CAMBRIDGE ADVANCED NATIONALS

OCR
Oxford Cambridge and RSA

This session will begin at 4pm (update)

L3 Cambridge Advanced Nationals (AAQ)
ENGINEERING

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Troubleshooting

Are you having issues with sound?

I can’t hear anything. What should I do?

The main reason for sound issues is use of an incompatible web browser. To make sure the session runs smoothly, and for the best experience, please use **Chrome** or **Firefox**

I can't hear anything. Can I change the volume?

You can adjust your speaker volume in ’My Settings’. Select ‘My Settings’ from the Collaborate panel (to open, click on the purple arrow icon in the bottom right of the screen). Click ‘Audio and Video Settings’

I am still having sound issues – what next?

If you continue to have issues with sound, please log out using the **X** button located at the top right of your screen and then re-join Blackboard using the guest link provided in your joining instructions

Contact us

If you have tried all the above and are still having trouble using Blackboard, please send a message via the chat window

Notification settings

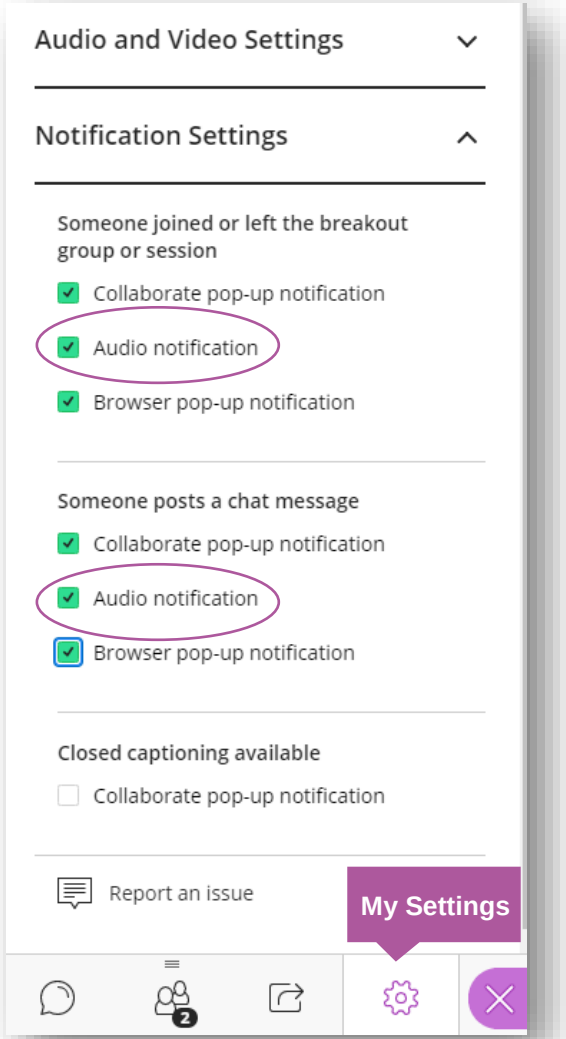
To avoid any distractions during the session, you may find it useful to mute notifications

Select ‘My Settings’ from the Collaborate panel

Click on ‘Notification Settings’

