

12 Pages

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either mark the script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. **Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.**

1	Student Number	2205436
2	Title of Examination Paper	Transducers and Signal Conditioning
3	Module Code	ACDA5006
4	Date and Time of Examination	7/1/25 15:00
5	Examination Venue	IQ103
6	Seat Number	032
7	Number of Answer Books handed in	1

[illegible]

(Gweler yr ochr arall am y fersiwn Cymraeg)

$$\frac{28}{50} \times 100 = 56\%$$

1 Calibration is required in measurement instruments in order for them to work as described in the specification.

Calibration is necessary when several factors influence the accuracy of the measurements taken using the instrument. ~~calibration~~ ~~the~~

Environmental factors such as ~~temperature~~ temperature ~~can~~ can affect the instrument. regardless of the value being measured as some components are affected by air temperature within the instrument.

4.

2a The circuit shown is used for overvoltage protection

2

2b The circuit consists of a 100Ω resistor and two Zener diodes.

✓

The resistor is used to reduce the voltage and the Zener diodes are used to redirect ~~the~~ some of the voltage to ground, reducing the voltage to a safe limit for the circuit.

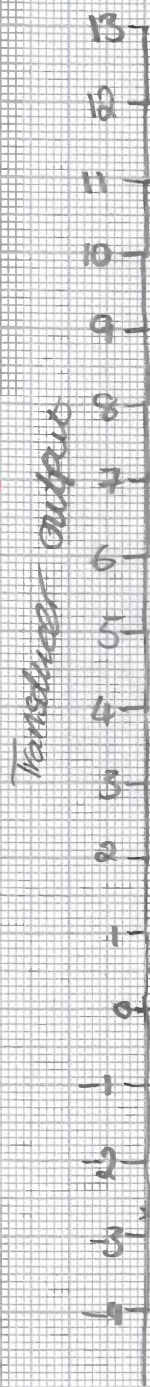
The value of the resistor will affect how much voltage is allowed through to the circuit. X.

4.

- 4a
- volume of input and output → Range required.
 - ~~sensor~~ sensor material → reaction to chlorine?
 - fluid pressure? → sensor depth
 - Temperature of system → sensor will need to be compatible

- 4b
- Sensor material
 - appropriate size for use? → counter?, other components.
↳ will other components be needed for a display
 - Volume of input and output to determine range
 - ~~temperature~~ Temperature of system / fluid

6



No line of best fit
No units
X axis label missing

$$\frac{2.}{4}$$

5 Random errors can be ~~attributed~~ caused by any rounding errors, or slight changes in environmental conditions. Systematic errors can be caused by calibration ~~errors~~ errors.

The difference between the two is that random errors can be caused by a variety of factors however systematic errors can only be caused by the system itself.

6 Accuracy is the closeness of results to the expected value when measuring a set of values, however precision is the closeness of results to each other. Precision can also be described as the freedom from random errors.

Accuracy and precision are often confused with each other.

5