
PHYSICS

0625/53

Paper 5 Practical Test

October/November 2017

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

This document consists of **8** printed pages.

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 cooperate 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) Two 250 cm³ beakers, one labelled **A** and one labelled **B**. See note 1.
- (ii) Lid for beaker **B**, with a hole to allow a thermometer to be inserted. See note 2.
- (iii) Thermometer: –10 °C to 110 °C, graduated in 1 °C intervals. See note 3.
- (iv) Clamp, boss and stand. See note 3.
- (v) Stopclock or stopwatch or wall-mounted clock showing seconds. Candidates will be required to take readings at 30-second intervals. They may use their own wristwatches. The question will refer to a stopclock.
- (vi) Supply of hot water. See note 4.
- (vii) Paper towels to soak up any water spillages.

Notes

1. If the beakers do not have graduations at 75 cm³ and 100 cm³, indelible marks must be drawn. On beaker **A** the mark must be at the 100 cm³ level and labelled **100 cm³**. On beaker **B** the mark must be at the 75 cm³ level and labelled **75 cm³**.
2. Thin cardboard is a suitable material for the lid. Spare lids must be available.
3. The thermometer must be supplied mounted in the clamp, so that the bulb of the thermometer will be below the 75 cm³ level in each beaker. Candidates must be able, easily and safely, to insert the thermometer into each beaker. The thermometer must be clamped near the top so that candidates are able to read temperatures from the maximum temperature of the hot water.
4. Hot water is to be available for each candidate throughout the experiment. The hot water should be maintained at an approximately constant temperature between 80 °C and 100 °C. Each candidate will require about 250 cm³ of hot water in total. Candidates must be able to pour hot water into the beakers safely.
5. Candidates should be warned of the dangers of burns and scalds when using very hot water.

Action at changeover

Remove the thermometer from beaker **B**.
Empty the water from the beakers.
Check that the apparatus is intact.
Supply a new lid if necessary.

Question 2

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

- (i) Two 2W resistors, one approximately $5\ \Omega$ labelled **X**, and the other approximately $10\ \Omega$ labelled **Y**. The values should be obscured so that candidates cannot read them. See note 1.
- (ii) Power supply of approximately 2V–3V. See note 3.
Where candidates are provided with a variable power supply, the voltage should be set by the Supervisor and fixed, e.g. taped.
- (iii) Switch. The switch may be an integral part of the power supply.
- (iv) Sufficient connecting leads to set up the circuit shown in Fig. 2.1, with 4 spare leads.
- (v) Ammeter capable of measuring currents up to 1.00A with a resolution of at least 0.05A. See note 4.
- (vi) Voltmeter capable of measuring up to 3.0V with a resolution of at least 0.1V. See note 4.

Notes

1. The resistors must have suitable terminals so that candidates are able easily and quickly to rearrange the circuit.
2. The circuit is to be set up for candidates as shown in Fig. 2.1.

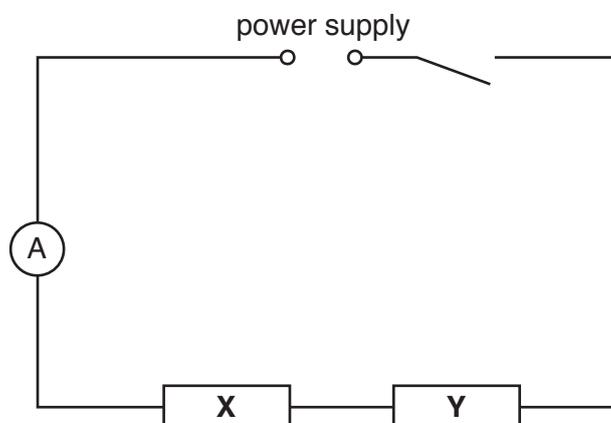


Fig. 2.1

3. If cells are used, they must remain adequately charged throughout the examination. Spare cells must be available.
4. 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. The voltmeter must not be connected to the circuit but must have leads and terminals that enable it to be connected to different parts of the circuit.