Untick the ‘Audio notification’ radio buttons

You can also deactivate ‘pop-up’ notifications from this area



Policy recap

DfE Reforms - Post-16 qualifications review

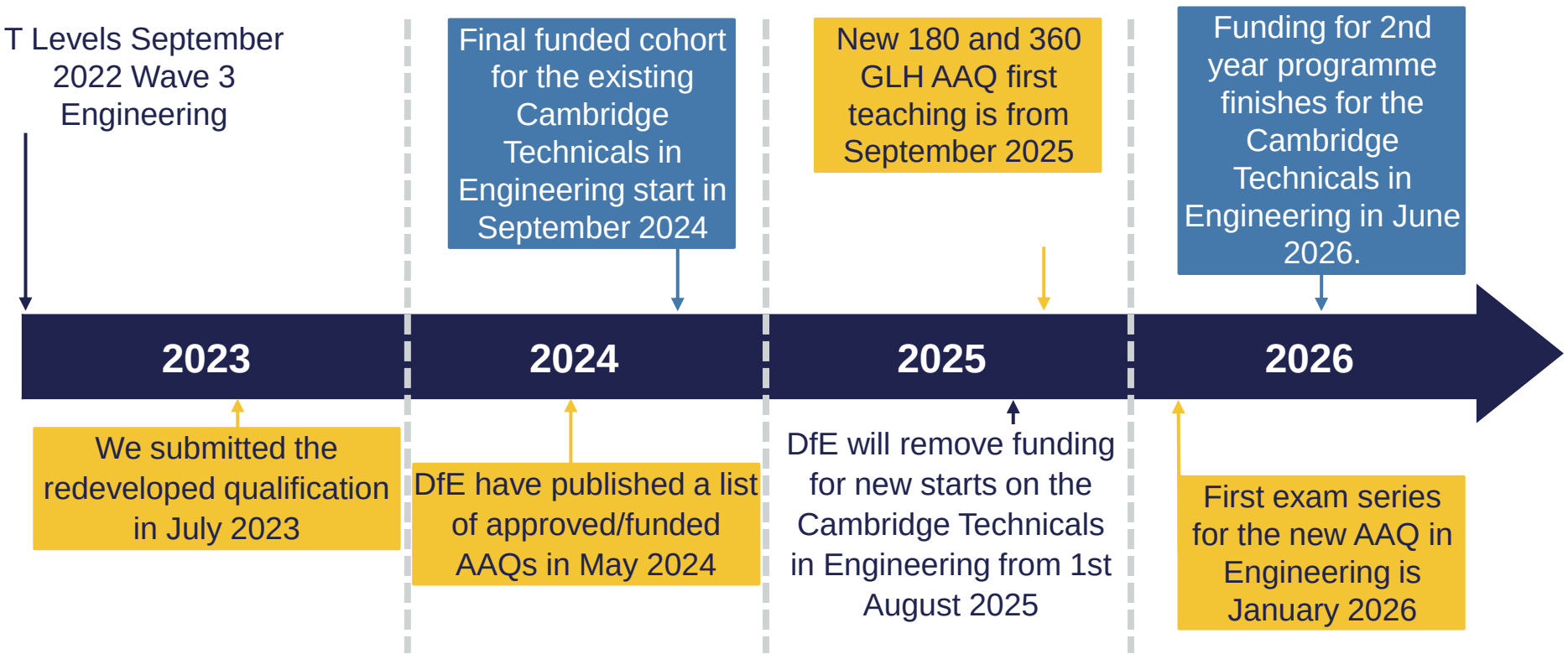
- Students will have **two choices** post-16:
  - **Academic:** A-Levels and Alternative Academic Qualifications (AAQs)
  - **Technical:** T-Levels and Apprenticeships

- Students on the academic route can only take x1 AAQ
- In engineering the largest size AAQ is 360 GLH
- Curriculum could be:
  - x3 A-Levels
  - x2 A-Levels and x1 AAQ (360GLH)
  - x1 A-Level and x2 AAQs (360GLH) (although there may be caveats)

Note: larger AAQs are only available in subjects that do not have a T-level, e.g. Sport

Q1. – Which Level 3 engineering qualifications you are currently teaching?
Please use the chat function

Cambridge Advanced Nationals - Timeline



If there is a policy change, for example due to a change of government, this reform may be reviewed which could lead to a continuation of funding for current Cambridge Technical Level 3 qualifications.

Suite Changes

What is new in the Cambridge Advanced Nationals?

We have taken the opportunity to make meaningful changes that give teachers greater confidence in marking and reward students for the skills they are able to demonstrate.

