



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS

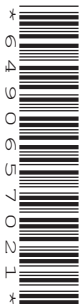
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Paper 5 Practical Test

October/November 2018

CONFIDENTIAL INSTRUCTIONS

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



If you have any queries regarding these Confidential Instructions, please contact Cambridge stating the Centre number, the nature of the query and the syllabus number quoted above.

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This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **7** printed pages and **1** blank page.

Instructions for preparing apparatus

The Supervisor is **not** allowed to consult the Question Paper before the examination. This teacher should, as part of the preparation of the examination requirements, test the apparatus in order to ensure that it is satisfactory.

The Supervisor is asked to give (and attach to the Supervisor's Report printed on pages 7 and 8) a *brief* description of the apparatus supplied, mentioning any points that are likely to be of importance to the Examiner in marking the answers. The Supervisor should also report any assistance given to candidates. All reports should be signed by the Supervisor.

In addition to the usual equipment of a physics laboratory, each candidate will require the apparatus specified in these Confidential Instructions. If a candidate breaks any of the apparatus, or loses any of the material supplied, the matter should be rectified and a note made in the Supervisor's Report.

Number of sets of apparatus

As a *minimum*, the number of sets of apparatus provided should be $N/3$, where N is the number of candidates (per session). A few spare sets should, preferably, be available to avoid any candidate being delayed when moving to another question.

The order in which a given candidate attempts the four questions is immaterial. It is suggested that candidates spend **about 20 minutes on each of questions 1 to 3, and about 15 minutes on question 4.**

Assistance to candidates

The purpose of the Physics Practical Test is to find out whether the candidates can carry out simple practical work themselves. The Examiners are aware that candidates may sometimes be unable to show their practical ability through failure to understand some point in the theory of the experiment. If an Examiner were present in the laboratory, he/she would be willing to give a hint to enable such a candidate to get on with an experiment. In order to overcome this difficulty, the Supervisor is asked to co-operate with the Examiners to the extent of being ready to give (or allow the physics teacher to give) a hint to a candidate who is unable to proceed.

The following regulations must be strictly adhered to.

- (i) No hint may be announced to the candidates as a whole.
- (ii) A candidate who is unable to proceed and requires assistance must come up to the Supervisor and state the difficulty. Candidates should be told that the Examiners will be informed of any assistance given in this way.
- (iii) A report must be made of any assistance given to the candidate, with the name and candidate number of the candidate.

It is suggested that the following announcement be made to the candidates.

'The Examiners do not want you to waste time through inability to get on with an experiment. Any candidate, therefore, who is unable to get on with the experiment after spending five minutes at it may come to me and ask for help. I shall report to the Examiners any help given in this way, and some marks may be lost for the help given. You may ask me for additional apparatus which you think would improve the accuracy of your experiments, and you should say, on your script, how you use any such apparatus supplied.'

Question 1

Items to be supplied by the Centre (per set of apparatus unless otherwise specified)

- (i) Clamp, boss and stand.
- (ii) Expendable spring, approximately 55 mm overall length (including loops) \times 15 mm diameter, capable of supporting at least 500 g without overstretching (e.g. Philip Harris expendable steel spring, www.philipharris.co.uk).
- (iii) Metre rule, graduated in mm. Some 'blu-tack'. See note 3.
- (iv) A 10 g mass hanger and nine 10 g slotted masses. See note 1.
- (v) Set-square. See note 2.
- (vi) Spare springs should be available.

