

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level

PHYSICS

9702/5

PAPER 5 Practical Test

INSTRUCTIONS

MAY/JUNE 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.

These instructions consist of 7 printed pages and 1 blank page.

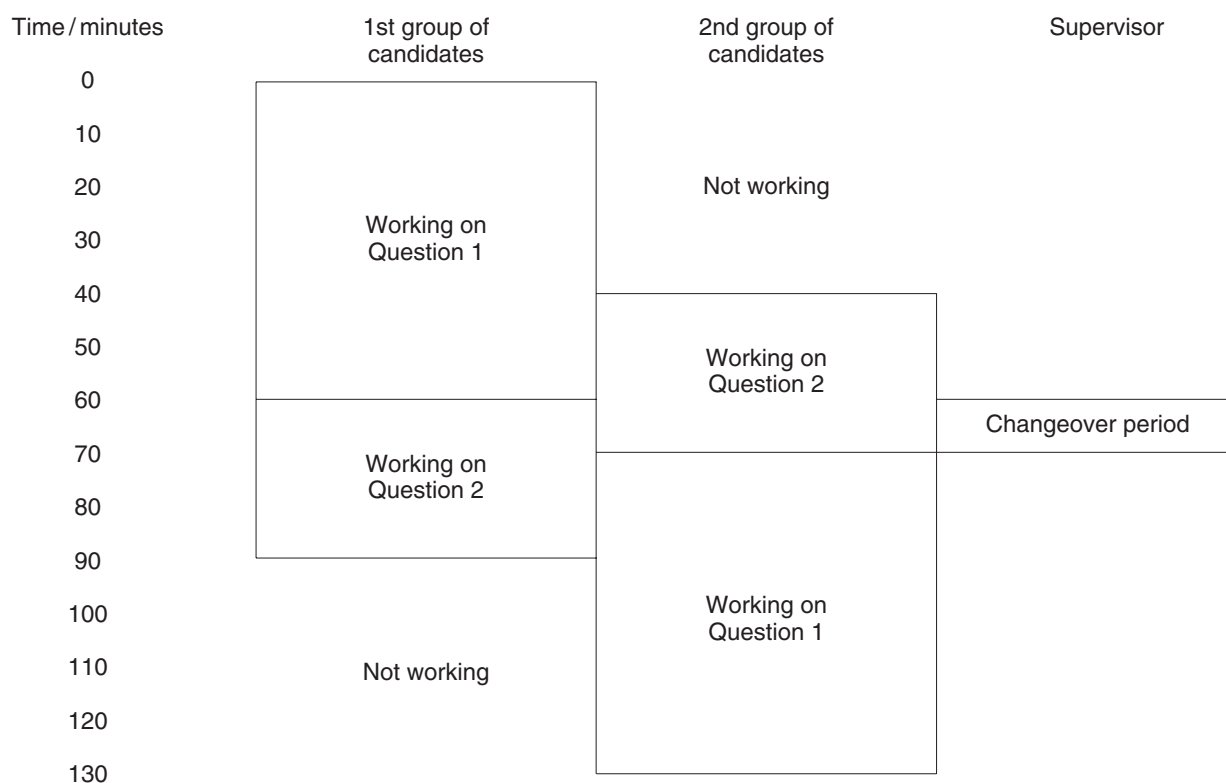
Instructions for preparing apparatus

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.

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

Two mounted filament lamps rated 12 V, 36W. The lamps should be clearly labelled P and Q respectively. Ray boxes would be suitable. The lamps must have identical characteristics, and it is therefore important that Supervisors check that both lamps allow the same current to pass when particular potential differences of about 1 V to 9 V are applied across them. Candidates will be expected to use the lamps when they are carrying currents of the order of one or two amperes.

Low voltage power supply unit capable of providing potential differences in the range 0 to about 12 V and currents of about 4 A. A stop should be attached to the dial on the unit so that candidates are not able to exceed the working voltage of the lamp. If this is not possible then candidates should be told at the start of the experiment that they must not exceed the working voltage of the lamp.

Ammeter, range 0–5 A. A digital ammeter would be suitable.

Voltmeter, range 0–10 V, 0–12 V or 0–15 V. A digital voltmeter would be suitable.

Switch.

Sufficient connecting wires to connect the circuit shown in Fig. 1.1, plus two additional connecting wires.

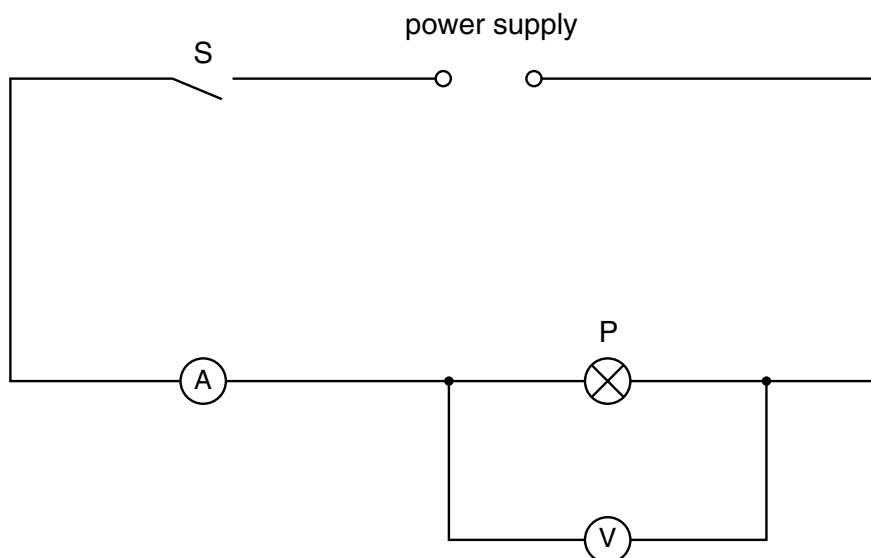


Fig. 1.1

Procedure to be followed by candidates

Candidates will be required to investigate the variation of current with potential difference for one lamp, and then for two lamps connected in parallel.

Candidates will set up the circuit in Fig. 1.1 and use it to obtain a set of values for current I and potential difference V . The experiment is repeated with lamp Q connected in parallel with lamp P. A graph of $\lg(I/A)$ against $\lg(V/V)$ should give a straight line in each case. The gradients of the two lines should be equal. Both graphs should have y -intercepts which are non-zero.

Supervisors should be particularly vigilant throughout the experiment to ensure that candidates have connected the circuits correctly. The extent of any help given should be reported and sent with the scripts.

If the apparatus is to be used by a second candidate then it 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 the Examiners

For one lamp, a typical value of the p.d. across the lamp when it is carrying a current of

- (i) 1 A,
- (ii) 2 A.

Question 2

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

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

REPORT ON PRACTICAL PHYSICS

General Certificate of Education Advanced Level

May/June 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 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 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.

For one lamp, a typical value of the p.d. across the lamp when it is carrying a current of

- (i) 1 A,
- (ii) 2 A.

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