- Full compensation
- Designed with teachers and universities
- Support and resources
- 2-year assignment life span
- Complement A-Levels
- Mixed curriculum suggestions
- Clear and granular assessment criteria
- Focus on the application of knowledge
- Larger sizes where possible

Compensation at unit level

Hurdles based model

In the hurdles-based model above, the student would fail to achieve a pass grade for the unit.

New Advanced National compensation based model

Using our new compensation-based model, the same student would **still** achieve a grade/result for the unit.

Boundaries* for each unit can be found in the specification. The example above is simplified for illustration.

Cambridge Advanced Nationals – 60 GLH unit example

All 60 GLH units have a total of **22** criteria (11 Pass, 6 Merit, 5 Distinction)

The total number of criteria needed for each grade are:

- **Pass = 9***
- **Merit = 13***
- **Distinction = 18***

Remember the total number of criteria required for a Pass, Merit or Distinction can come from any of the criteria. This is the new compensatory approach. *Boundaries will be reviewed over time.

Q2. If a student achieved 8 pass, 3 merit and 2 distinction criteria what unit grade would they achieve?

Compensation at qualification level

Every criterion that a student achieves will count towards their final qualification outcome.

Hurdles based model

P1	M1	D1
P2	M2	D2
P3	M3	
P4		

In the hurdles-based model above, the student would have achieved a **Pass** at unit level.

New compensation based model

P1	M1	D1
P2	M2	D2
P3	M3	
P4		

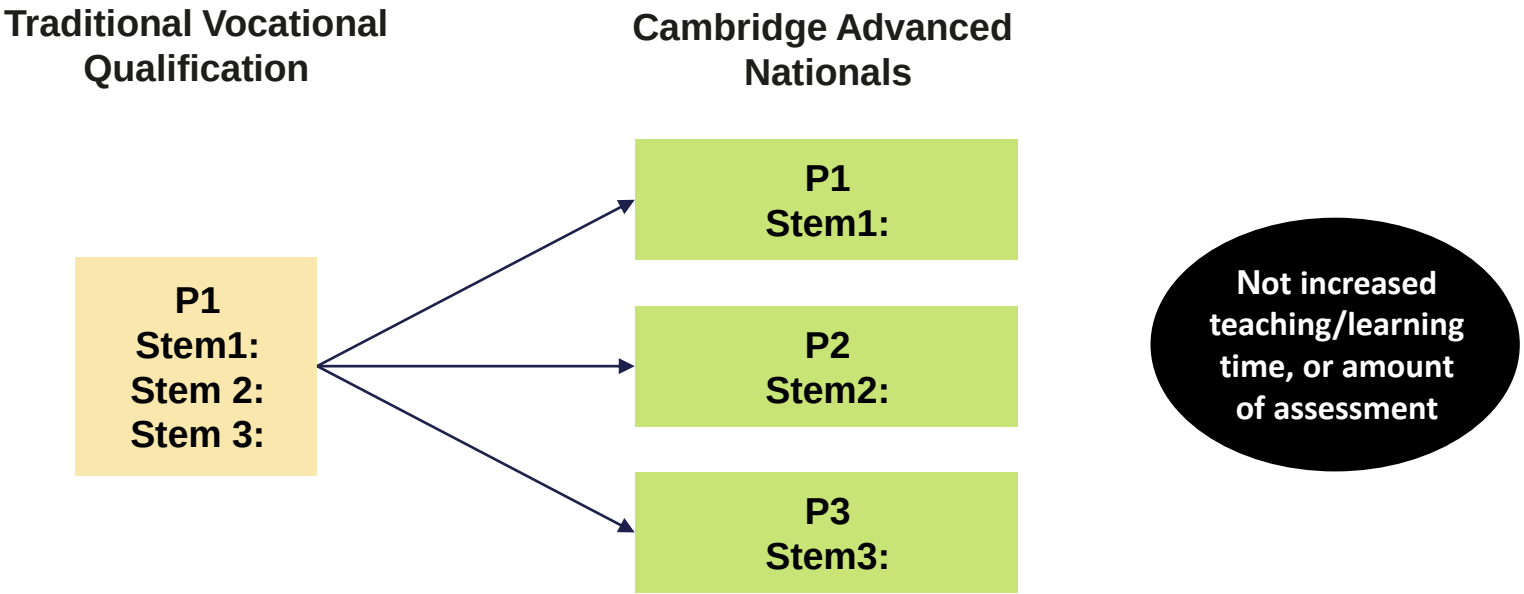
Using our new compensation-based model, M1, M2 and D1 all count towards the final qualification grade, even if a student had not achieved a Merit or Distinction at unit level.

