
PHYSICS

9702/34

Paper 3 Advanced Practical Skills 2

May/June 2018

CONFIDENTIAL INSTRUCTIONS

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

No access to the Question Paper is permitted in advance of the examination.



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.

email info@cie.org.uk
phone +44 1223 553554
fax +44 1223 553558

This document consists of **6** printed pages and **2** blank pages.

Preparing apparatus

These Confidential Instructions detail the apparatus required for the experiments in the Question Paper. It is essential that absolute confidentiality is maintained in advance of the examination: the contents of these Confidential Instructions must not be revealed either directly or indirectly to candidates.

No access is permitted to the Question Paper in advance of the examination.

Number of sets of apparatus

The number of sets of apparatus provided for each experiment should be $\frac{1}{2}N$, where N is the number of candidates taking the examination. There should, in addition, be a few spare sets of apparatus available in case problems arise during the examination.

Organisation of the examination

Candidates should be allowed access to the apparatus for each experiment for one hour only. After spending one hour on one experiment, candidates should change over to the other experiment. The order in which a candidate attempts the two experiments is immaterial.

Assistance to candidates

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.

Assistance should only be given:

- when it is asked for by a candidate,
- or as directed in the Notes sections of these Confidential Instructions,
- or where apparatus is seen to have developed a fault.

Assistance should be restricted to enabling candidates to make observations and measurements. Observations and measurements must not be made for candidates, and no help should be given with data analysis or evaluation.

All assistance given to candidates must be reported on the Supervisor's Report.

Faulty apparatus

In cases of faulty apparatus (not arising from a candidate's mishandling) that prevent the required measurements being taken, the Supervisor may allow extra time to give the candidate a fair opportunity to perform the experiment as if the fault had not been present. Any action taken must be reported on the Supervisor's Report.

Supervisor's Report

The Supervisor should complete the Supervisor's Report on pages 7 and 8 and enclose it in the envelope containing the answers of the candidates. If more than one envelope is used, a copy of the report must be enclosed in each envelope.

Question 1

Apparatus requirements (per set of apparatus unless otherwise specified)

3 V d.c. power supply (e.g. two 1.5 V cells). The positive terminal should be labelled +.

Switch labelled S. This must be in addition to any switch on the power supply.

Twelve connecting leads. One lead should be labelled L.

Two component holders, each with terminals.

Digital voltmeter with a range of 0–20 V and reading to 0.01 V. A multimeter set to this range is suitable provided the range switch is fixed and any unused terminals are covered.

100 μF capacitor rated at 25 V (e.g. RS Components stock number 519-4059). It should be labelled C and fitted with terminals. The anode terminal should be labelled 'A +'. The negative terminal should be labelled B.

Ten 22 μF capacitors rated at 25 V (e.g. RS Components stock number 707-6423). See Note 1.

Notes

- The 22 μF capacitors should be separated into four groups containing 4, 3, 2 and 1. The capacitors in each group should be soldered together in parallel (anodes connected together). The anode end of each group should be labelled +, as shown in Fig. 1.1. It should be possible to connect each group, in turn, into a component holder.

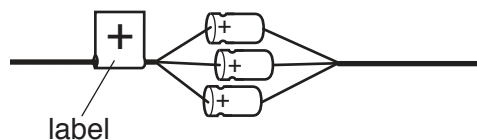


Fig. 1.1

- The apparatus should be laid out on the bench. If the apparatus is to be used by another candidate, then it should be restored to its original state.

Information required by Examiners

Sample set of numerical results, clearly labelled 'Supervisor's Results' and obtained out of sight of the candidates by the Supervisor, who should be a teacher of Physics or other competent physicist.

Question 2

Apparatus requirements (per set of apparatus unless otherwise specified)

2 litre plastic carbonated drinks bottle with a circular cross-section. See Note 1.

10 litre plastic bucket containing water to a height of 6 cm below the top.

Tray in which to stand the bottle.

Paper towels.

Jug or beaker containing 600 cm^3 of water.

500 ml beaker.

100 g mass hanger.

Five 100 g slotted masses to fit on the mass hanger.

Rubber band of approximate circumference 20 cm.

Stopwatch reading to 0.1 s or better.

30 cm ruler with a millimetre scale.

Notes

- 1 The bottle should be cut down to a height of approximately 20 cm, as shown in Fig. 2.1.

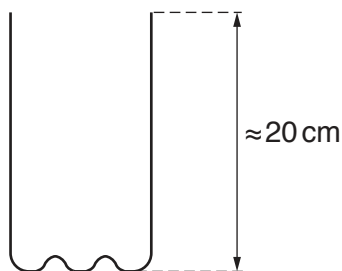


Fig. 2.1

The shape of the base is not important.

- 2 The apparatus should be laid out on the bench. If the apparatus is to be used by another candidate, then it should be restored to its original state.

Information required by Examiners

Sample set of numerical results, clearly labelled 'Supervisor's Results' and obtained out of sight of the candidates by the Supervisor, who should be a teacher of Physics or other competent physicist.

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

SUPERVISOR'S REPORT

The Supervisor's Report should give full details of:

- (a) any help given to a candidate (including the nature of the help given and the name and candidate number of the candidate);
- (b) any cases of faulty apparatus (including the nature of the problem, the action taken to rectify it, any additional time allowed, and the name and candidate number of the candidate);
- (c) any accidents that occurred during the examination;
- (d) any other difficulties experienced by candidates, or any other information that is likely to assist the Examiner, especially if this information cannot be discovered in the scripts.

Cases of individual hardship, such as illness, bereavement or disability, should be reported directly to Cambridge on the normal Special Consideration Form.

Information required by Examiners

For each question, please enclose a sample set of numerical results, obtained out of sight of the candidates and clearly labelled 'Supervisor's Results'.

Supervisor's Report

Supervisor's Report (continued)

Declaration

(to be signed by the Supervisor)

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

Signed

Name

Centre number

Name of Centre