

Write your name here

Surname

Other names

Centre Number

Candidate Number

**Edexcel GCSE**

**Manufacturing (Double Award)  
Engineering (Double Award)  
Unit 3: Application of Technology in  
Engineering and Manufacturing  
Paper D: Engineering Fabrication**

Monday 16 May 2011 – Afternoon  
**Time: 1 hour 30 minutes**

Paper Reference

**5EM03/3D**

**You must have:**

Notes and sketches collected during your pre-release research.  
Ruler, pen, pencil, rubber.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*

### Information

- The total mark for this paper is 110.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed  
– *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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## SECTION A

Answer ALL questions.

Some questions must be answered with a cross . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .

1 All of the products listed below belong to a manufacturing sector.

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

(2)

Food processor	<input type="checkbox"/>
Perfume	<input type="checkbox"/>
Steel rule	<input type="checkbox"/>
Garden fork	<input type="checkbox"/>
Business card	<input type="checkbox"/>
Computer mouse	<input type="checkbox"/>

(b) Put a cross  in the **two** boxes below where the products belong to the **engineering fabrication** sector.

(2)

Supermarket receipt	<input type="checkbox"/>
Recycled envelope	<input type="checkbox"/>
Door key	<input type="checkbox"/>
Mobile phone	<input type="checkbox"/>
Saxophone	<input type="checkbox"/>
Repositionable sticky notes	<input type="checkbox"/>

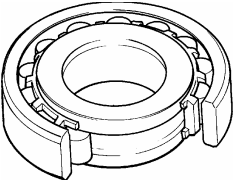

(Total for Question 1 = 4 marks)



2 The tables below show some components used during the manufacture of engineering fabrication products.

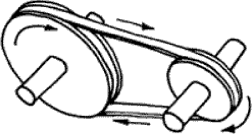

(a) Complete Table 1 by naming each component.

(2)

Table 1		
Component	Component name	Use
		Used to reduce the friction between a rotating component and a stationary component.
		Used to transfer and reverse rotary motion from one shaft to another and may change the speed.

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

(4)

Table 2		
Component	Component name	Use
	Pulley and belt system	
	Solid rivet	

(Total for Question 2 = 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.

<b>Term</b>	<b>Key Area</b>
Bluetooth	
Robotics	Modern materials
Polypropylene (PP)	
Aluminium alloy	Control technology
Video conferencing	
Computer aided manufacture (CAM)	Information and communications technology (ICT)
Polyvinyl chloride (PVC)	

**(Total for Question 3 = 7 marks)**



4 Shopping trolleys belong to the engineering fabrication sector.

(a) Name **two** other products from this sector, apart from a shopping trolley, that utilise modern materials in their manufacture.

(2)

1 .....

2 .....

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

(1)

.....

(ii) Explain **two** benefits to the **manufacturer** of using the modern material named in 4(b)(i).

(4)

1 .....

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2 .....

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(c) (i) State **two** smart materials used in the engineering fabrication sector.

(2)

1 .....

2 .....

(ii) Describe the characteristics of **one** smart material named in 4(c)(i).

(2)

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**(Total for Question 4 = 11 marks)**



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

(a) Describe why a **manufacturer** would use CAD rather than traditional methods. (2)

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(b) (i) State **two** benefits to the **manufacturer** of using CAM. (2)

1 .....

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2 .....

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(ii) Explain **two** benefits to the **distributor** when the manufacturer uses CAD and CAM. (4)

1 .....

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2 .....

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**(Total for Question 5 = 8 marks)**



6 Systems and control technologies are widely used by manufacturers of engineering fabrication products.

(a) Explain the term 'systems and control technology'.

(2)

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(b) Robotics is an example of a systems and control technology.

(i) Name **one** other example of a systems and control technology.

(1)

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(ii) Name the traditional method this has replaced.

(1)

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.....

(iii) Explain **two** benefits of using robotics in hazardous conditions.

(4)

1 .....

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2 .....

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**(Total for Question 6 = 8 marks)**





**7** Handling information and data is an essential feature in engineering fabrication companies.

Explain **one** implication that information and data handling systems have for:

(a) marketing

(3)

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(b) materials supply.