No criteria/mark will go to waste

Boundaries* for each unit can be found in the specification. The example above is simplified for illustration.

Granular criteria

We have in most cases made criteria much more specific and granular. This aims to support teachers in identifying the evidence required to meet each criterion and rewards students for the evidence they were able to produce.




Questions on this Section

Our new L3 Cambridge Advanced Nationals in Engineering

Cambridge Advanced Nationals (ocr.org.uk)

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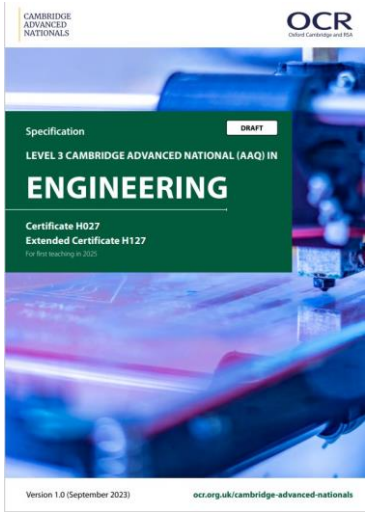
Cambridge Advanced Nationals in Engineering

Engineering is the safe, efficient and sustainable application of science/mathematics knowledge and practical skill to transform ideas and material into products and services that solve problems.

- These are ‘general engineering’ qualifications
- The **benefit** of this is better preparation to study a variety of undergraduate engineering degrees
- It is general engineering, because the mandatory units cover a mix of:
    - mechanical engineering, and
    - electrical/electronic engineering

- Built in **flexibility** to support you and your students depending on:
    - Student needs
    - Teacher’s skills/expertise
    - Centre resources
    - University progression



Cambridge Advanced National in Engineering

Structure Summary

1. Certificate (180 GLH) containing two mandatory units
2. Extended Certificate (360 GLH) containing three mandatory units plus optional units

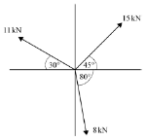
Q3. Roughly what percentage of marks come from external assessment in the Extended Certificate?

Units and Qualification Structure

		GLH	180	360	Assessment
F130	Principles of Engineering	90	M	M	External
F131	Material Science and Technology	60	-	M	External
F132	Engineering in Practice	90	M	M	Internal
F133	Computer Aided Design	60	-	O	Internal
F134	Programmable Electronics	60	-	O	Internal
F135	Mechanical Product Design	60	-	O	Internal
F136	Computer Aided Manufacture	60	-	O	Internal
F137	Electrical Devices and Circuits	60	-	O	Internal

