

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
**General Certificate of Education Advanced Subsidiary Level**  
**and Advanced Level**

**PHYSICS**

**9702/3**

PAPER 3 Practical Test

INSTRUCTIONS

**MAY/JUNE SESSION 2002**

1 hour 15 minutes

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

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**These instructions consist of 6 printed pages and 2 blank pages.**



**Instructions for preparing apparatus**

These instructions detail the apparatus required for the experiment in this paper. A summary of the questions 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.

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

**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  $0^\circ$  to  $180^\circ$  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 candidate**

Stand, boss and clamp

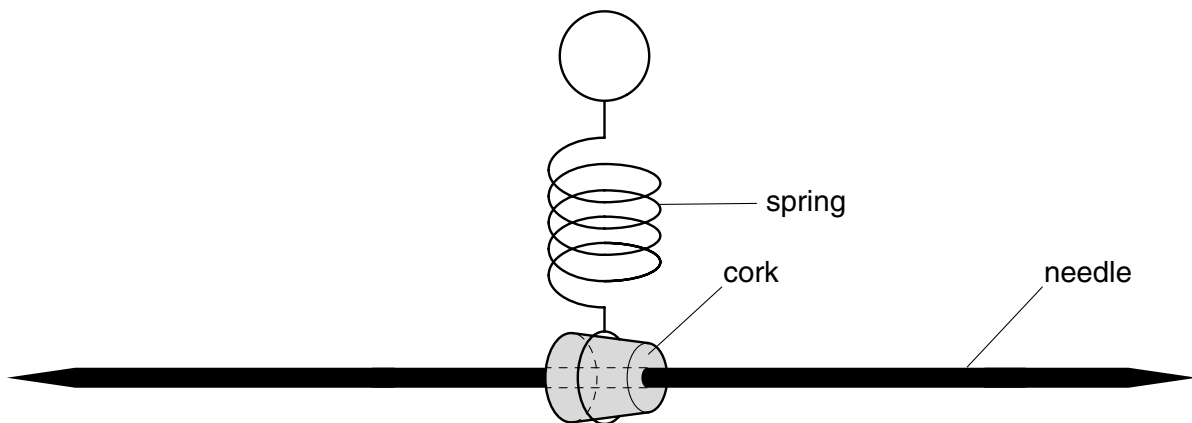
30 cm rule

Two lumps of plasticine (or other type of modelling clay). Each lump should have a mass of 20 g. The initial shape of the plasticine must be irregular.

Rod, diameter about 3 mm and length about 300 mm. A knitting needle or wooden skewer has been found to be suitable. The rod must be sufficiently pointed at each end so that the plasticine can be slid on to it without difficulty.

Expendable steel spring (e.g. Philip Harris catalogue number A41397 or Griffin & George catalogue number XBV-590-010H).

Small cork. The cork should have a hole through its central axis so that it can be pushed on to the rod. The size of the hole should be such that the rod fits tightly into the cork. The middle of the cork is to have an external diameter which is the same as the diameter of the supporting loop of the spring so that when the cork is pushed into the supporting loop of the spring it makes a tight fit as shown in Fig. 1.1.



**Fig. 1.1**

Two small blocks of wood (to be used to grip the spring).

Stopwatch reading to 0.1 s or better.

The rod should be pushed into the cork so that the cork is situated about half way along the rod. The spring should be pushed on to the cork so that it is positioned in the centre of the rod. The remaining apparatus is to be assembled by the candidate.

### Procedure to be followed by candidates

Candidates will be required to load the rod symmetrically with two plasticine balls. Candidates will clamp the spring using the blocks of wood so that the loaded rod is suspended horizontally as shown in Fig. 1.2.

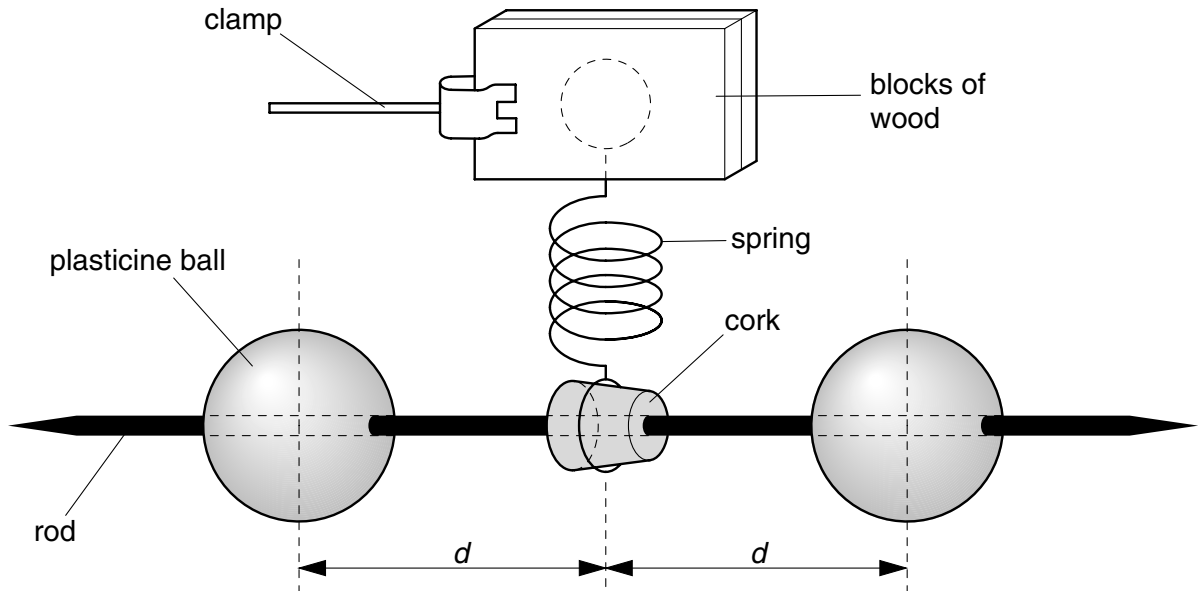


Fig. 1.2

At the start of the experiment Supervisors must be particularly vigilant to ensure that candidates are timing torsional oscillations in a horizontal plane. Candidates will not be penalised if they require assistance to ensure that they are using the correct oscillatory mode.

Candidates will measure the period  $T$  of torsional oscillations of the loaded rod for different values of  $d$ .

A graph of  $T^2$  against  $d^2$  should give a straight line which does not pass through the origin.

### Information required by the Examiners

None.





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

**REPORT ON PRACTICAL PHYSICS**

**General Certificate of Education Advanced Subsidiary Level and 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.

**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 .....