Action at changeover

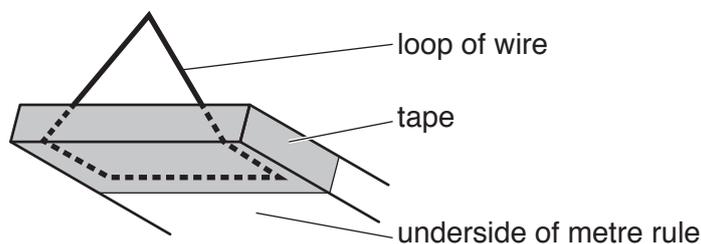
Disconnect the voltmeter with its leads from the circuit.
Connect the circuit as shown in Fig. 2.1 and check that the circuit is working.
Switch the circuit off.

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

- (i) Metre rule, graduated in mm, of weight approximately 1 N to 2 N. See notes 1 and 2.
- (ii) 2 loops of thin wire. See note 1.
- (iii) 1 loop of thin string. See note 3.
- (iv) Forcemeter capable of reading forces up to at least 2.5 N with a resolution of 0.05 N or 0.1 N. See note 5.
- (v) 100 g mass, incorporating a hanger.
- (vi) 2 bosses, 2 clamps and 2 stands.
- (vii) 50 cm ruler or 30 cm ruler graduated in mm. Candidates may use their own.
- (viii) Set-square. Candidates may use their own.

Notes

1. A loop of wire is to be taped securely to each end of the metre rule as shown in Fig. 3.1 so that the metre rule can be suspended, with its scale facing upwards. Thin string is a suitable alternative.

**Fig. 3.1**

2. If the metre rule has two scales in opposite directions, one scale must be taped over.
3. The loop of string must be looped around the metre rule so that the 100 g mass may be suspended from it in different positions.

4. The apparatus must be set up for the candidates as shown in Fig. 3.2, with the metre rule suspended between a clamp at the 0.0cm end and the forcemeter at the 100.0cm end. When the 100g mass is suspended at the 95.0cm mark, with the metre rule horizontal, the mass must be clear of the bench and the clamp holding the forcemeter must be below the top of the stand. The wires suspending the metre rule must be vertical. The 100g mass should be suspended near the centre of the rule.

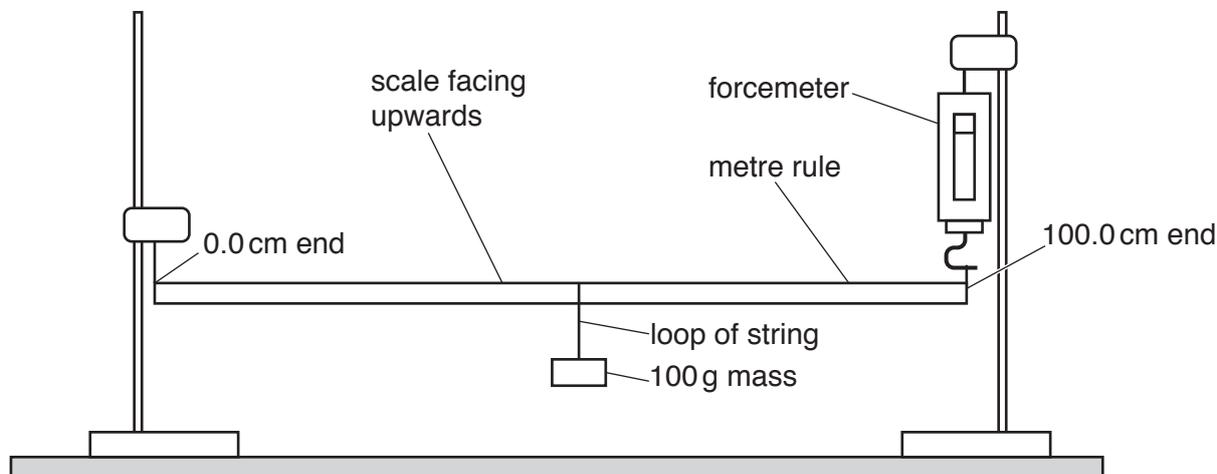


Fig. 3.2

5. The forcemeter must not exceed its full scale deflection when the 100g mass is suspended at the 95.0cm mark. If it does, a forcemeter capable of reading higher values must be used.

Action at changeover

Check that the apparatus is arranged as shown in Fig. 3.2 with the 100g mass near the centre of the rule.
Check that the wire loops are secure.

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