

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
**General Certificate of Education Advanced Level**

**PHYSICS**  
PAPER 5 A2 Practical  
INSTRUCTIONS

**9702/5**

**OCTOBER/NOVEMBER SESSION 2002**

1 hour 30 minutes

**Great care should be taken that any confidential information given does not reach the candidates either directly or indirectly.**

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**These instructions consist of 8 printed pages.**



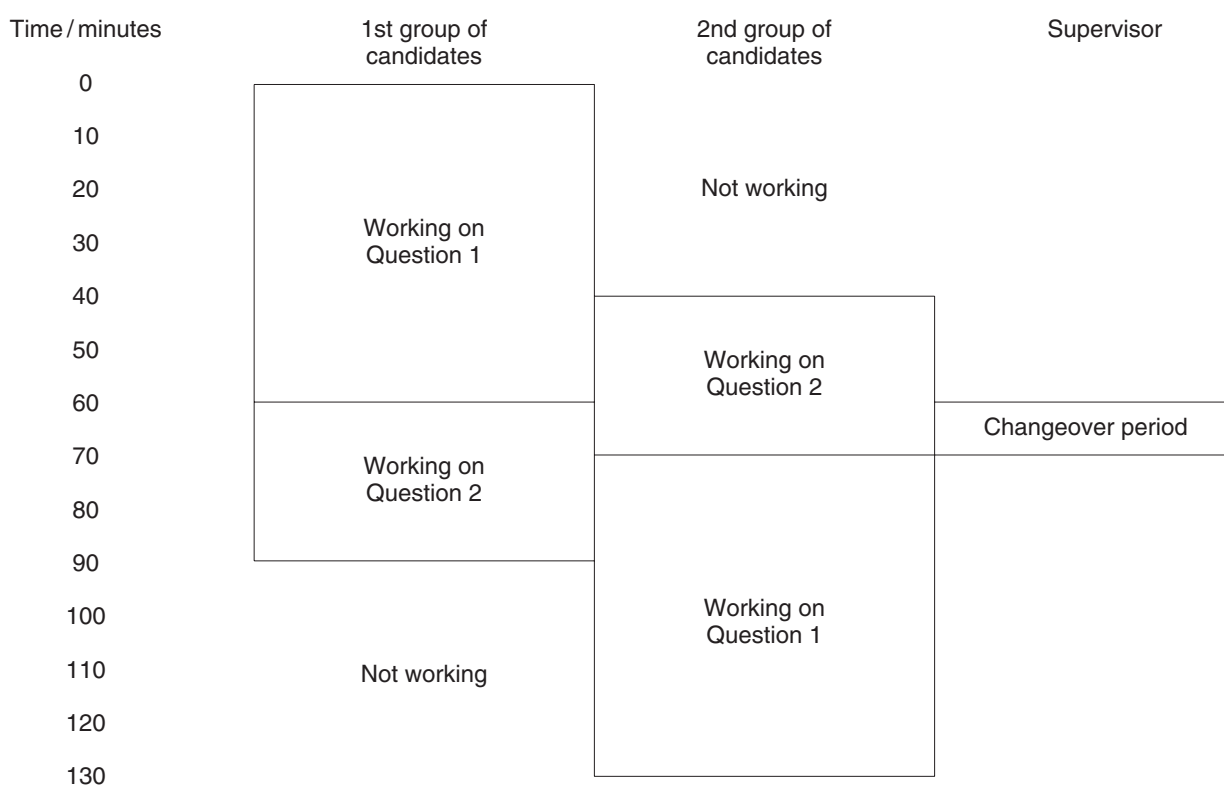
## Instructions for preparing apparatus

These instructions detail the apparatus required for the experiment in this paper. A summary of the question that will be presented to the candidates is included, to allow the Physics teacher to test the apparatus appropriately. No access is permitted to the question paper in advance of the examination session.

## Number of sets of apparatus

In addition to a few spare sets, there should ideally be one set of apparatus per candidate.

If this is not possible, then the minimum number of sets of apparatus to be provided should be sufficient for half the candidates to carry out the experiment simultaneously, plus a few spare sets. With this number of sets available, a staggered start to the examination will be required, which may be organised as shown in the diagram below.