$$x + 2y = 6 \quad \ldots(1)$$
$$x - y = 3 \quad \ldots(2)$$

$$v^2 = u^2 + 2as$$
$$s = ut + \frac{1}{2}at^2$$



$$E = \frac{1}{2}CV^2$$


Questions on this Section

Cambridge Advanced National in Engineering

Mandatory Units
Content and Assessment Summary

Unit F130: Principles of Engineering

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Topic Area 1: Mathematics	Topic Area 2: Mechanical principles	Topic Area 3: Electrical / electronic principles
• 1.1 Application of SI Units • 1.2 Mensuration • 1.3 Algebra • 1.4 Trigonometry	**2.1 Systems of forces** • 2.1.1 Forces • 2.1.2 Moments • 2.1.3 Systems of coplanar concurrent forces • 2.1.4 Systems of coplanar non-concurrent force in equilibrium • 2.1.5 Direct loading of engineering components • 2.1.6 Sheer loading of engineering components • 2.1.7 Stress vs strain graphs **2.2 Simply supported beams** • 2.2.1 Beams and beam supports • 2.2.2 Forces acting on beams • 2.2.3 Beam calculations • 2.2.4 Bending moment diagrams **2.3 Linear dynamic systems** • 2.3.1 Parameters and applications • 2.3.2 Interpretation of graphs • 2.3.3 Newton's Laws of Motion • 2.3.4 SUVAT equations • 2.3.5 Energy and power • 2.3.6 Friction • 2.3.7 Conservation of energy • 2.3.8 Momentum	**3.1 Electrical principles** • 3.1.1 Concepts of electricity • 3.1.2 Capacitors and capacitance • 3.1.3 Direct current networks • 3.1.4 Inductors and inductance • 3.1.5 Alternating current • 3.1.6 Electrical efficiency **3.2 Analogue and digital circuits** • 3.2.1 Analogue circuit • 3.2.2 Digital logic circuits

Unit F130: Exam Questions – Section A

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2 Which quantity is defined as the straight-line distance between two points in a given direction?

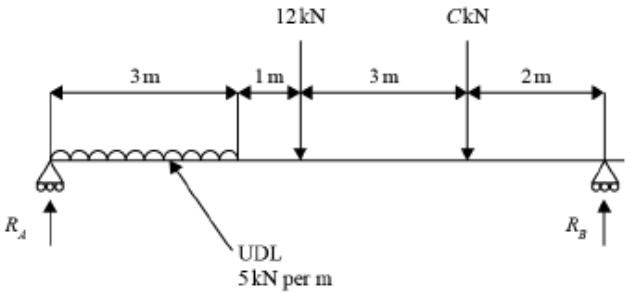
Tick (✓) **one** box.

- Displacement ☐
- Height ☐
- Length ☐
- Work done ☐

8 This diagram shows a simply supported beam under load. The beam is in static equilibrium.

Ignore the weight of the beam.

Diagram not to scale.



(a) Calculate the magnitude and position of the single point load that is equivalent to the uniformly distributed load (UDL).

Magnitude = ... kN

Distance from R_A = ... m

[2]

(b) The reaction force acting at R_B is 22.3 kN.

Determine the magnitude of the applied point load *C*.

You must show your working.

Magnitude of point load (*C*) = ... kN

[4]

Q4. How long is the longest EA?

Unit F130: Exam Questions - Section B

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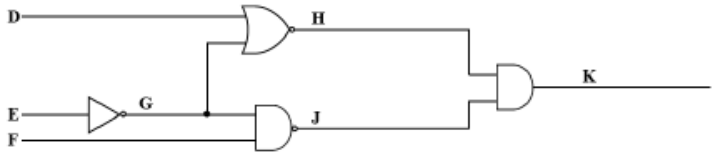
15 A coil has 200 turns of copper wire which produces a magnetic flux of 0.01Wb. A steady 50 A current is being passed through the coil.

Calculate the inductance (L) of the coil.

Inductance (L) =..... H
[2]

(b) The diagram shows a logic gate circuit.



Complete the truth table for this circuit.