(3)

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**(Total for Question 7 = 6 marks)**

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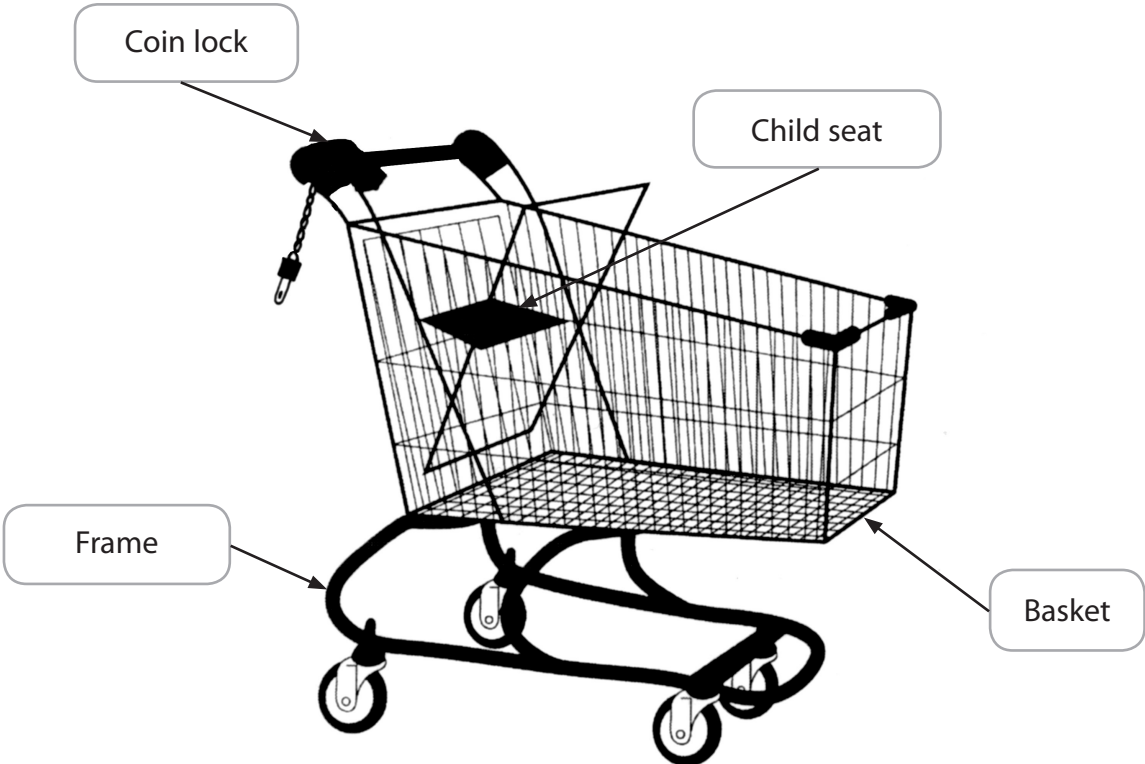
**TOTAL FOR SECTION A = 50 MARKS**



SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass produced shopping trolleys.

The diagram below shows a shopping trolley.

