ENGINEERING DESIGN

INCLUDED ON THE KS4 PERFORMANCE TABLES

Candidate style work and commentary

OCR Level 1/Level 2

Cambridge National in

Engineering Design

J822

For first teaching in 2022 | Version 1

Unit R039 - Communicating designs

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Contents

About this resource

We have produced this resource using the sample set assignment for Unit R039.

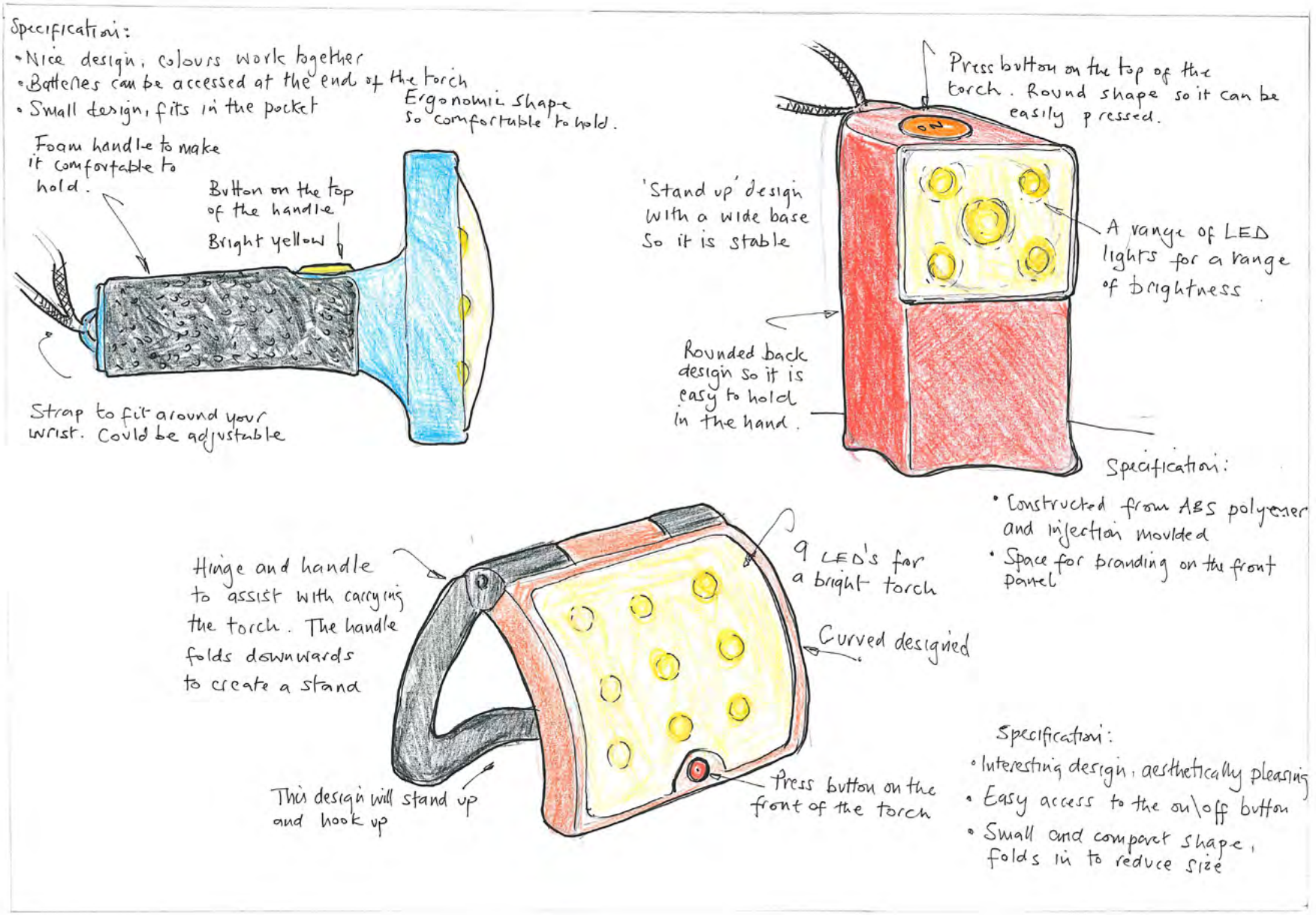
The aim of the resource is to help you understand how candidate work could be marked using the marking criteria.