D	E	F	G	H	J	K
0	0	0				
0	0	1				
0	1	0				
0	1	1				
1	0	0				
1	0	1				
1	1	0				
1	1	1				

[4]

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Unit F132: Engineering in Practice

Topic Area 1: Product analysis **1.1 Product analysis of the components**	**Topic Area 2: Produce CAD mechanical and electronic drawings** **2.1 Produce a 2D CAD engineering drawing of a mechanical prototype** • 2.1.1 Engineering Drawing Standards • 2.1.2 Mechanical features and component types **2.2 Produce a CAD engineering drawing of an electronic circuit** • 2.2.1 Engineering drawing standards • 2.2.2 Electronic circuit diagrams • 2.2.3 Circuit simulation	**Topic Area 3: Plan the safe manufacture of a mechanical prototype and an electronic circuit prototype** **3.1 Plan the safe manufacture of a mechanical prototype** **3.2 Plan the safe manufacture of an electronic circuit prototype**
Topic Area 4: Manufacturing processes **4.1 Manufacture a mechanical prototype** **4.2 Manufacture an electronic circuit prototype**	**Topic Area 5: Evaluate a prototype** **5.1 Evaluate a mechanical prototype** **5.2 Evaluate an electronic circuit prototype**	

Unit F132: NEA Scenario and Part A Mechanical Prototype

Scenario

You work for a lighting company that manufactures different types of lighting solution. The product you have been asked to investigate is an **angled desk lamp**.

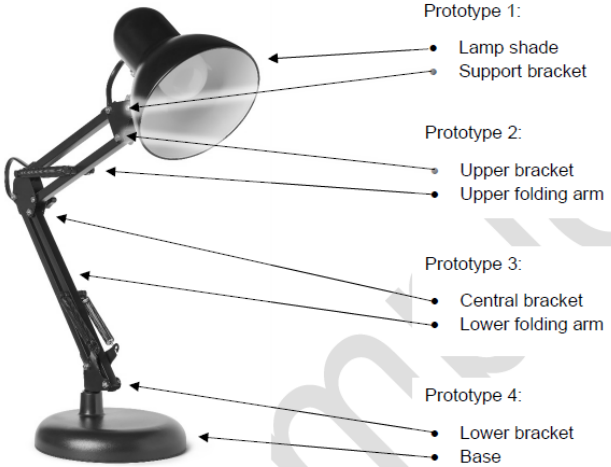
To ensure that a work area is well lit for different purposes, angled desk lamps need their height, angle and tilt to be adjustable.

An example of an angled desk lamp is shown below. The angled desk lamp you are using may look slightly different to this one

Part A: Mechanical Analysis, Drawing and Prototype Manufacture

The non-standard components in the angled desk lamp have been grouped together as shown in **Fig. 1**.

Fig. 1



Each prototype (1, 2, 3 and 4) may also contain relevant standard components, such as nuts and bolts.

You will be told which **one** of these prototypes to use in your assignment.

Unit F132: NEA Part A - Task 2

Task 2:

Produce two-dimensional (2D) Computer Aided Design (CAD) mechanical drawings

Topic Area 2 is assessed in this task.
Having carried out your product analysis, you now need to produce 2D CAD engineering drawings of the prototype you are going to manufacture.

The task is:
Use a CAD software package to produce 2D CAD engineering drawings of the prototype which follow standard drawing conventions.
Your evidence **must** include:

- Annotated screenshots of CAD software being used to produce the engineering drawings.
- Final 2D CAD engineering drawings in a pdf file format.

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P3: Produce an appropriate third angle orthographic projection of the non-standard component(s) in the prototype using engineering drawing standards.	**M2: Produce** an appropriate sectioned/detailed view of **one** non-standard component from the prototype using engineering drawing standards.	**D1: Produce** an appropriate isometric assembly projection for the prototype using engineering drawing standards.

Unit F132: NEA Part B Scenario for the Electronic Prototype

Scenario:

Part B: Electronic Circuit Analysis, Drawing and Prototype Manufacture
The lighting company want to improve the angled desk lamp by making it automatically turn the light on or off depending on the ambient light level.
They want you to make a prototype of the electronic circuit using a Light Emitting Diode (LED).

