

**Physics**

**Unit 3 Investigative and Practical Skills in AS Physics**

**Investigative Skills Assignment (ISA) P**

**PHY3T/P09/TN**

**Instructions to Supervisors**

**CONFIDENTIAL**

- These instructions are provided to enable centres to make appropriate arrangements for the Unit 3 ISA P test.
- For further details of the administration of the ISA and for information about these instructions, please see the document *Guidance Instructions for the Administration of Investigative Skills Assignment (ISA): GCE Physics*

## ISA (P) Emf and Internal Resistance Investigation

### Centre instructions for the investigation

In this ISA candidates will be investigating the terminal pd and current drawn from a cell with different resistors connected to the cell.

### Information for centres

Candidates should be told about one week before undertaking Stage 1 of the ISA that the investigation will be about emf and internal resistance of a cell.

Stage 2 of the ISA (the written tests: Section A and B) should take place as soon as possible after the practical investigation.

### Apparatus

Centres should ensure that the apparatus provided can be used safely.

- (a) Dry cell or dry cell battery with convenient method of connecting leads to terminals. To stabilise the condition of the cell, new cells should be used to power a suitable lamp for 5 minutes before being used in the task.
- (b) Selection of 8 fixed resistors or a resistance box. The resistor values should give a range of current and voltage values compatible with the cell and meter ranges available. The resistor values should be clearly labelled. A method of connecting the resistors into the circuit should be provided.
- (c) Voltmeter with range appropriate to cell and resistors available. Analogue or digital meters may be used.
- (d) Ammeter with range appropriate to cell and resistors available. Analogue or digital meters may be used.
- (e) Leads and optional switch.

It will be suggested to candidates that they should switch off or disconnect the cell between readings but **no explanation for this should be given.**

### Further details on choice of cell/battery and resistors

In testing this experiment the following values were used:

1.5 V alkaline dry cell, with internal resistance approximately  $0.3 \Omega$

Resistor values (4 W) 1.0, 1.5, 2.2, 3.3, 4.7, 6.8, 10,  $22 \Omega$