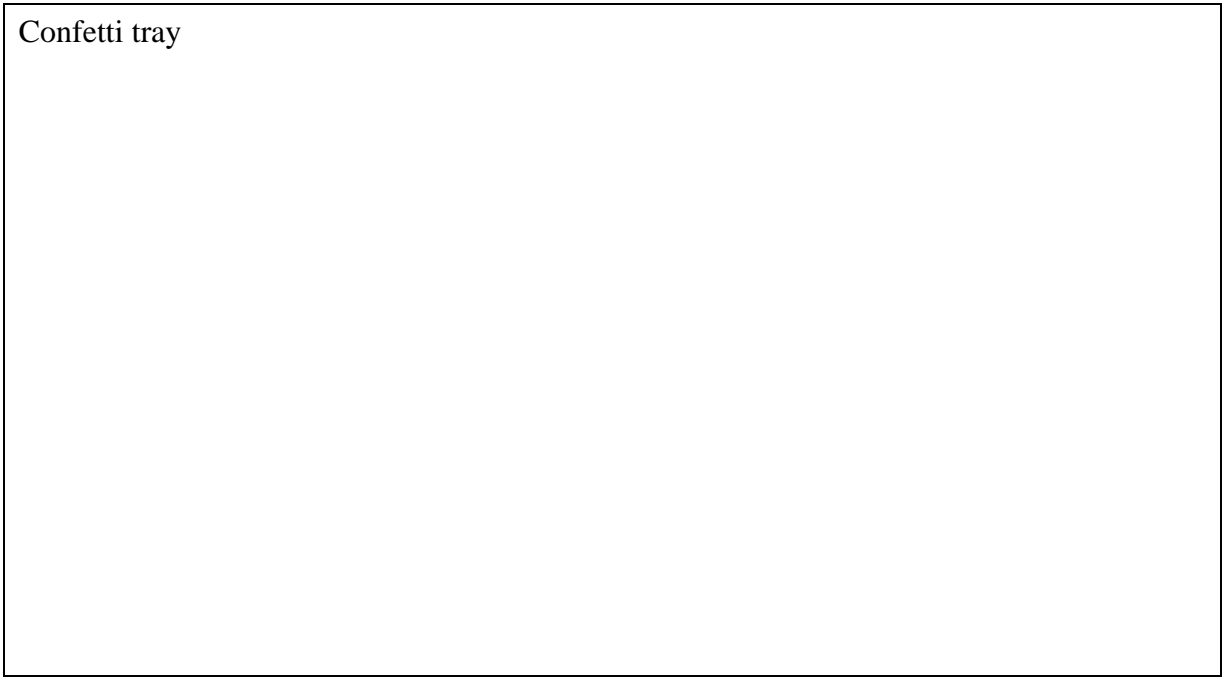
(b) the function of the lever arm.

Lever arm

(3)

(c) the function of the confetti tray.

Confetti tray



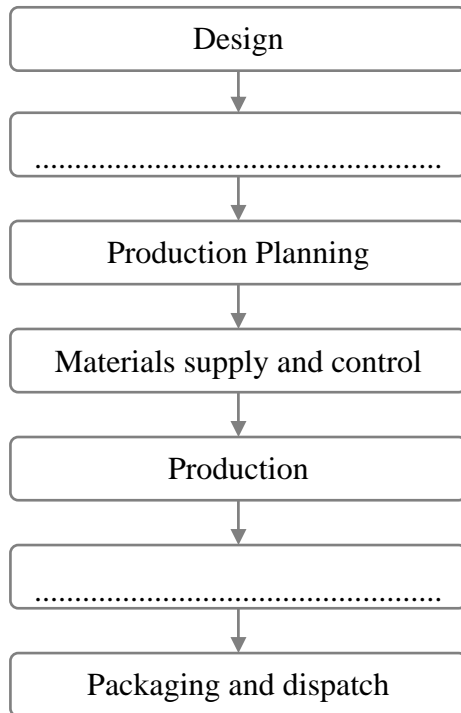
**(3)**

**(Total 9 marks)**

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9. (a) The incomplete flow diagram below indicates some of the main stages in manufacturing the paper hole punch.

(i) Complete the flow diagram by writing the two missing main stages in manufacturing paper hole punches.



(2)

(ii) State the stage where the lever arm is press formed.

Stage .....

(1)

(b) Describe the following **two** stages in the manufacture of paper hole punches.

(i) Design.....  
.....  
.....  
.....  
.....  
.....  
**(3)**

(ii) Production planning .....  
.....  
.....  
.....  
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.....  
**(3)**

**(Total 9 Marks)**

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10. Certain materials are used in the manufacture of the paper hole punch.

(a) (i) State a specific polymer commonly used in the manufacture of the paper hole punch.

.....  
(1)

(ii) Explain how the use of steel has helped to improve the function of the blade cylinders on the paper hole punch.

.....  
.....  
.....  
(2)

(b) Explain why press forming is a suitable process for the production of the lever arm of the paper hole punch.

.....  
.....  
(2)

(c) State **two** production processes other than press forming used in the manufacture of paper hole punches.

Process 1.....  
Process 2.....  
(2)

(d) Explain how the use of modern materials has made paper hole punches appeal to office personnel.

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(3)

**(Total 10 Marks)**

11. Quality control is used in the manufacture of paper hole punches.

(a) Explain the term “quality control”.

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(2)

(b) (i) Describe **one** quality control procedures used at the production stage of the manufacture of paper hole punches.

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.....  
.....

(2)

(ii) Describe **one** benefit to the manufacturer of applying the type of quality control procedure named in (b)(i).

.....  
.....  
.....

(2)

(iii) Describe **one** benefit to the consumer of applying the type of quality control procedure named in (b)(i).

.....  
.....  
.....

(2)

(c) Explain the difference between open-loop and closed-loop quality control systems.

.....  
.....  
.....  
.....  
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.....

(4)

**(Total 12 marks)**

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12. Information and communications technology (ICT) plays an important role in the manufacture of paper hole punches.

(a) (i) Describe **one** use of ICT in the **design** stage of the paper hole punch.

.....  
.....

(2)

(ii) State **two** benefits of the use of ICT at the **design** stage.

.....  
.....  
.....  
.....

(2)

(b) (i) Describe **one** use of computer control in the packaging and dispatch stage of manufacturing the paper hole punch.

.....  
.....

(2)

(ii) Explain **two** advantages of using computer control at the packaging and dispatch stage.

Advantage 1 .....

.....  
.....  
.....

Advantage 2 .....

.....  
.....  
.....

(4)

**(Total 10 Marks)**

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13. Systems and control technology are used in modern engineering manufacturing processes.

(a) Evaluate the effect of the use of systems and control technology on “materials supply and control”.

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**(5)**

(b) Evaluate the effect of the use of systems and control on the working environment.

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**(5)**

**(Total 10 Marks)**

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**TOTAL FOR SECTION B: 60 MARKS**

**TOTAL FOR PAPER: 110 MARKS**

**END**

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