## Instructions for the Practical Physics Supervisor

Candidates should be informed that, if they find themselves in real difficulty, they may ask the Supervisor for practical assistance but that the extent of this assistance will be reported to the Examiner, who may make a deduction of marks.

The Supervisor should complete the report form on pages 7 and 8 and enclose it in the envelope containing the answers of the candidates. A note of any help given to, or any particular difficulties experienced by, a candidate should also be enclosed, especially if the Examiner would be unable to discover these from the written answers.

It is assumed that candidates will provide themselves with such standard items as a 30 cm rule, a pair of compasses, a 0° to 180° protractor, a set square and a calculator.

Squared paper should be available.

Whenever a stopwatch or stopclock is specified, candidates should be advised, in advance, that they may, if they wish, use quartz wristwatches with stopwatch facilities.

## Instructions to Supervisors

### Question 1.

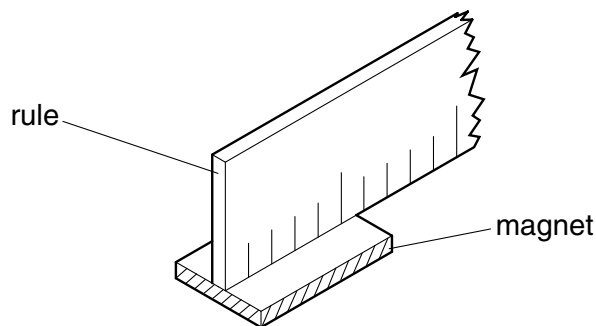
#### Apparatus requirements (per set of apparatus unless otherwise specified)

Stand, boss and clamp

Stout pin (e.g. optical pin) and cork

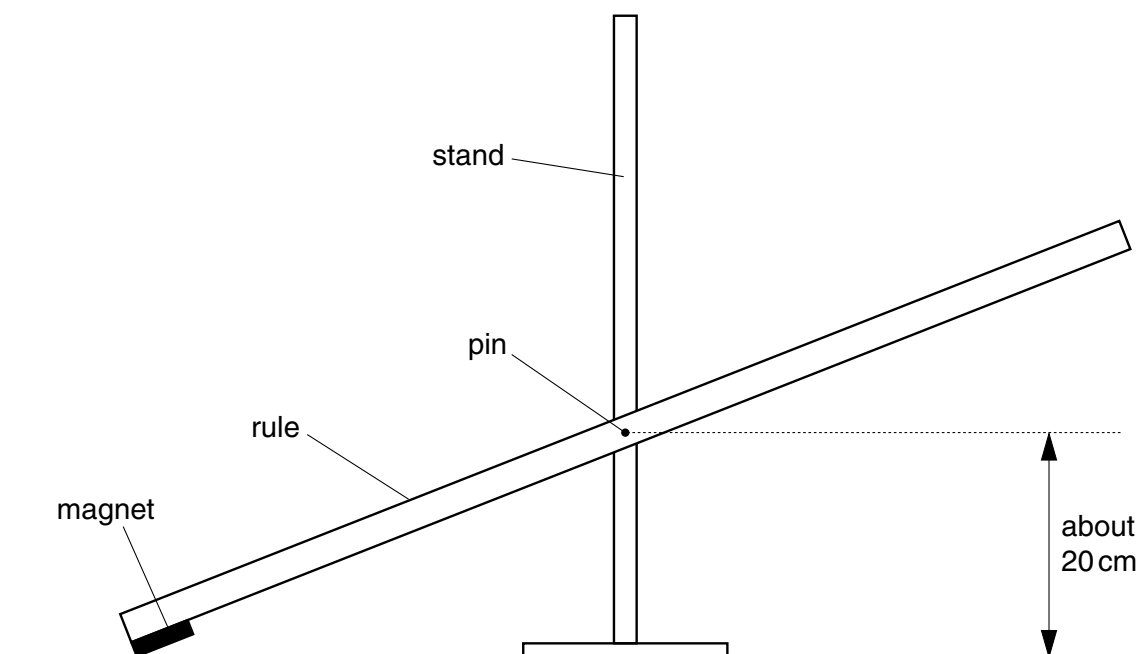
Metre rule. The rule should have a small hole drilled at the 50 cm mark. The hole should be large enough to allow the pin to pass through without difficulty.

