

Draft - subject to accreditation and change

Paper Reference(s)

**XXXX/XX**

**Edexcel GCSE**

**Engineering (Double Award)**

Unit 1: Engineering Design and Graphical  
Communication

Sample Controlled Assessment Tasks and  
Grids

**Information**

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Please see the contents of this document.

# Controlled assessment task

## Unit 1: Engineering Design and Graphical Communication

For this task you will produce a design solution for an engineered product which includes either:

- Mechanical components or;
- hydraulic/pneumatic components or;
- Electrical components.

In order to complete this task you will undertake the following **design** activities:

Section	Sub-section	Suggested times
1. Investigation	a. Analysis of the brief to identify key features of the product or service	2 - 3 hours
	b. Details of the product criteria and production constraints	
2. Design	c. Ideas and design solutions	5 - 8 hours
	d. Testing and selecting the final solution	
3. Graphical Communication	e. Interpreting engineering drawings/circuit diagrams	15 – 20 hours
	f. Selecting engineering drawing techniques	
	g. Engineering drawings and technical details	
4. Presentation and evaluation	h. Presenting and modifying the final design solution	1 - 2 hours

Suggested products are:

1. **Low voltage light**, e.g.

- Table lamp
- Handheld torch

2. **Security device**, e.g.

- Shed alarm
- Bike alarm
- Dummy surveillance camera

3. **Electrically operated toy**, e.g.

- Model car
- Automaton
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4. **Remote control**, e.g.

- Window curtains/blinds
- Entry barrier

**5. Lifting devices, e.g.**

- Hoist such as for lifting a small load vertically, or lifting a cycle on to a roof-rack
- Wheel chair lifting device

**6. Sorting device, e.g.**

- Coins
- Metallic/plastic components
- The suggested products can be contextualised to suit local centre/employer needs or where access to particular resources may be an issue.

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**Controlled conditions**

The preparation and production of students' designs and drawings must take place under controlled conditions. Students will only be allowed to produce their design portfolios during lesson time when supervised by a teacher or invigilator. Student's work must be collected in at the end of each lesson and handed back at the beginning of the next lesson.

**Feedback control**

Teachers are allowed to provide regular formative feedback throughout the creative design process. Student progression should be supported by the centre's own Assessment for Learning (AFL) strategies.

Demonstrations of practical activities are allowed in order to develop knowledge, understanding and skills and to identify health and safety issues relating to specific tools, equipment and processes.

**Collaboration control**

Where group-work occurs, evidence of individual contributions must be clearly identified and recorded.

**Resources**

Access to resources is determined by those available to the centre.

## Unit 1: Engineering Design and Graphical Communication

Section	Sub-section	Marks	Level of response	Mark range
<b>Investigation (12 marks)</b>	a) Analysing the brief*	6	<ul style="list-style-type: none"> <li>Level of response not worthy of credit.</li> </ul>	0
			<ul style="list-style-type: none"> <li>An analysis of the brief to identify basic client needs, with the identification of some key features of the engineering product.</li> </ul>	1 - 2
			<ul style="list-style-type: none"> <li>An analysis of the brief to identify the main client needs, with a description of the main key features of the engineering product.</li> </ul>	3 - 4
			<ul style="list-style-type: none"> <li>An analysis of the brief to explain the main client needs, with a justification of the main key features of the engineering product.</li> </ul>	5 - 6
	b) Details of the product criteria and production constraints*	6	<ul style="list-style-type: none"> <li>Level of response not worthy of credit.</li> </ul>	0
			<ul style="list-style-type: none"> <li>Production of a design specification that identifies basic details of the product criteria and of the production constraints.</li> </ul>	1 - 2
			<ul style="list-style-type: none"> <li>Production of a design specification that describes some of the main details of the product and of the production constraints.</li> </ul>	3 - 4
			<ul style="list-style-type: none"> <li>Production of a design specification that explains the main details of the product and of the production constraints.</li> </ul>	5 - 6