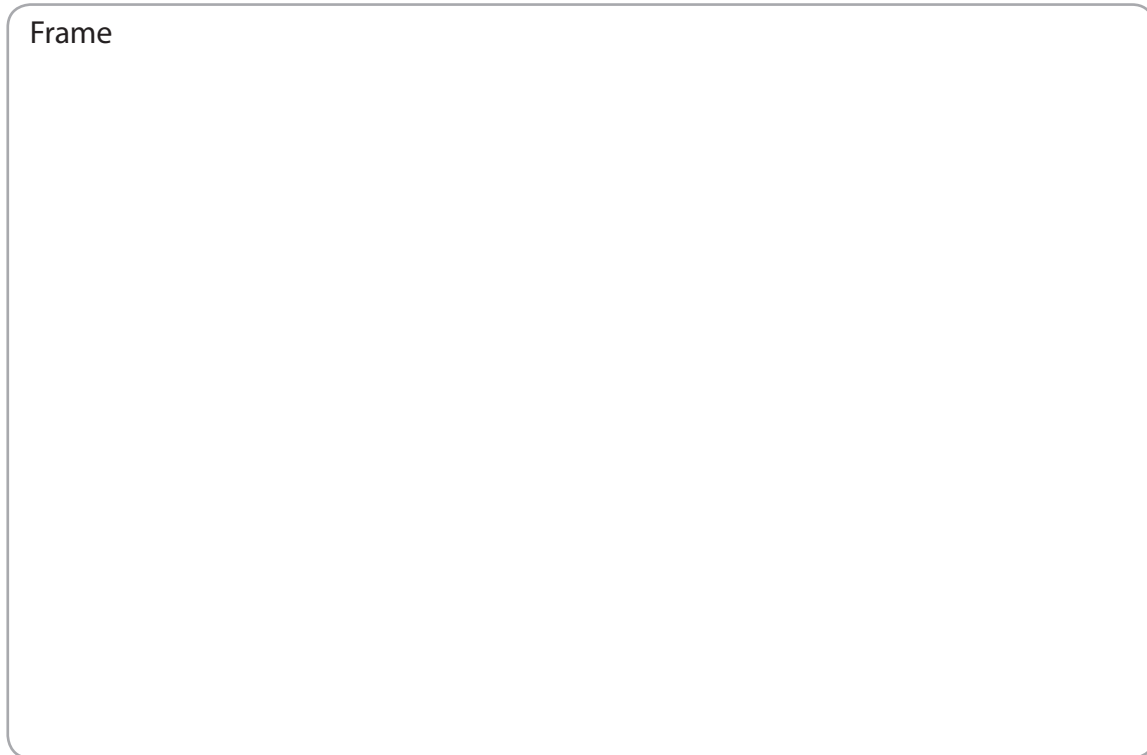


8 Describe, using notes and sketches:

(a) the function of the frame

(3)

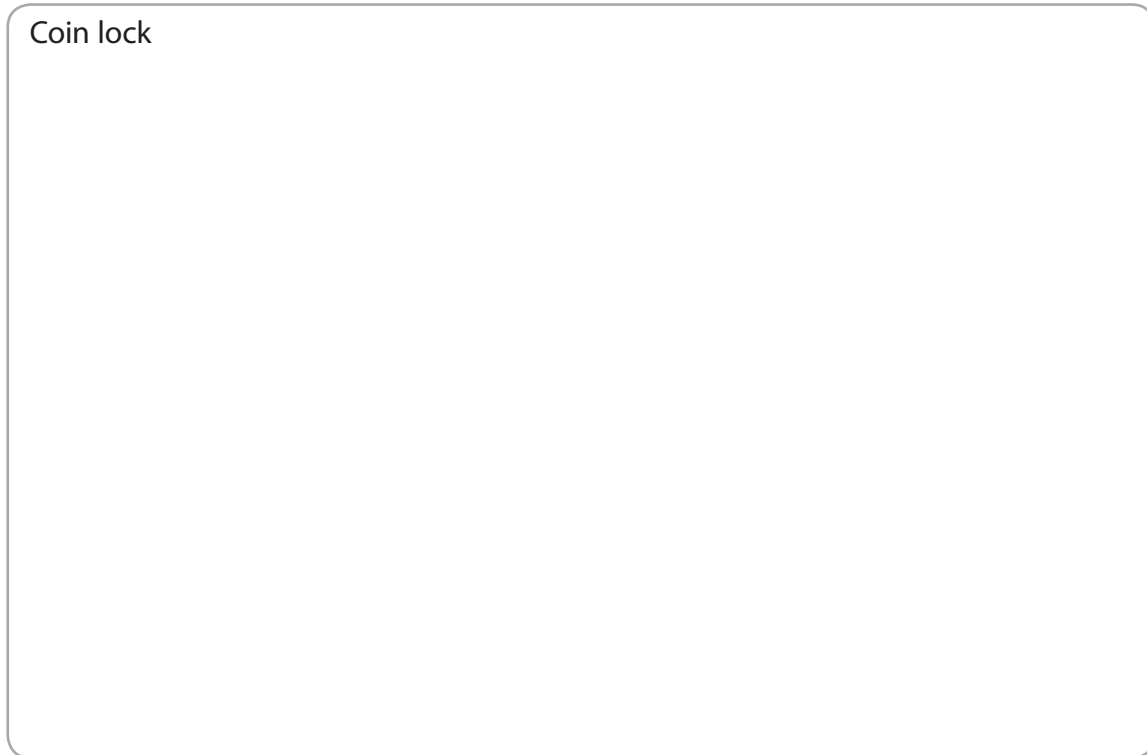
Frame



(b) the function of the coin lock

(3)

Coin lock



(c) the function of the basket.

