**OCR-set Assignment**

**Sample Assessment Material**

OCR Level 1/Level 2 Cambridge National in Engineering Design Sample Set Assignment

Unit R039: Communicating designs

This is a sample set assignment which should only be used for practice.

This assignment **must not** be used for live assessment of students.

The live assignments will be available on our secure website, ‘Teach Cambridge'.

**The OCR administrative codes associated with this unit are:**

* unit entry code R039
* certification code J822

**The regulated qualification number associated with this unit is:**

603/7086/5

##### Duration: Approximately 10 - 12 hours

ALL OF THIS MATERIAL MAY BE PHOTOCOPIED. Any photocopying will be done under the terms of the Copyright Designs and Patents Act 1988 solely for the purposes of assessment.

Contents

[Information for Teachers - Using this Assignment 3](#_Toc61956225)

[Scenario for the Assignment 4](#_Toc61956226)

[Your Tasks and Marking Grids 5](#_Toc61956227)

[Task 1 – Manual production of freehand sketches 5](#_Toc61956228)

[Task 2 – Manual production of freehand sketches – design development 6](#_Toc61956229)

[Task 3 – Manual production of engineering drawings 7](#_Toc61956230)

[Task 4 – Use of Computer Aided Design (CAD) 8](#_Toc61956231)

[Marking Criteria Command Words 9](#_Toc61956232)

[Teacher Observation Record 12](#_Toc61956233)

[Teacher Observation Record Guidance Notes 13](#_Toc61956234)

# **Information for teachers** **Using this assignment**

You **must**:

* make sure you are familiar with the Assessment Guidance relating to the tasks. This is with the unit content in Section 4 of the [Specification](https://www.ocr.org.uk/qualifications/cambridge-nationals/engineering-design-level-1-2-j822/).
* make sure that you have read and understood **all** the rules and guidance provided in Section 6 of the [Specification](https://www.ocr.org.uk/qualifications/cambridge-nationals/engineering-design-level-1-2-j822/) **before** your students complete and you assess the set assignments.
* make sure that completion and assessment fully adhere to the rules and guidance provided in Section 6 of the [Specification](https://www.ocr.org.uk/qualifications/cambridge-nationals/engineering-design-level-1-2-j822/).
* provide students with the [Engineering Design Student guide to NEA assignments](https://www.ocr.org.uk/Images/620496-student-guide-to-nea-assignments.pdf) before they start the assignments.
* allow students approximately 10-12 guided learning hours (GLH) to complete all tasks.
* complete the [Teacher Observation Record](#TOR_Form) provided on page 12 for Task 3. You must adhere to the [guidance](#TOR_Guidance) given on page 13 when completing it.

You **must not**:

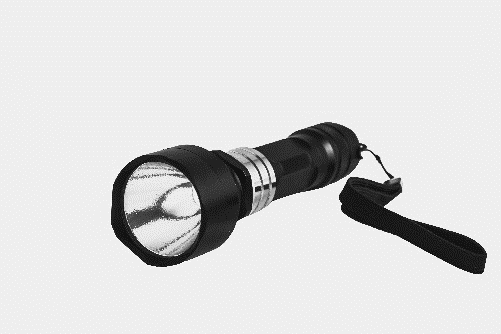
* change or modify this assignment in any way.

## Scenario for the assignment

Designing a torch

A company produces a range of torches for use in the home. Torches are an essential item to have whether used in the home, outside during the winter months or carried in the car in case of emergencies.

The company has been asked to design a free gift for a national breakdown service. As the design engineer, you have been tasked with designing the torch that will be given to new customers when they join as a member.



A torch should:

* consist of a moulded construction with space for internal components
* include a method to secure to the wrist
* be ergonomic to hold for long periods
* be aesthetically pleasing
* include a space for corporate branding
* have a method to turn the torch on and off
* have access for changing the batteries
* be compact and space saving
* incorporate LED for providing a bright light.

**Read through all of the tasks carefully, so that you know what you will need to do to complete this assignment.**

**Important:**

* You will need to refer to the marking criteria grid. Your teacher can explain the marking criteria if you need further clarification.
* You will need to draw upon relevant skills/knowledge/understanding from other units you have studied in this qualification.

## Your tasks and marking grids

### Task 1 – Manual production of freehand sketches

Topic Area 1.1 is assessed in this task.