Our senior assessors have created some sample candidate work and commentary. They have indicated the criteria that should be considered and how the marking criteria could be applied.

Please note this resource is for guidance only – it does not contain candidate work from an assessment series for this qualification and has not been through a standardisation process. The mark band awarded is only indicative of what similar work might receive. The resource also does not in any way indicate an endorsed approach to creating an NEA task and should not be used by students to submit as evidence.

Alongside this resource, we recommend that you view the sample assessment materials including the **command words**, to support your understanding.

Task 1: Manual production of freehand sketches



Commentary

The candidate has produced an adequate range of creative design proposals with some links to the initial design specification.

The design proposals have been drawn using different 3D techniques including oblique and isometric, together with a 2D side elevation. Coloured rendering has been included on all of the design proposals to enhance the ideas, while tonal shading has been used to improve the 3D style.

There is evidence of some annotation and links to the initial design specification which helps to explain the design proposals. The use of labels should have also been used to identify a part, component, or feature with no further commentary. This addition would support the annotation.

More generally, to improve the annotation, the candidate could have added further detail and links to the needs and wants of the user. More of the features and characteristics could have been identified and explained. This would be another source of differentiation across the mark bands.

Typically, a candidate would not achieve MB2 if there was a limited range of design proposals, a very basic range of techniques were used and little or no supporting annotation that linked to the design specification.

Even better if

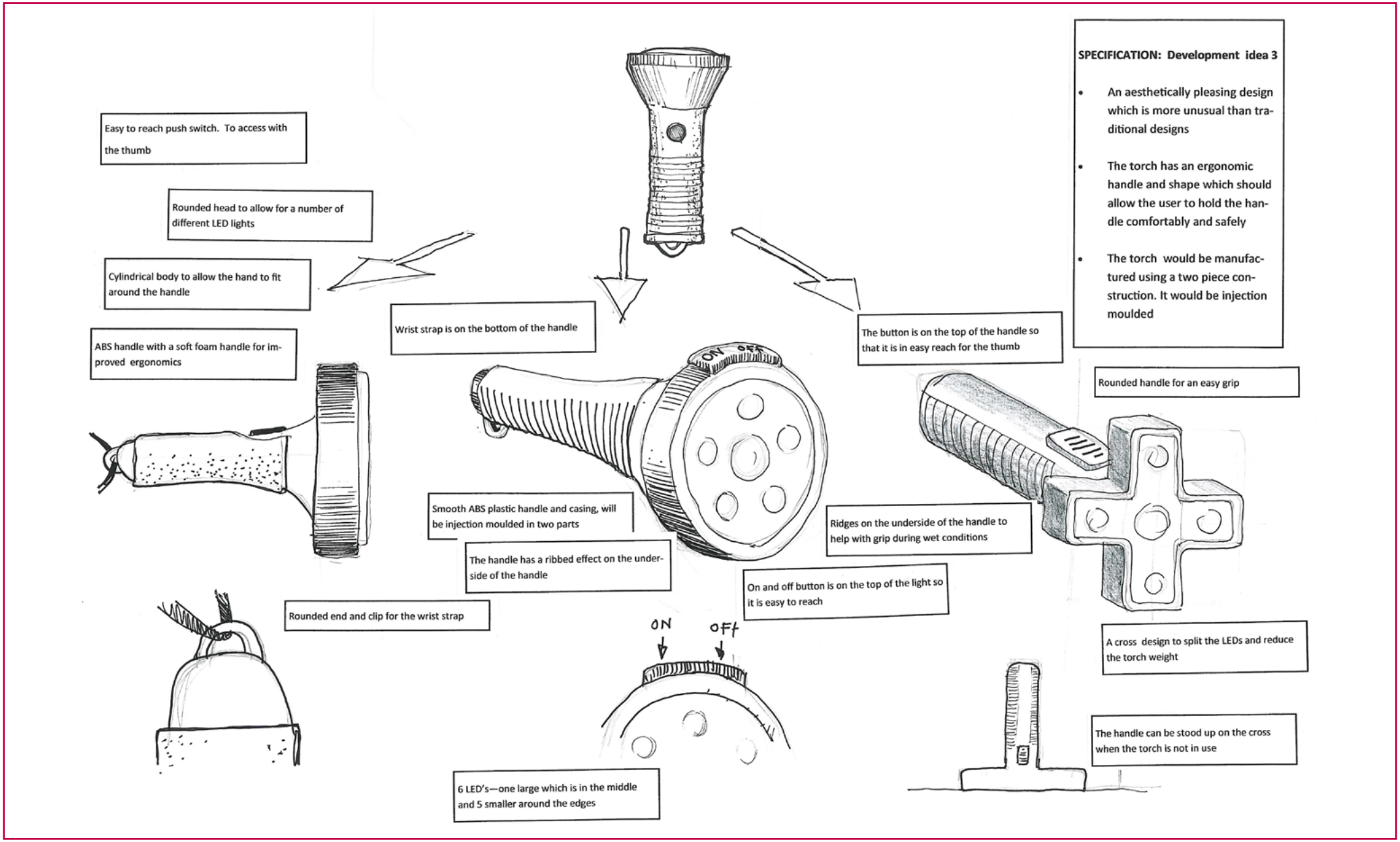
To improve this work, the candidate could have linked their design proposal to the design specification points.