Ceramic magnadur magnet (e.g. Philip Harris catalogue number A47156). This magnet should be attached to one end of the rule using masking tape. The largest plane face of the magnet should be perpendicular to the plane face of the rule as shown in Fig. 1.1.



**Fig. 1.1**

It does not matter which pole of the magnet is facing the rule. The pin should be passed through the centre of the rule and inserted into the cork. The cork should then be clamped about 20 cm above the surface of the bench so that the rule is inclined to the horizontal with the magnet resting on the surface of the bench as shown in Fig. 1.2.



**Fig. 1.2**

50 g mass holder with a short length of twine attached to it. The twine is to be used to suspend the mass holder from the rule. The length of twine should be such that, when the mass holder is suspended from the rule and the rule is horizontal, the bottom of the mass holder is about 2 cm above the bench.

Low voltage power supply unit. The unit must be capable of supplying a continuously variable output from 0 to about 12 V.

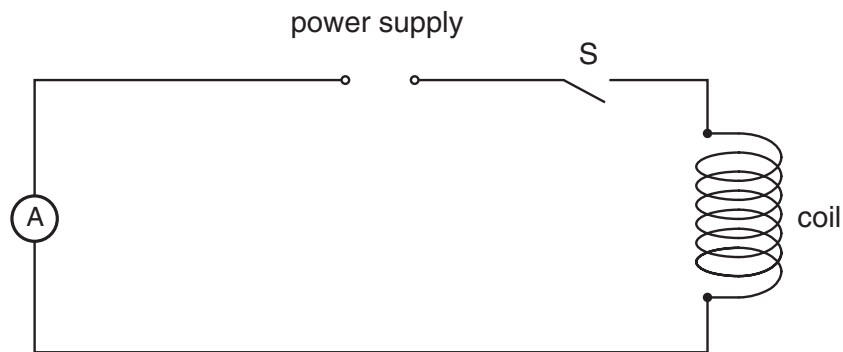
Short coil of at least 100 turns. A wide variety of home made and commercially available coils have been found to be suitable.

Solid, non-metallic block. The dimensions of the block should be such that, when the coil is placed on the block and the magnet rests on the top of the coil, the rule is horizontal.

Ammeter (0 - 5 A range). A digital ammeter would be suitable.

Switch

Sufficient connecting wires to allow candidates to construct the circuit shown in Fig. 1.3.