(3)

Basket

**(Total for Question 8 = 9 marks)**



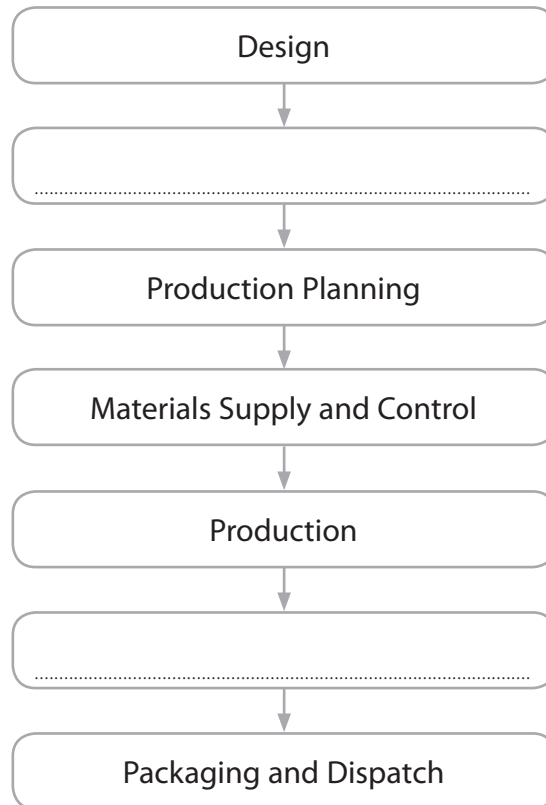
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9 (a) The incomplete flow diagram below indicates some of the main stages in manufacturing shopping trolleys.

(i) Complete the flow diagram by writing the **two** missing main stages in manufacturing shopping trolleys.

(2)



(ii) State the stage where ideas for a new coin lock would be first developed.

(1)

Stage

.....



(b) Describe the following **two** stages in the manufacture of shopping trolleys.

(i) Production planning

(3)

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(ii) Packaging and dispatch

(3)

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**(Total for Question 9 = 9 marks)**



10 (a) State a specific material commonly used for the shopping trolley basket.

(1)

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(b) Spot welding is used to construct the basket of the shopping trolley.

(i) State **three** production processes, other than spot welding, used during the manufacture of shopping trolleys.

(3)

Process 1

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Process 2

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Process 3

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(ii) Explain why spot welding is a suitable process for joining the wires of the basket.

(3)

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(c) Explain how the use of modern materials has helped the manufacturer of shopping trolleys to increase sales.

(3)

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**(Total for Question 10 = 10 marks)**



11 Automation is used in the manufacture of shopping trolleys.

(a) Explain the term 'automation'.

(2)

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(b) (i) Describe **two** examples of automation used at the production stage of the manufacture of shopping trolleys.

(4)

1 .....

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2 .....

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(ii) Explain **one** benefit to the **manufacturer** of applying a type of automation described in 11(b)(i).

(2)

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(iii) Explain **one** benefit to the **consumer** of applying a type of automation described in 11(b)(i).

(2)

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(c) Explain the difference between automation and mechanisation.

(2)

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**(Total for Question 11 = 12 marks)**

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**12** Communications technology and quality control play an important role in the manufacture of shopping trolleys.

(a) (i) State **two** types of communications technology used at the **design** stage when manufacturing shopping trolleys.

(2)

1 .....

2 .....

(ii) Using an example from 12(a)(i), describe **one** benefit of the use of communications technology at the **design** stage.

(2)

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(b) During the manufacture of shopping trolleys, physical damage quality checks are carried out.

(i) State **one** other quality check used during the **production** stage.

(1)

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(ii) Describe how the quality check stated in 12(b)(i) would be carried out.

(2)

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(iii) Explain the benefits of the use of quality control to the shopping trolley end user.

(3)

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**(Total for Question 12 = 10 marks)**

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