Looking to MB3

To move the work to MB3, the candidate could have:

- produced further design ideas to create a comprehensive range of creative and innovative proposals
- added further appropriate rendering techniques, including adding textures and a greater use of tone and shading.

Task 2: Manual production of freehand sketches – design development



Commentary

The candidate has created an adequate range of freehand sketches of a design proposal. The design page begins with a chosen initial concept and presents a number of developed iterations. The design proposals have been produced using a freehand method including an oblique, isometric and 2-dimensional style. Each of the iterations also includes a further drawing that explains one of the features in more detail.

Each iteration has explanations of some of the key features, while one developmental idea has been selected as the preferred idea and some consideration has been made to the design specification.

Even better if

To improve this work to achieve a higher MB2, the candidate should increase the number of iterations and also label the designs to identity a part, component or feature.

Looking to MB3

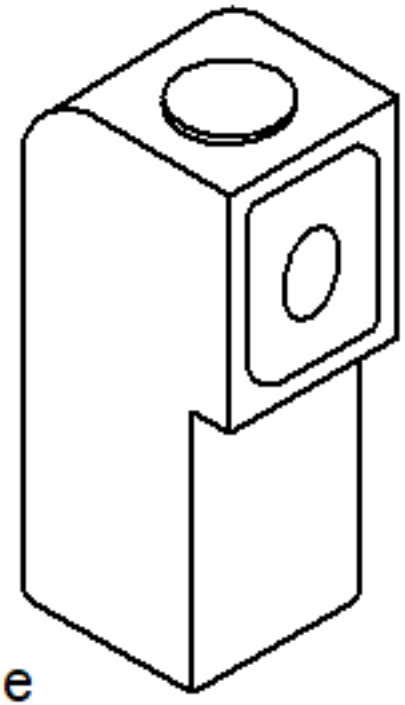
To move the work towards MB3, the candidate could have, for example:

- produced a comprehensive range of 2D and 3D iterations and communicate the different potential components and methods of assembly
- included further methods to enhance the drawings including the use of shading, tone and texture applied to each design
- added further detailed of the key features
- considered the whole design specification, explaining how the chosen design meets the design specification criteria.