You are required to produce a range of design proposals for the torch.

You **must**:

* use freehand sketching techniques to present your initial concepts for the torch.
* use annotation and labelling techniques to explain your concepts.
* produce sketches of your design proposals using suitable methods.
* select your preferred design proposal and justify how it meets the design specification.

Total marks for Task 1: 18 marks

**Task 1 Tips**

* Use both 2D and 3D sketching techniques.
* Include shading, tonal, texturing techniques to enhance your design work.
* Whilst annotating, aim to thoroughly explain your thoughts of each concept.

**Topic Area 1: Manual production of freehand sketches**

|  |  |  |
| --- | --- | --- |
| **MB1: 1–4 marks** | **MB2: 5-8 marks** | **MB3: 9-12 marks** |
| Produces a **limited** range of creative freehand design proposals. | Produces an **adequate** range of creative freehand design proposals. | Produces a **wide** range of creative and innovative freehand design proposals. |
| **Limited** consideration of the design specification. | **Partial** consideration of the design specification. | **Fully** considers the design specification. |
| Uses a **basic** range of techniques. | Uses an **adequate** range of techniques. | Uses a **comprehensive** range of techniques. |
| **MB1: 1–2 marks** | **MB2: 3-4 marks** | **MB3: 5-6 marks** |
| Evidence of analysis of design proposals with **limited** annotation. | Evidence of analysis of design proposals, with **some** annotation. | Extensive evidence of analysis of design proposals that are **fully** annotated. |
| Justification demonstrates **limited** understanding of needs and wants of the client/user. | Justification demonstrating **some** understanding of needs and wants of the client/user. | Justification demonstrating a **detailed** understanding of needs and wants of the client/user. |

If your work does not meet Mark Band 1 criteria, you will be awarded zero marks for this task.

### Task 2 – Manual production of freehand sketches – design development

Topic Area 1.1 is assessed in this task.

Having chosen a design proposal, the national breakdown service has asked you to present your proposal for the torch.

You **must**:

* use freehand sketching techniques to present your developed concept for the torch.
* use annotation and labelling techniques to explain your concepts.
* produce 2D and 3D sketches of your developed concept using suitable methods.
* explain how it meets the design specification.

Total marks for Task 2: 12 marks

**Task 2 Tips**

* Use both 2D and 3D sketching techniques.
* Include shading, tonal, texturing techniques to enhance your design work.
* Explain all of the key features using annotation and labelling.

**Topic Area 1: Manual production of freehand sketches - Design Development**

|  |  |  |
| --- | --- | --- |
| **MB1: 1–4 marks** | **MB2: 5-8 marks** | **MB3: 9-12 marks** |
| Produces a **basic** freehand sketch of design proposal. | Produces **adequate** freehand sketches of design proposal. | Produces **comprehensive** freehand sketches of design proposal. |
| **Brief** explanation of the key features of a design proposal with **limited** annotation. | **Adequate** explanation of the key features of a design proposal with **some** annotation. | **Detailed** explanation of the key features of a design proposal that is **fully** annotated. |
| **Limited** consideration of the design specification. | **Some** consideration of the design specification. | **Fully** considers the design specification. |

If your work does not meet Mark Band 1 criteria, you will be awarded zero marks for this task.

### Task 3 – Manual production of engineering drawings

Topic Area 2.1 is assessed in this task.

The national breakdown service want you to develop your selected design proposal. You should use a range of engineering and assembly drawing techniques to present your design solution.

You **must**:

* produce a 3rd angle orthographic projection drawing that includes a range of dimensions.
* produce an assembly drawing that shows the main elements of your developed concept.
* use appropriate assembly drawing techniques.
* ask your teacher to complete a Teacher Observation Record for this task.

Total marks for Task 3: 12 marks

**Task 3 Tips**

* Engineering drawings can be produced using drawing boards or 2D Computer Aided Design.
* Dimension your 3rd angle orthographic using standard conventions and scale your engineering drawing if necessary.
* Use assembly drawing techniques such as isometric and exploded views, or sectional views.