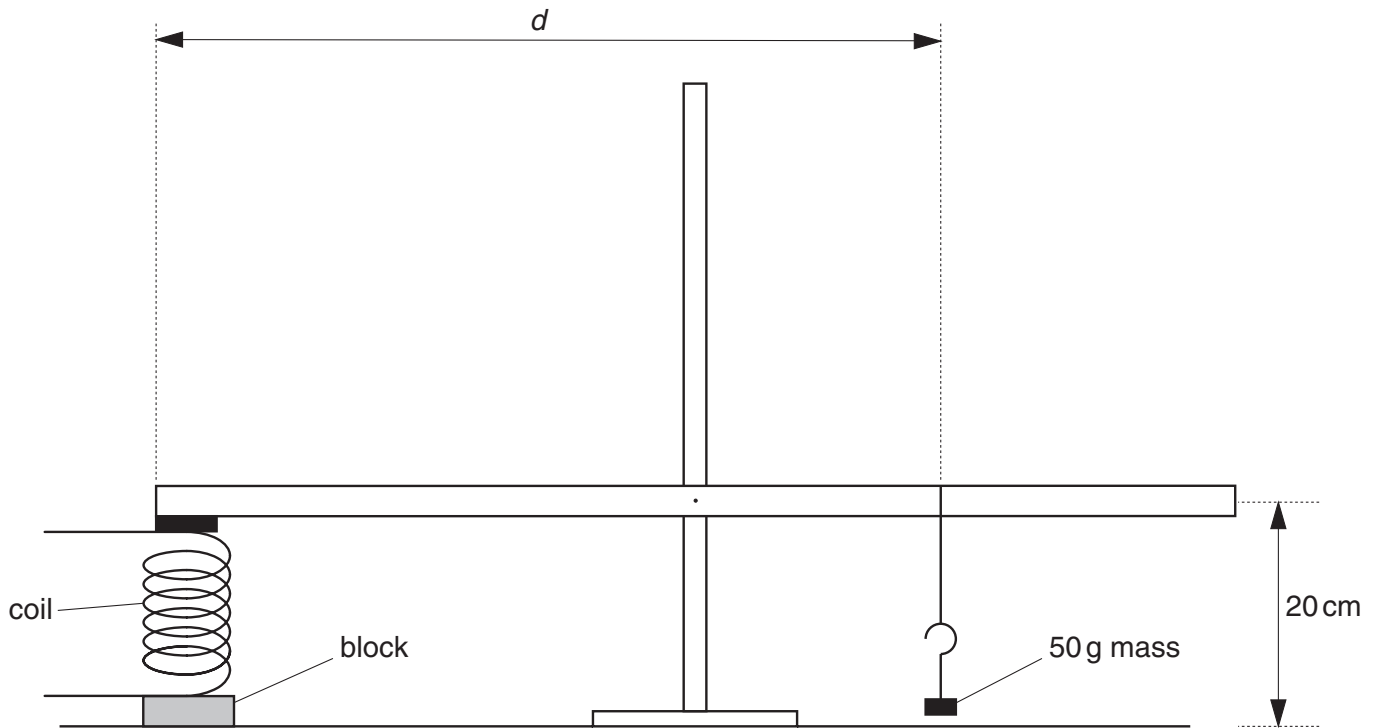


**Fig. 1.3**

If the apparatus is to be used by a second candidate then the equipment should be dismantled and restored to its original condition at the end of the first candidate's experiment.

**Procedure to be followed by candidates**

Candidates will set up the apparatus as shown in Fig. 1.4 below.



**Fig. 1.4**

Candidates will measure the minimum current  $I$  required to maintain horizontal equilibrium of the rule as the distance  $d$  is changed.

A graph of  $I$  against  $d$  should give a straight line which does not pass through the origin.

**Information required by the Examiners**

None.

**Question 2**

Question 2 is a design exercise which does not require apparatus.

**This form should be completed and sent to the Examiner with the scripts.**

## **REPORT ON PRACTICAL PHYSICS**

### **General Certificate of Education Advanced Level**

**October/November Session 2002**

#### **General**

The Supervisor is invited to give details, on the reverse of this form, of any difficulties experienced by particular candidates, giving names and index numbers. These should include reference to:

- (a)** accidents to apparatus or materials;
- (b)** any other information that is likely to assist the examiner, especially if this cannot be discovered in the scripts;
- (c)** any help given to a candidate.

Other cases of individual hardship, e.g. illness, disability, should be reported direct to CIE on the normal 'Special Consideration Form'.

In cases of faulty apparatus (not arising from a candidate's mishandling) which prevent the required readings being taken, the following action is permissible.

The Invigilator – in consultation with the Physics teacher responsible for preparing the examination – may allow extra time to give the candidate a fair opportunity of performing the experiment as if the fault had not been present. The candidate should use a spare copy of the Question Paper when the fault has been rectified or when working with a second set of apparatus. The Invigilator is asked to provide CIE with details of such cases of time compensation (a copy being enclosed with the scripts), especially

- (i)** the candidate's name and index number,
- (ii)** the extra time allowed,
- (iii)** notes on the nature of the fault, the action taken to rectify the difficulty and any other comments which would be helpful to the Examiner in making a fair assessment of the candidate's work during the practical examination.



**Information required**

A list, by name and index number, of candidates requiring help, with details of help provided

**Declaration** (to be signed by the Principal)

The preparation of this practical examination has been carried out so as to maintain fully the security of the examination.

Signed .....

Centre Number .....

Name of Centre .....