Task 3: Manual production of engineering drawings – Isometric drawing

Isometric drawing of my torch

Button to press to turn it on and off



Button to press to turn it on and off

Large LED to provide a bright light

Wide base so it is stable and will stand up

Correct shape to fit into a users hand

Commentary

The candidate has produced an isometric drawing which displays the shape and style of the torch. It is drawn in CAD using a simplistic style, but clearly shows the main features.

The candidate has also added supporting annotation to explain the key features, such as the button, the base, torch shape and the LED.

A **Teacher Observation Record** should be used to explain the level of assistance provided to the candidate (Engineering Design specification Section 6.3.6 Teacher Observation Records). The completion of this form is mandatory and should have an impact on the marks that are awarded for this task – i.e. the degree to which the candidate completed this task independently.

Even better if

To improve this work, the candidate could create different parts of the torch or different views (e.g., from the rear, battery compartment, lens assembly). An exploded-view drawing, annotated, would give a clearer understanding of the parts of the torch and how they are all connected together.

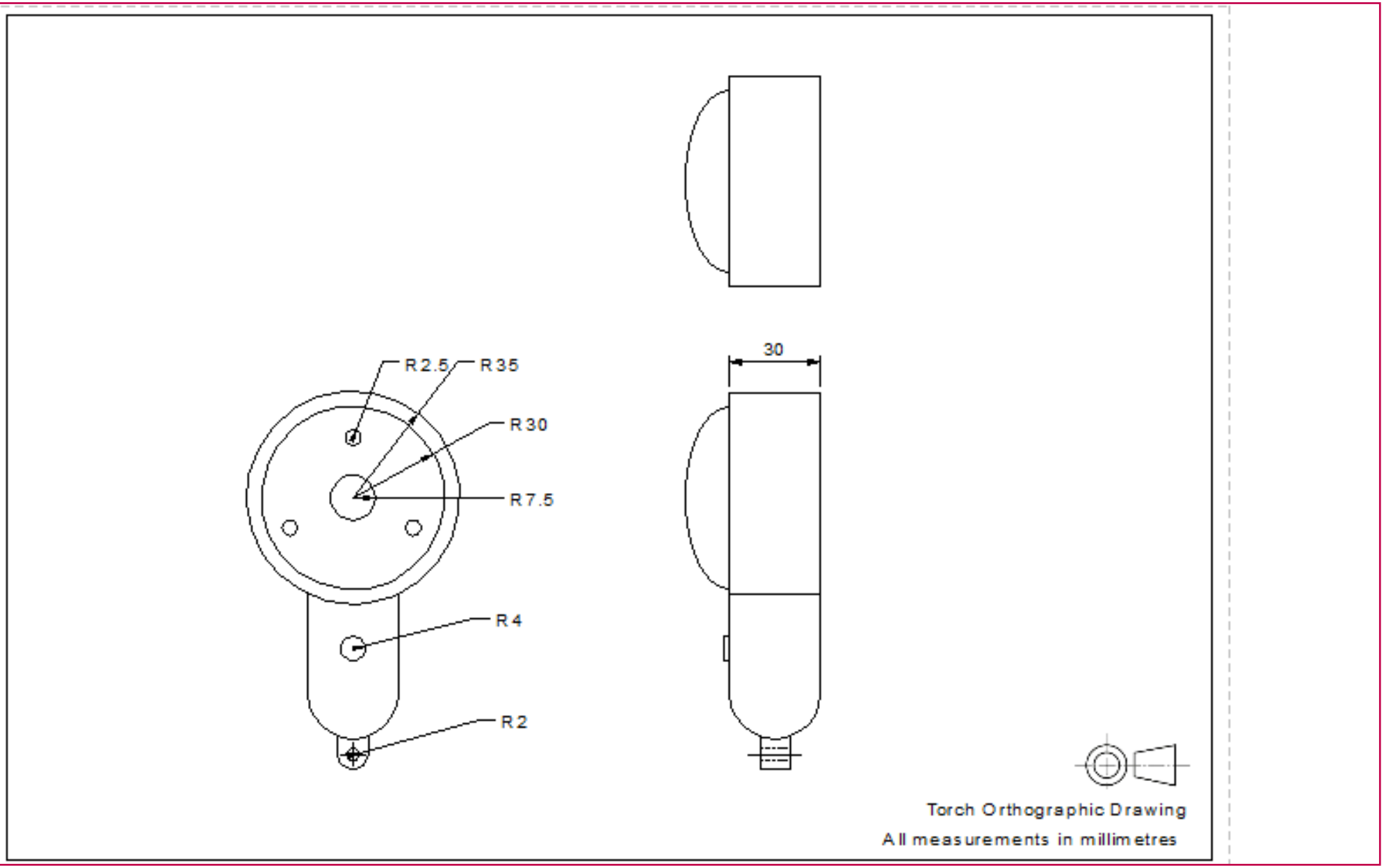
Looking to MB3

To move the work to MB3, the candidate could have, for example:

- added some additional details to enhance the overall appearance and explain how the user can access the battery compartment (torch grip, door open, screw assembly)
- included in the drawing some key dimensions to indicate the scale and size of the torch
- provided additional drawings which show the shell casing or other torch parts
- provided further annotation ensuring each statement is justified and linked to the design specification.

It is crucial that a **Teacher Observation Record** is used to explain the level of assistance provided to the candidate. (Engineering Design specification Section 6.3.6 Teacher Observation Records). The form is in the R039 set assignment sample assessment material.

Task 3 continued – Orthographic drawing



Commentary

The candidate has produced an orthographic drawing which provides three views of their torch. The front, side, and plan elevations.

Typically, a candidate would not achieve MB2 if the orthographic drawing didn't contain at least two views, the layout was incorrect and it wasn't dimensioned.

Looking to MB3

To move the work towards MB3, as well as including the drawing title and third angle orthographic symbol, the candidate could have included, for example:

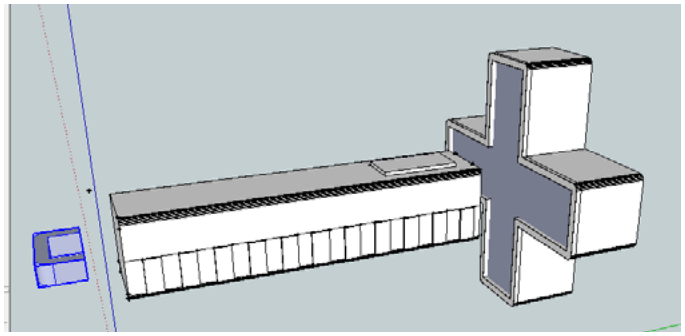
- a title block which explains drawing number, scale and tolerance used
- further dimensions and a different line thickness for the drawn object.