**Topic Area 2: Manual production of engineering drawings**

|  |  |  |
| --- | --- | --- |
| **MB1: 1–4 marks** | **MB2: 5-8 marks** | **MB3: 9-12 marks** |
| Produces a **basic** orthographic drawing. | Produces an **adequate** and accurate orthographic drawing. | Produces a **comprehensive** orthographic drawing. |
| Produces an assembly drawing that is **limited** in detail. | Produces an assembly drawing with **some** detail. | Produces a **fully** detailed assembly drawing. |
| Production of drawings is **dependent** upon assistance or help from other sources. | Drawings are produced with **some** assistance or help from other sources. | Drawings are produced **independently**. |

If your work does not meet Mark Band 1 criteria, you will be awarded zero marks for this task.

### Task 4 – Use of Computer Aided Design (CAD)

Topic Area 3.1 is assessed in this task.

Your final design proposal needs to be modelled for the national breakdown service prior to consideration for manufacture. You should use CAD methods and consider the following:

You **must**:

* use CAD to produce 3D virtual models of your design proposal.
* within your CAD drawings you can add rendering, textures, dimensioning and assembly views.

Total marks for Task 4: 18 marks

**Task 4 Tips**

* Render your design with different materials.
* Show your virtual model from different viewpoints.
* Produce 3D virtual models that include multiple components as part of a CAD assembly.

**Topic Area 3: Use of Computer Aided Design (CAD)**

|  |  |  |
| --- | --- | --- |
| **MB1: 1–6 marks** | **MB2: 7-12 marks** | **MB3: 13-18 marks** |
| Use of CAD to produce a **simple** model of the design proposal. | Use of CAD to produce an **adequate** model of the design proposal. | Use of CAD to produce a **complex** model of the design proposal. |
| A **simple** 3D virtual model consisting of a very limited number of components. | An **adequate** 3D virtual model consisting of some components. | A **detailed** 3D virtual model consisting of many components. |
| Production of a 3D virtual model is **dependent** upon assistance or help from other sources. | Production of 3D virtual model is produced with **some** assistance or help from other sources. | 3D virtual models are produced **independently**. |

If your work does not meet Mark Band 1 criteria, you will be awarded zero marks for this task.

## Marking criteria command words

The tables below show the command words that will be used in the NEA Marking Criteria grids. They explain the type of evidence that you should expect to see to meet each command word.

**Mark Band (MB1) Words:**

|  |  |
| --- | --- |
| **Command word** | **Meaning** |
| **Basic** | * Work includes the minimum required. It is a starting point but is simplistic and not developed. * Understanding and skills are applied in a way that partly achieves the wanted or intended result, but it would not be useable without further input or work. |
| **Brief/Briefly** | * Work includes a small number of relevant facts or concepts but lacks detail, contextualisation or examples. |
| **Dependent** | * The student can perform a task when given regular assistance or help |
| **Few** | * Work produced is restricted or narrow. It includes less than half of the information or examples expected for a full response. |
| **Inefficient** | * Outputs are produced but with great expense or effort because of poor organisation or design and not making the best use of available resources. |
| **Limited** | * Work produced is restricted in range or scope and includes only some of the information required. It evidences partial rather than full understanding. * Work produced is a starting point rather than a developed process, concept or output. |
| **Minimal** | * Includes very little in amount or quantity required. |
| **Simple** | * Includes a small number of relevant parts, which are not related to each other. |
| **Superficial** | * Work completed lacks depth and detail. |

**Mark Band (MB2) Words:**

|  |  |
| --- | --- |
| **Command word** | **Meaning** |
| **Adequate(ly)** | * Work includes the appropriate number of relevant facts or concepts but does not include the full detail, contextualisation or examples. |
| **Assisted** | * The student can perform a task with occasional assistance or help. |
| **Part(ly)/Partial** | * To some extent but not completely. * Work produced is inclusive in range and scope. It evidences a mainly developed application of understanding, performance or output needed. * Work produced results in a process, concept or output that would be useable for its purpose. |
| **Some** | * Work produced is inclusive but not fully comprehensive. It includes over half the information or examples expected for a full response. |
| **Sound** | * Valid, logical, shows the student has secured most of the relevant understanding, but points or performance are not fully developed. * Applies understanding and skills to produce the wanted or intended result in a way that would be useable. |