Important

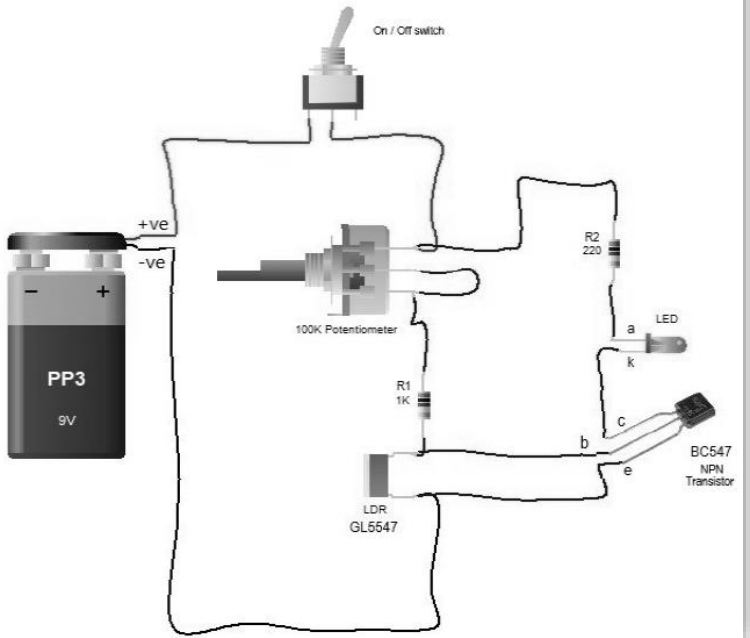
Part A and Part B are independent activities and should not be integrated together.

Unit F132: NEA Part B Task 6

Task 6

Produce a CAD drawing and simulate an electronic circuit.
Topic Area 2 is assessed in this task.

This is a picture of the electronic circuit needed to achieve the improvement. The LED should turn on when the ambient light falls below a threshold set by the potentiometer. The LED should turn off when the ambient light goes above this threshold.



Unit F132: NEA Part B Task 6 continued

The task is:
Produce a CAD engineering drawing of the electronic circuit diagram using standard drawing conventions.
Simulate the circuit in operation so you can complete these tests. Use the test table in Appendix A to record your simulated values.

Parameter	Explanation
V_{R2}off	Voltage across R2 when the LED is off
V_{LDR}off	Voltage across LDR when the LED is off
$I_T$off	Total current through the circuit when the LED is off
V_{R2}on	Voltage across R2 when the LED is off
V_{LDR}on	Voltage across LDR when the LED is off
$I_T$on	Total current through the circuit when the LED is on

Your evidence **must** include:

- Final CAD drawing of the electronic circuit diagram.
- Annotated screenshots of the simulation of the electronic circuit in operation.
- A completed test table (Appendix A) showing simulated values.
- Annotated screenshots of any simulated testing completed, including connections of virtual test equipment and readings.

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P8: Produce a CAD drawing of the electronic circuit diagram using engineering drawing standards.		
P9: Simulate the electronic circuit to demonstrate its correct operation.		**D4: Use** correct methods to measure appropriate values and voltages from the simulated circuit.

Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
P8	• The circuit diagram must be an accurate representation of the required circuit and be drawn to meet current engineering drawing standards (e.g. BS 60617).
P9	• Students must use simulation to show the function of the circuit to meet the stated requirement(s).
D4	• Students need to use correct testing methods and virtual test equipment to generate the results required.