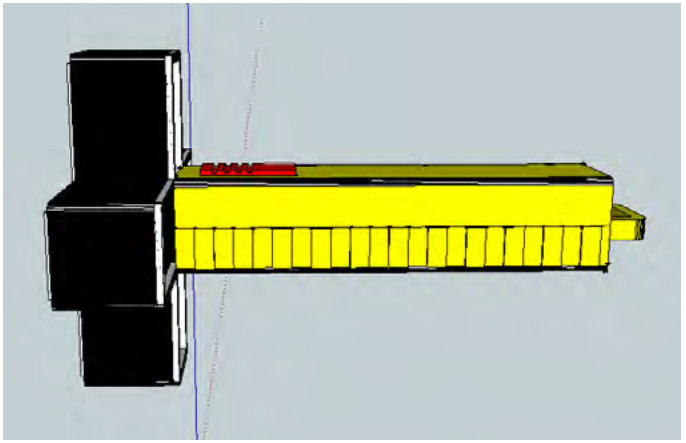
Possible misconception

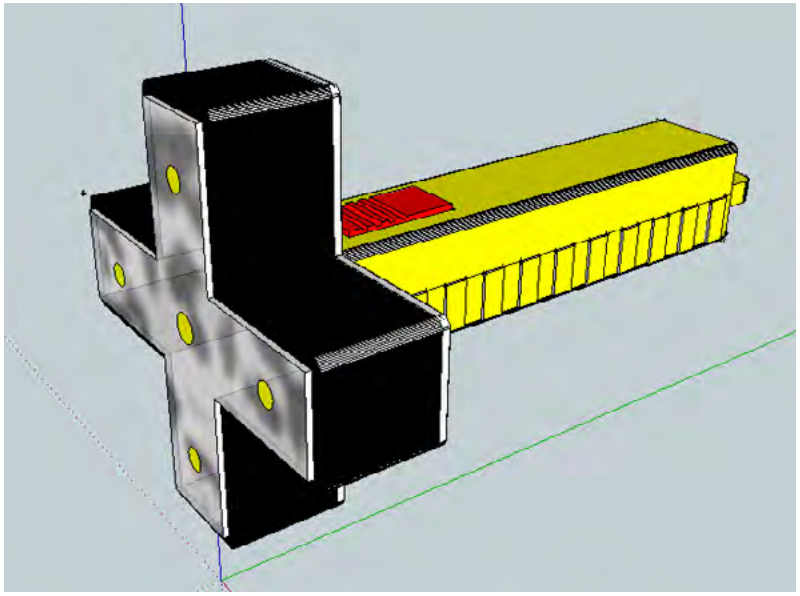
Students need to understand the difference between first angle orthographic technique and third angle orthographic drawings and make sure they produce a third angle orthographic drawing for this task.

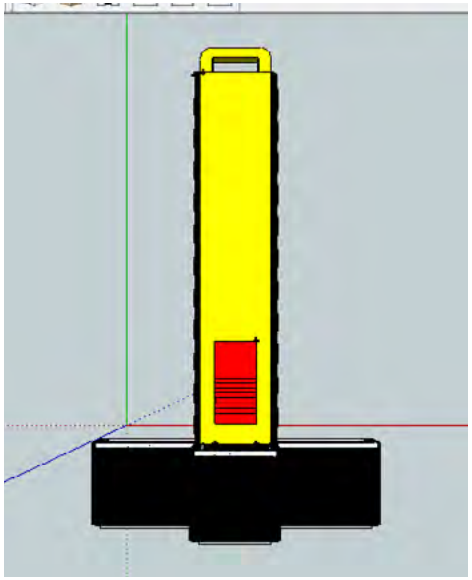
It is crucial that a **Teacher Observation Record** is used to explain the level of assistance provided to the candidate. (Engineering Design specification Section 6.3.6 Teacher Observation Records). The form is located in the R039 set assignment sample assessment material.

Task 4: Use of Computer Aided Design (CAD)









This is my torch design. The torch includes 5 LED's which will illuminate the search area, a handle with a textured finish for improved grip and a button positioned on the top of the handle so it can be accessed easily. It also include a eyelet for a wrist strap.

Commentary

The candidate has produced an adequate 3D CAD model of the design proposal. The candidate has shown, using screen shots, how they have used CAD software to create separate parts for their torch design.

Screen shots display the torch from various viewpoints including isometrically and from a plan and side elevation. The CAD models have been suitably rendered using various colours and materials.

Typically, a candidate would not achieve MB2 if the CAD models were drawn to a limited standard and the candidate relied heavily on assistance to create their 3D model. The teacher needs to record this on a Teacher Observation Record document.

Looking to MB3

To move the work to MB3, the candidate could have, for example:

- produced drawings of the shell housing to show how the batteries and internal components fit inside and a greater number of the different components, such as the button, lens and LEDs
- included a greater selection of screen shots to demonstrate the different techniques they used to construct their torch, such as extrude, revolving, and mating shapes
- included dimensions to indicate the size of the product and its features.

Teaching tips

It is crucial that a **Teacher Observation Record** is used to explain the level of assistance provided to the candidate. (Engineering Design specification Section 6.3.6 Teacher Observation Records). The form is located in the R039 set assignment sample assessment material.

Need to get in touch?

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