

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level

PHYSICS

9702/05

Paper 5 Practical Test

October/November 2004

CONFIDENTIAL INSTRUCTIONS

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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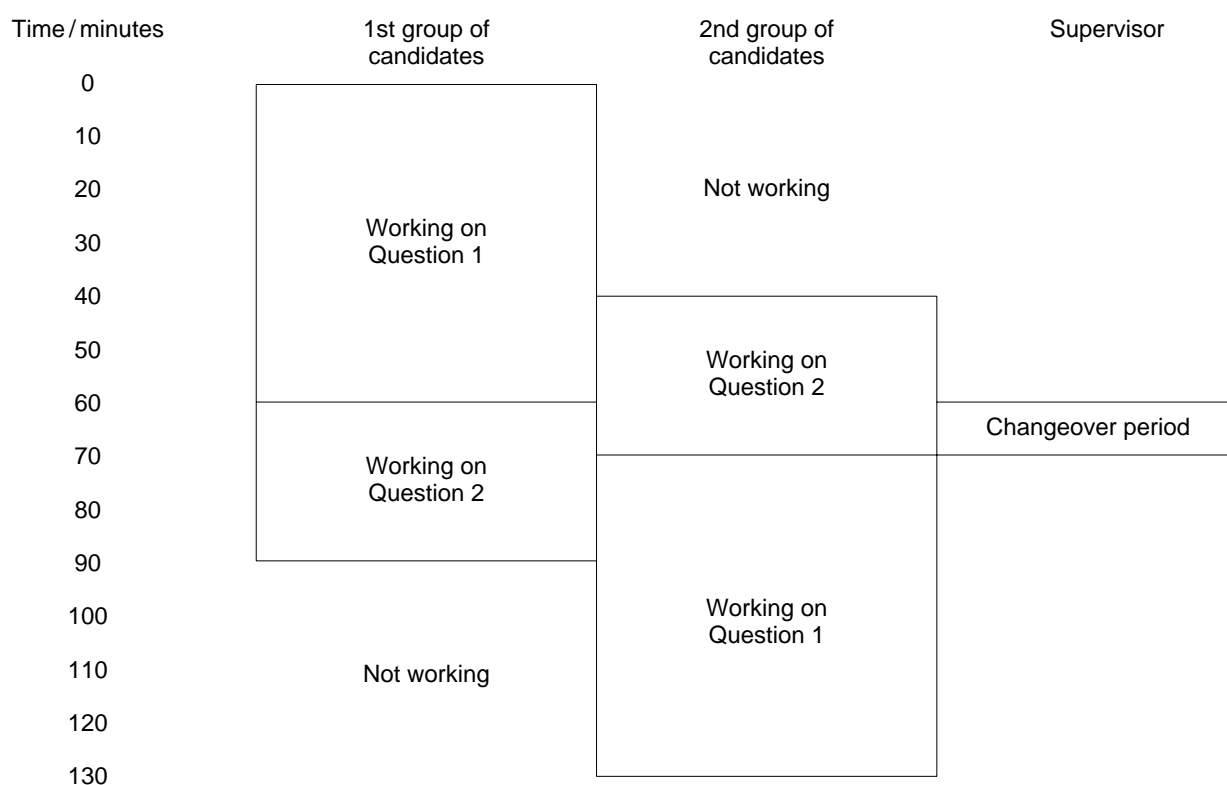
Instructions for preparing apparatus

These instructions detail the apparatus required for the experiment in this paper. A summary 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.

Graph paper should be available.

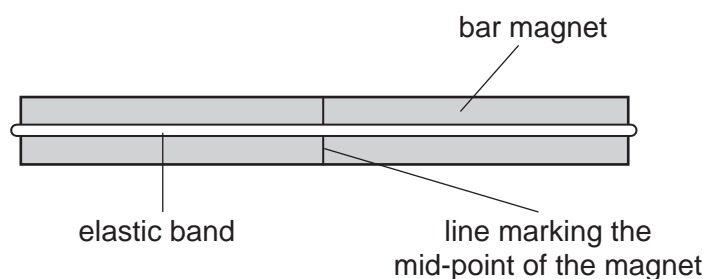
Whenever a stopwatch or stopclock is specified, candidates should be advised in advance that they may, if they wish, use quartz wrist watches with stopwatch facilities.

Question 1**Apparatus requirements (per set of apparatus unless otherwise specified)**

Newton-meter, range 0–5 N or 0–10 N in 0.1 N steps (e.g. Philip Harris catalogue numbers A40277–A40289). The meter should have a hook at the lower end for suspending a load, and a loop or ring at the upper end so that it may be suspended from a clamp. The meter should be zeroed by the Supervisor before the examination.