Section	Sub-section	Marks	Level of response	Mark range
<b>Design (12 marks)</b>	c) Ideas and design solutions*	6	<ul style="list-style-type: none"> <li>Level of response not worthy of credit.</li> </ul>	0
			<ul style="list-style-type: none"> <li>The generation of basic design ideas and the development of simple design solutions.</li> </ul>	1 – 2
			<ul style="list-style-type: none"> <li>The generation of alternative design ideas and the development, in some detail, of design solutions.</li> </ul>	3 – 4
			<ul style="list-style-type: none"> <li>The generation of imaginative design ideas and the development of detailed and appropriate design solutions.</li> </ul>	5 – 6
	d) Testing and selecting the final solution*	6	<ul style="list-style-type: none"> <li>Level of response not worthy of credit.</li> </ul>	0
			<ul style="list-style-type: none"> <li>Present limited testing against some of the design criteria to select the final design solution. There is little evidence of why the final design idea was chosen.</li> </ul>	1 – 2
			<ul style="list-style-type: none"> <li>Present a range of testing against the design criteria to select the final design solution. Describe in some detail how the final design solution meets the main design criteria.</li> </ul>	3 – 4
			<ul style="list-style-type: none"> <li>Present objective testing against the design criteria to select and justify the final design solution.</li> </ul>	5 – 6

	Activities	Marks	Level of response	Mark range
<b>Graphical communication (20 marks)</b>	e) Interpreting engineering drawings and circuit diagrams	6	<ul style="list-style-type: none"> <li>Level of response not worthy of credit.</li> </ul>	0
			<ul style="list-style-type: none"> <li>Read engineering drawings and circuit diagrams and name the components/features used.</li> </ul>	1 – 2
			<ul style="list-style-type: none"> <li>Read and interpret engineering drawings and circuit diagrams and name and explain the function of some of the components/features.</li> </ul>	3 – 4
			<ul style="list-style-type: none"> <li>Read and interpret engineering drawings and circuit diagrams and name and explain the function of all of the components/features used.</li> </ul>	5 – 6
	f) Selecting engineering drawing techniques	6	<ul style="list-style-type: none"> <li>Level of response not worthy of credit</li> </ul>	0
			<ul style="list-style-type: none"> <li>Selection and use of a limited range of engineering drawing techniques to communicate some aspects of the final solution. The selection of the drawing techniques takes some account of the purpose of the drawing.</li> </ul>	1 – 2
			<ul style="list-style-type: none"> <li>Selection and use of a range of engineering drawing techniques to communicate, in some detail, the final solution. The selection of the drawing techniques takes some account of the purpose of the drawing and the intended audience.</li> </ul>	3 – 4
			<ul style="list-style-type: none"> <li>Selection and use of an effective range of engineering drawing techniques to communicate, in detail, the final solution. The selection of the draw techniques takes considered account of the purpose of the drawing and the intended audience.</li> </ul>	5 – 6

	Activities	Marks	Level of response	Mark range
	g) Producing engineering drawings	8	<ul style="list-style-type: none"> <li>Level of response not worthy of credit.</li> </ul>	0
			<ul style="list-style-type: none"> <li>Production of basic engineering drawings that show limited compliance with sector-specific standards and conventions. The drawings include the use of some relevant common standard symbols.</li> </ul>	1 – 2
			<ul style="list-style-type: none"> <li>Production of engineering drawings that comply, in some detail, with sector specific standards and conventions. There is use of a range of relevant standard symbols for components which are named.</li> </ul>	3 – 5
			<ul style="list-style-type: none"> <li>Production of appropriate manual and CAD produced engineering drawings that comply with sector specific standards and conventions.</li> </ul>	6 – 8
<b>Presentation (6 marks)</b>	h) Presenting and modifying final design solution*	6	<ul style="list-style-type: none"> <li>Level of response not worthy of credit.</li> </ul>	0
			<ul style="list-style-type: none"> <li>Limited description of how the final design solution meets the brief and specification, with an identification of some relevant modifications.</li> </ul>	1 – 2
			<ul style="list-style-type: none"> <li>Description, in some detail, of how the final design solution meets the brief and specification, describing relevant modifications.</li> </ul>	3 – 4
			<ul style="list-style-type: none"> <li>A detailed explanation of how the final design solution meets the brief and specification, explaining relevant modifications.</li> </ul>	5 – 6
<b>Total marks:</b>		<b>50</b>		<b>50</b>

\* Opportunity for students to be assessed on Quality of Written Communication (strand (iii) — organise information clearly and coherently, using specialist vocabulary when appropriate).