Notes

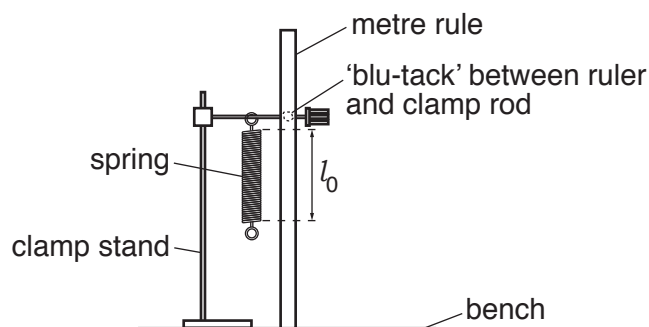


Fig. 1.1

1. The nine 10 g slotted masses and the 10 g mass hanger should each be labelled 0.10 N. An alternative to individually labelling the masses is to provide a card with the words 'each mass and the mass hanger has a weight of 0.10 N'. If slotted masses are not available, a light hook must be provided so that up to ten 10 g masses each labelled 0.10 N can be hung from the spring.
2. If the set-square has a scale marked in cm or mm this must be taped over so that it is not visible to candidates. Opaque masking tape is appropriate for this use.
3. The apparatus is to be set up for the candidates as shown in Fig. 1.1. The spring is to be hung from the clamp, supported by a boss and stand. The spring must be sufficiently high above the laboratory bench so that when the 1.00 N load is hung on the spring, the bottom of the load is about 10 cm above the surface of the bench. The metre rule should be securely attached to the horizontal bar of the clamp so that it rests vertically on the bench or foot of the stand. The metre rule must be close to, but not touching, the spring. The arrangement should be stable and will not topple when used for the experiment.

Action at changeover

Check that the apparatus is set up ready for the next candidate, as shown in Fig. 1.1. Replace the spring if it has been overstretched. Ensure the ruler is attached securely to the stand.

Question 2

Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)

- (i) Power supply of approximately 1.5V – 3V. Where candidates are provided with a power supply with a variable output voltage, the voltage setting should be set by the Supervisor and fixed (e.g. taped). See note 2.
- (ii) Two similar filament lamps, labelled **X** and **Y**, in suitable holders. Any low voltage filament lamps will suffice, provided that they glow when connected as shown in Fig. 2.1.
- (iii) Switch. The switch may be an integral part of the power supply.
- (iv) Ammeter capable of reading up to 1.00A with a minimum precision of 0.05A. See note 4.
- (v) Voltmeter capable of measuring the supply p.d. with a minimum precision of 0.1 V. See note 4.
- (vi) Sufficient connecting leads to construct the circuit shown in Fig. 2.1. See note 3.
- (vii) Spare lamps and spare leads should be available.

Notes

1. The components are to be connected by the Supervisor as shown in Fig. 2.1.

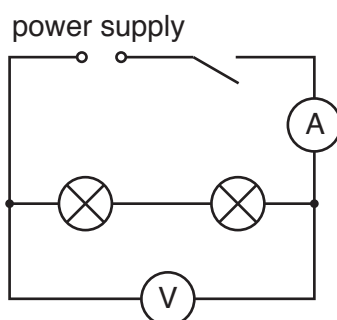


Fig. 2.1

2. If cells are to be used they must remain adequately charged throughout the examination. Spare cells should be available.
3. Candidates must be able easily and quickly to rearrange the circuit.
4. Either analogue or digital meters are suitable. Any variable settings should be set by the Supervisor and fixed (e.g. taped). Spare meters should be available.

Action at changeover

Set up the circuit so that it is arranged as shown in Fig. 2.1.

Check the power supply and lamps.

Question 3**Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)**

- (i) Sheet of plain A4 paper (*per candidate*) with a hole in one corner so that it can be tied into the Question Booklet.
- (ii) Rectangular, transparent glass or Perspex block, 10 cm × 6 cm × 1.5 cm or similar size.
- (iii) 4 optics pins.
- (iv) Pin board e.g. a cork mat, A4 size or larger.
- (v) Protractor (candidates may use their own).
- (vi) 50 cm or 30 cm ruler, graduated in mm (candidates may use their own).
- (vii) String or treasury tag (*per candidate*) to tie the ray-trace sheet into the Question Booklet.

Notes

1. Spare sheets of plain paper should be available (as in **(i)**).
2. Spare pins should be available.

Action at changeover

Supply a sheet of plain A4 paper (as in **(i)**) and string or a treasury tag (as in **(vii)**).

Question 4

No apparatus is required for this question.

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This form must be completed and returned with the scripts.

SUPERVISOR'S REPORT

General

The Supervisor is required to give details of any difficulties experienced by particular candidates giving their names and candidate numbers. These should include reference to:

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

Information required

A plan of workbenches, giving details by candidate number of the places occupied by the candidates for each experiment for each session, must be enclosed with the scripts.

The space below can be used for this, or it may be on separate paper.

Information required (cont.)

A list by name and candidate number of candidates requiring help, with details of the help provided.

CENTRE NO.

NAME OF CENTRE

Declaration (to be signed by the Supervisor)

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

SIGNED
Supervisor