

Preparing apparatus

These 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 Instructions must not be revealed either directly or indirectly to candidates.

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

If you have problems or queries regarding these Instructions, please contact Cambridge
by email: info@cie.org.uk,
by phone: +44 1223 553554,
by fax: +44 1223 553558,
stating the nature of the query and quoting the syllabus and paper numbers (9702/33).

It is assumed that the ordinary apparatus of a Physics laboratory will be available.

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 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 Form.

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. 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.

Supervisor's Report

The Supervisor should complete the Supervisor's Report Form 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 Form must be enclosed in each envelope.

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

Flat, rigid board with approximate dimensions 35cm × 35cm × 6mm (e.g. plywood or MDF). See Note 1.

Bulldog clip (spring clip) with jaws of approximate width 50mm.

Glass or metal sphere with approximate diameter 25mm. See Note 2.

30cm length of strong thread. See Note 2.

30 cm ruler with a millimetre scale.

Sheet of A4 squared paper with 5mm squares.

Stopwatch reading to 0.1 s or better.

Wooden strip of approximate cross section 15mm × 30mm and length 30cm.

G-clamp (to clamp the wooden strip to the bench).

Stand, boss and clamp.

180° protractor with 1° divisions.

Notes

- 1 Drill a hole of diameter 3 mm through the board midway along one of the sides and 10 mm from the edge.
- 2 Glue one end of the thread securely to the sphere. The patch of glue should not be greater than 10mm in diameter.
- 3 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.

Question 2

Apparatus requirements (per set of apparatus unless otherwise specified)

Glass or metal sphere of approximate diameter 18 mm.

Glass or metal sphere of approximate diameter 25 mm.

Small container to hold the spheres (e.g. a plastic petri dish).

Two 60.0 cm lengths of steel wire of approximate diameter 1.5 mm (e.g. 16 swg). See Note 1.

Plastic-coated cloth adhesive tape (duct tape) at least 3.0 cm wide. See Note 1.

Wooden block with approximate dimensions 5 cm × 5 cm × 5 cm.

Plastic tray with approximate dimensions 30 cm × 20 cm and approximate depth 5 cm. See Note 2.

Dry sand. See Note 2.

Stand, boss and clamp.

30 cm ruler with a millimetre scale.

Metre rule with a millimetre scale.

180° protractor with 1° divisions.

Notes

- 1 Use the wire and tape to make a track for the spheres to roll on:
 - Place a length of tape on the bench with the sticky side facing up.
 - Make sure the wires are straight and then press them onto the tape parallel to each other and approximately 1.0 cm apart.
 - Press another length of tape (sticky side down) on top of the wires.
 - Trim excess tape from the ends to give the appearance of Fig. 2.1.

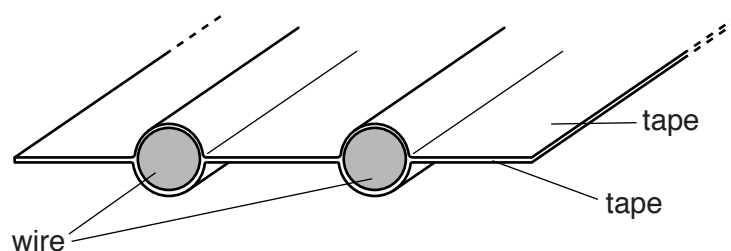


Fig. 2.1 (not to scale)

Bend the track to make a ramp with a shape similar to that shown in Fig. 2.2.

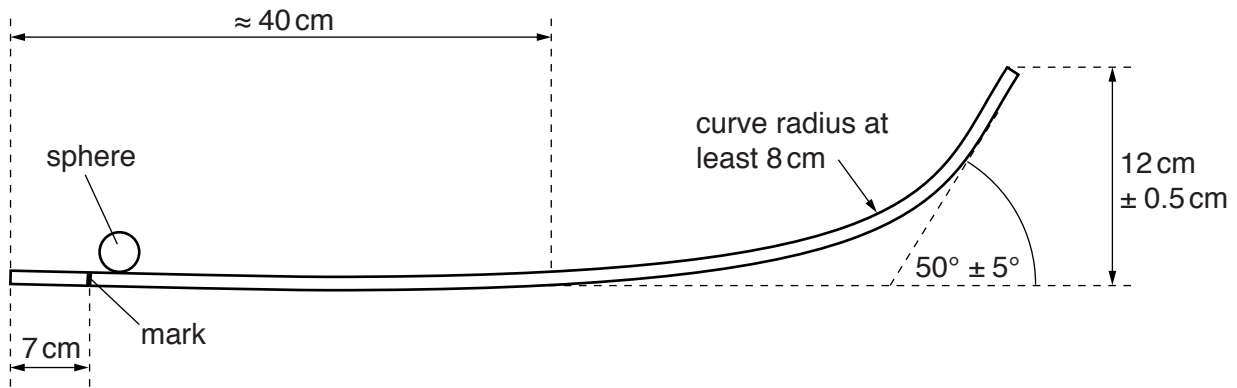


Fig. 2.2 (not to scale)

Make a small mark on each side of the track 7 cm from the end, as shown in Fig. 2.2.

- 2 Add sand to the tray to give a depth of approximately 1 cm.
- 3 The apparatus should be laid out on the bench. If the apparatus is to be used by a second 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.

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

SUPERVISOR'S REPORT FORM

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