Questions on this Section

Cambridge Advanced National in Engineering

Support:

- Teaching and learning resources
- Professional development
- Active results
- ExamBuilder

Cambridge Advanced National in Engineering

Summary:

- Full compensation at unit and qualification level
- Flexible qualification structure and within units
- External assessment is kept to a minimum
- Updated existing units to aid transition
- Familiar moderation
- Designed for progression to HE

Welcome and contact details – do stay in touch

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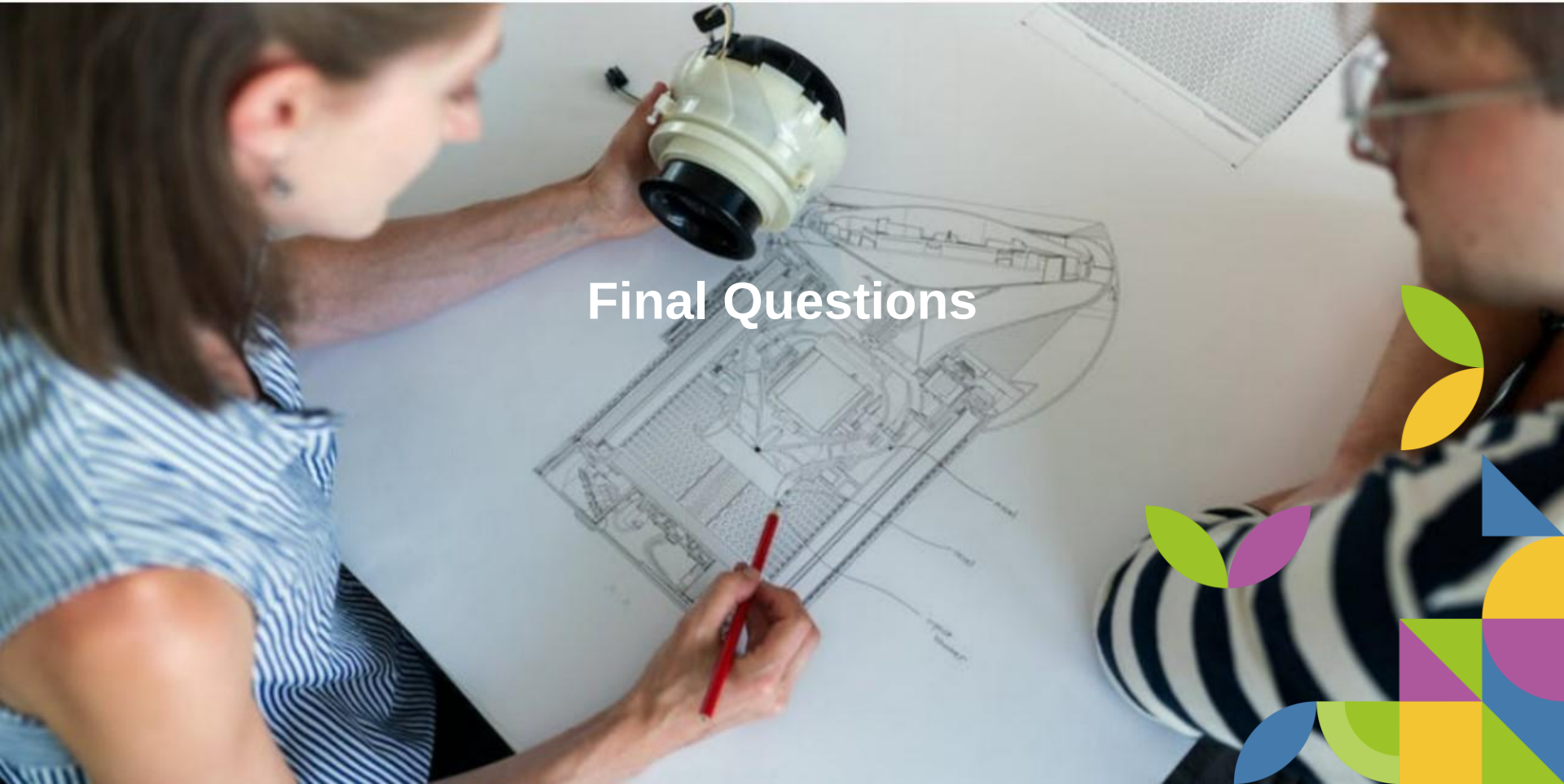
Final Questions