**Mark Band (MB3) Words:**

|  |  |
| --- | --- |
| **Command word** | **Meaning** |
| **Accurate(ly)** | * Acting or performing with care and precision. * Correct in all details. |
| **All** | * Work produced is fully comprehensive and wide-ranging. It includes almost all, or all the information or examples expected for a full response. |
| **Clear(ly)** | * Focused and accurately expressed, without ambiguity. |
| **Complex** | * Includes many relevant parts, all of which relate to each other logically. |
| **Comprehensive(ly)** | * The work produced is complete and includes everything required to show depth and breadth of understanding. * Applies the understanding and skills needed to successfully produce the wanted or intended result in a way that would be fully fit-for-purpose. |
| **Consistent(ly)** | * A level of performance which does not vary in quality over time. |
| **Critical** | * Objective analysis and evaluation in order to form: a judgement, evaluation of the evidence or effective trouble shooting/fault finding. |
| **Detailed** | * Gives point by point consideration of all the key information. |
| **Effective** | * Applies the skills required to the task and is successful in producing the desired or intended result. * The work produced is effective in relation to a brief. |
| **Efficient** | * Able to produce results or outputs with the minimum expense or effort, because of good organisation or design and making the best use of available resources. |
| **Full(y)** | * Work produced is comprehensive in range and scope. It evidences a fully developed application of understanding, performance or output needed. * Work produced results in a process, concept or output that would be fully fit-for-purpose. |
| **Independent(ly)** | * The student can perform a task without assistance or reliance on others |
| **Justify/Justified** | * The reasons for doing something are explained in full. |
| **Most(ly)** | * Includes nearly all of what is expected to be included. |
| **Wide (ranging)** | * Includes many relevant details, examples or contexts; all of which are fully detailed, contextualised or exemplified. |

Teacher Observation Record

Please read the **guidance notes** on the following page before completing this form.

|  |  |
| --- | --- |
| **Student name:** |  |
| **Qualification:** | OCR Level 1/Level 2 Cambridge National in Engineering Design |
| **Unit number and title:** | Unit number: R039 |
| Unit title: Communicating designs |
| **Activity observed:** | Task title: Manual production of engineering drawings |
| Task number: 3 |
| **Date activity completed:** |  |
| **Additional evidence attached:** |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **TEACHER SECTION:** | | | | | |
| **How did the student complete the activity?**  **Your response must provide details of what the student did and how this relates to the relevant marking criteria.** | | | | | |
|  | | | | | |
| **STUDENT SECTION:** | | | | | |
| I agree with my teacher’s description of how I completed this activity. | | | | | Yes ☐ |
| Additional student comments: | | | | | |
| **Student signature** |  | **Date:**  **(DD/MM/YYYY)** | |  | |
| **Teacher name:** |  | | | | |
| **Teacher signature:** |  | **Date:**  **(DD/MM/YYYY)** |  | | |

Teacher observation record guidance notes

The class teacher and student being observed are responsible for completing this form.

The Teacher Observation Record is used by the teacher to detail their observation of a student completing an activity. In order to provide sufficient evidence, the completed form must give contextualised details of what the student did and how this relates to the marking criteria. Simply providing statements from the marking criteria is not acceptable. The evidence provided must be individual to the student.

The Teacher Observation Record is also used to show that the student agrees with the teacher’s assessment of this activity.

The information given by the teacher must be shared with the student for the student to agree, or otherwise. If the student does not agree with the teacher’s comments and links to the marking criteria, they must have the chance to talk about these further with the teacher to reach an agreed outcome **before** the work is submitted for moderation.

Both the teacher and student must sign and date the form to provide evidence of this agreement.

Additional evidence of the student completing the activity must also be provided with the form. The types of additional evidence that are acceptable are detailed in Task 3.

**Teacher observation records must:**

* describe what the teacher observed the student doing
* include how well the activity was completed and the reasons for this evaluation
* include confirmation from the student that they agree with the comments and reasons
* be accompanied by additional evidence as required in Task 3

**Teacher observation records must not:**

* be a simple repeat of the grading criteria
* be completed by anyone but the teacher observing the activity and the student completing the activity
* be written by the student for the teacher to sign
* contain just a list of skills
* be used to evidence the achievement of a whole unit or task in isolation

OCR acknowledges the use of the following content:

page 4: flashlight/Woraphon Nusen/EyeEm/gettyimages.co.uk.