Rectangular bar magnet (e.g. Philip Harris catalogue number A46978). A black line should be drawn indicating the mid-point of the magnet.

Elastic band. The length of the band must be such that it fits tightly around the magnet as shown in Fig. 1.1.

**Fig. 1.1**

Paper clip.

Stand, boss and clamp.

Ammeter, range 0–5 A or 0–10 A. A digital meter would be suitable.

Copper coil of about 300 turns, inner diameter about 2 or 3 cm and length in the range 5–10 cm. The ends of the coil should terminate in 4 mm sockets or crocodile clips so that candidates may make connections to the coil without difficulty. The wire from which the coil is made should be thick enough so that appreciable heating does not occur when the coil carries a continuous current of 2 A for about ten minutes.

d.c. power supply. The unit should be capable of delivering a variable output of between 0 and 5 A to the coil specified above.

Switch.

Sufficient connecting wires to enable the circuit in Fig. 1.2 to be constructed.

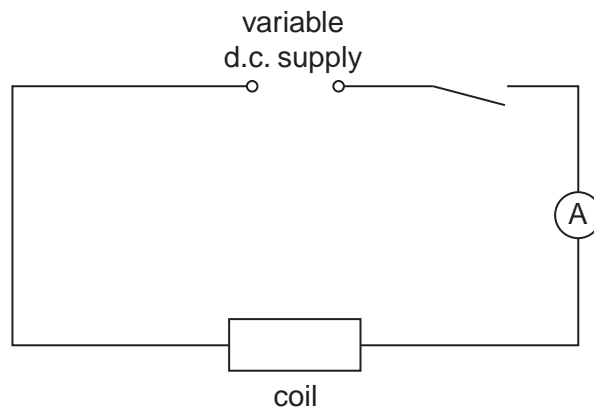


Fig. 1.2

Notes

- 1 The apparatus should not be assembled.
- 2 Candidates will set up the apparatus as shown in Fig. 1.3.

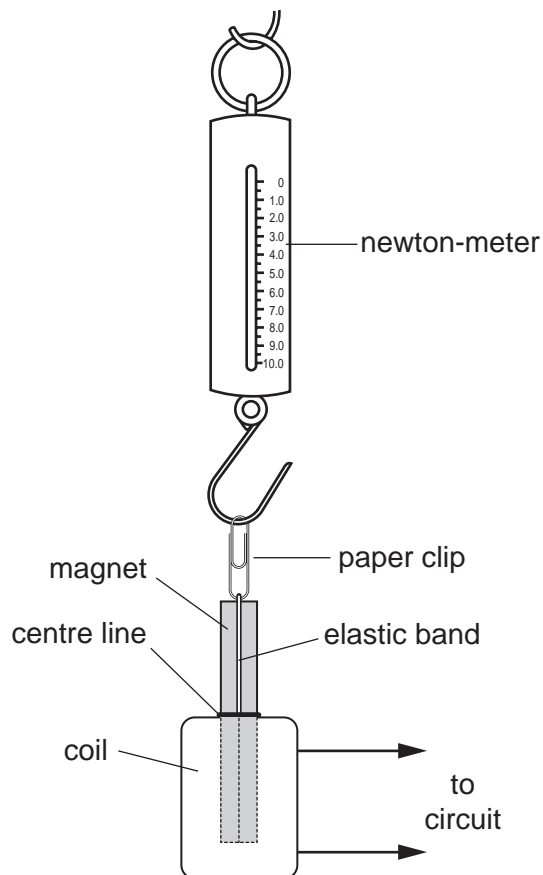


Fig. 1.3

The bar magnet will be suspended from the newton-meter using the paper clip so that the lower point of the magnet is level with the top of the coil, and the lower end of the magnet is 1.0 cm above the coil. When there is a current of 2 A in the coil, the reading on the newton-meter should be equal to the weight of the bar magnet plus about 0.5 N.

- 3 Supervisors must be particularly vigilant at the beginning of the experiment to ensure that candidates have set up the circuit correctly. In particular, Supervisors must ensure that the polarity of the coil is such that attraction occurs between the coil and the magnet. The extent of any help given to candidates must be detailed in the Supervisor's Report and sent with the scripts.
- 4 If the apparatus is to be used by a second candidate, the circuit should be dismantled at the end of the first candidate's experiment and the equipment laid out on the bench ready for the next candidate to use.

Information required by Examiners

None.

Question 2

Question 2 is a design exercise that 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 2004

General

The Supervisor is invited to give details, on the reverse of this form, of any difficulties experienced by particular candidates, giving names and candidate 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 information cannot be discovered in the scripts;
- (c) any help given to a candidate.

Other cases of individual hardship, e.g. illness or 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) that 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 to perform 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 candidate 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 that 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 candidate 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

