The roles of engineers

LEARNING INTENTION

We are learning to describe what different types of engineer do, linked to a real project.

SUCCESS CRITERIA — I CAN

- ☐ tell the difference between an electrical and an electronic engineer
- ☐ describe two distinct tasks for an engineer, linked to the context
- ☐ match engineering disciplines to parts of a project
- ☐ explain why engineers work in teams

Electrical or electronic?

	Electrical engineer	Electronic engineer
Works with	large currents and power	small signals and control
Examples	power supply, cables, motors, generators, grid connection	sensors, control circuits, microcontrollers, communications
Ski-centre example	designs the power supply to the snow cannons	designs the temperature-sensing control board

SHORT CIRCUIT

× WHAT EXAMINERS SAW

Some candidates confused the role of an electrical engineer with that of an electronic engineer.

✓ THE FIX

Electrical = power: generation, cables, motors, supply, distribution. Electronic = control: sensors, circuits, microcontrollers, signals.

Course report 2025, Question 3(b).

Other engineers on a project

Mechanical
moving parts, gears, structures that move

Civil / structural
foundations, roads, bridges, buildings

Chemical
processes and materials that react

Environmental
effects on land, air, water and wildlife

Software
large programs and data systems

Big projects need many engineers. Each one brings expert knowledge. Together they make sure every part works with every other part.

The roles of engineers

Describing two tasks

WORKED EXAMPLE **Two tasks for an electronic engineer**

1 GIVEN	2 FIND	3 FORMULA	4 SUBSTITUTE	5 ANSWER + UNIT
context: snow-cannon controller at Cairnloch ski centre	two distinct tasks	task 1 must differ from task 2 each task names something in the context	designs the sensor circuits that measure air temperature programs and tests the microcontroller that decides when to make snow	**2 different tasks, both linked**

'Designs circuits' and 'makes circuits' are too close to count as two tasks. Make them clearly different.

SHORT CIRCUIT

× WHAT EXAMINERS SAW

Answers listed general tasks ('designs things', 'makes sure it is safe') that were not linked to the context, or gave the same task twice.

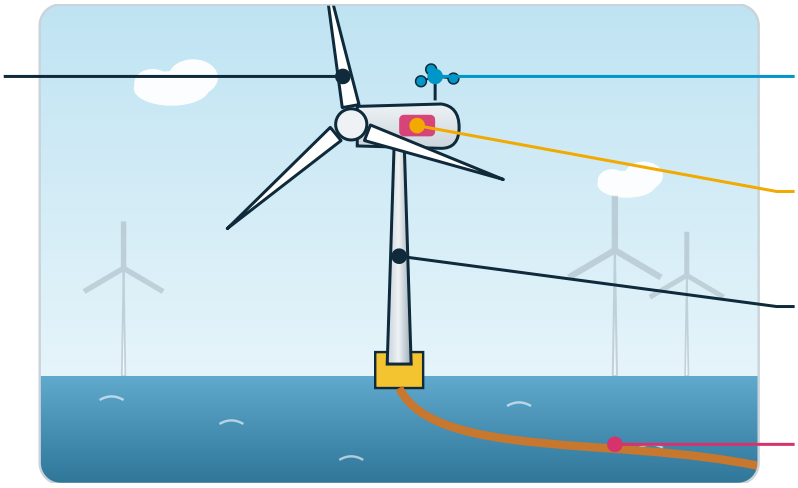
✓ THE FIX

Give two clearly different tasks, and name a part of the product or project in each.

Roles questions, marking instructions 2024–26.

Engineers on one product

Mechanical: blades and



Electronic: wind sensor
INPUT

Electronic: speed controller
PROCESS

Civil: tower and base

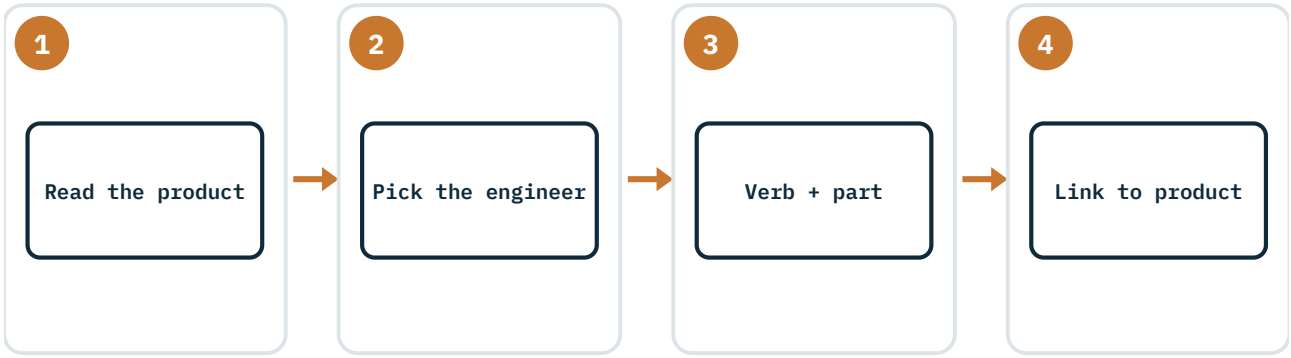
Electrical: cable to the grid
OUTPUT

The roles of engineers

WORKED EXAMPLE Matching engineers to a wind turbine

1 GIVEN	2 FIND	3 FORMULA	4 SUBSTITUTE	5 ANSWER + UNIT
Hillhead wind turbine (fictional) blades, gearbox, cable to the grid, speed controller, base	engineer for each part	what does the part do?	blades and gearbox → mechanical cable to the grid → electrical speed controller → electronic concrete base → civil	**Four disciplines, one system**

DESCRIBING AN ENGINEER'S TASK



What is the system?

Electrical, electronic, mechanical, civil...

e.g. design the motor supply

...for the ferry ramp

WORKED EXAMPLE Writing a strong 'describe a task' answer

1 GIVEN	2 FIND	3 FORMULA	4 SUBSTITUTE	5 ANSWER + UNIT
Question: describe one task an electrical engineer carries out on a ferry ramp.	a full answer	verb + what + why	Design (verb) the power supply to the ramp motor (what) so it can lift the ramp safely (why).	**1 mark: a specific task linked to the product**

'Works with electricity' is too vague.

The roles of engineers

WRONG

> Works with electronics.

Too vague: no mark.

RIGHT

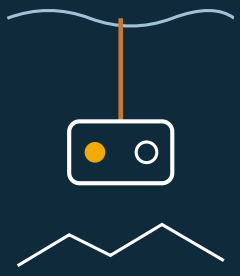
> Design the control circuit that stops the ramp when a car is detected.

Specific task linked to the product.

REAL ENGINEERING · SGEIR MHÒR FLOATING TURBINE

The floating turbine at Sgeir Mhòr (fictional) needed a whole team.

Electrical engineers designed the subsea export cable. Electronic engineers designed the pitch-control sensors. Mechanical engineers designed the gearbox. Environmental engineers surveyed the seabed and seabirds.



PROBE · QUICK CHECKS

1. Which engineer designs a motor's power supply? _____
2. Which engineer programs a control board? _____
3. Which engineer checks the effect on wildlife? _____

EXAM READY · 4 MARKS

1 A new ferry terminal at Strathmore (fictional) uses an electric ramp. **Describe** two tasks an electrical engineer would carry out on this project. **[2]**

The roles of engineers

2 **Describe** one task an electronic engineer would carry out on the ramp. **[1]**

3 **Explain** why engineers from different disciplines work as a team. **[1]**