



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/05

Paper 5 Practical Test

October/November 2009

CONFIDENTIAL INSTRUCTIONS

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

The Supervisor's attention is drawn to the form on page 8 which must be completed and returned with the scripts.

If you have any queries regarding these instructions, please contact CIE

by e-mail: International@cie.org.uk

by phone: +44 1223 553554

by fax +44 1223 553558

stating the nature of the query and the syllabus number quoted above.

* 0 0 0 5 2 7 4 6 1 5 *

This document consists of **5** printed pages and **3** blank pages.



Instructions for preparing apparatus

These instructions detail the apparatus, reagents and specimens required by each candidate for each experiment in this paper. A summary of the questions that will be presented to the candidates is included, where appropriate, to allow the 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 science laboratory will be available, including a supply of purified water (distilled or deionised).

If arrangements are made for different sessions for different groups of candidates, care must be taken to ensure that the different groups of candidates are effectively isolated so that **no information passes between them.**

For Question 1

Each candidate will require:

- (i) a set of three large test-tubes (size 150 x 25 mm) set up as shown and labelled **A**, **B** and **C**.
A dicotyledonous variegated plant is destarched in the dark for 48 hours. A pelargonium would be ideal.
Then leaves are pinned to the bungs of the tubes as shown. Tubes **A** and **C** contain 10 cm³ water. Tube **B** contains 10 cm³ sodium hydroxide solution. 0.5 mol dm⁻³ is an ideal concentration. Tube **C** is completely covered with aluminium foil or black paper so that it is lightproof. The prepared tubes are left in bright light for 24 hours ;
- (ii) a pair of tweezers ;
- (iii) three large test-tubes of size 150 x 25 mm. The tubes supplied containing the leaves may be re-used if necessary if the means are provided to wash them out. Candidates should be reminded of the hazardous nature of sodium hydroxide solution.
- (iv) a test-tube rack or beaker to support the tubes ;
- (v) a glass rod ;
- (vi) 40 cm³ alcohol (industrial methylated spirit) in a stoppered container ;
- (vii) one pair of tongs ;
- (viii) a labelled container for safe disposal of alcohol, e.g. a large beaker (keep away from naked flames) ;
- (ix) a small beaker containing cold water, labelled 'for rinsing leaves' if no running water is provided ;
- (x) a white tile ;
- (xi) 30 cm³ iodine solution ;

- (xii) Bunsen burner, heatproof mat, tripod, gauze, 400 cm³ beaker and water to half-fill it; If no Bunsen or spirit burner is available candidates should have access to a very hot (simmering) water bath. They should be able to immerse their leaf samples in the water and later have a means of support of their tubes in the water (clamp or test-tube rack). Care should be taken to avoid overcrowding.

Candidates should be supplied with extra alcohol and iodine if requested without penalty.

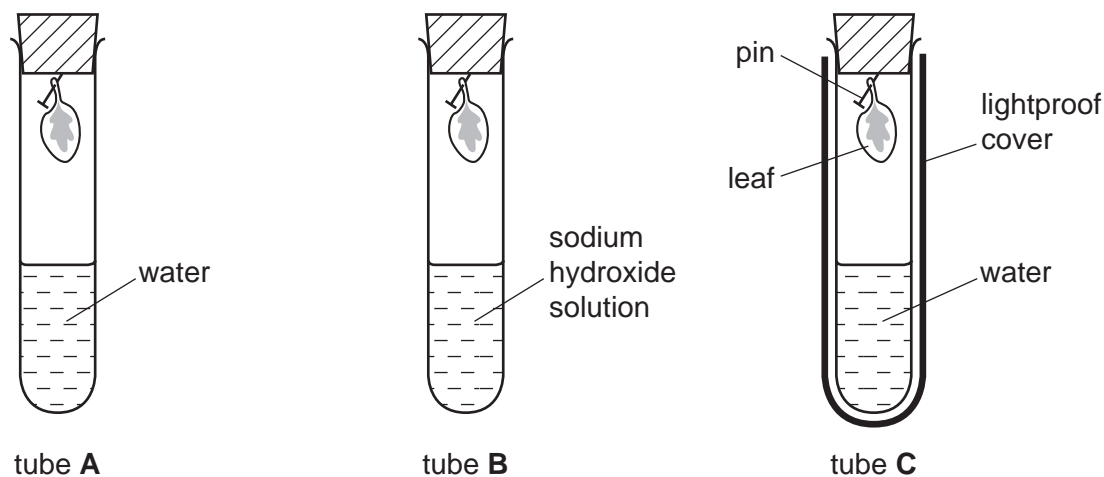


Fig. 1.1

For Question 2

Each candidate will require:

- (i) a rectangular glass or plastic block of known refractive index ;
- (ii) at least 2 sheets of A4 paper ;
- (iii) 4 long pins ;
- (iv) a protractor ;
- (v) a drawing board or similar into which pins may be pushed ;
- (vi) a ruler.

Each candidate will require the refractive index of the block. If similar blocks are used for all candidates it is not necessary to determine the refractive index for each block.

Candidates will be required to attach their ray diagrams to the question paper.

For Question 3

Each candidate will require:

- (i) about 10 cm³ of potassium manganate(VII) solution, concentration about 0.01 mol / dm³ labelled "solution **A**". See below for instructions regarding this concentration and the other two solutions **B** and **C** ;
- (ii) about 10 cm³ of potassium manganate(VII) solution, concentration about 0.005 mol / dm³ labelled "solution **B**";
- (iii) about 10 cm³ of potassium manganate(VII) solution, concentration about 0.0025 mol / dm³ labelled "solution **C**" ;
- (iv) a dropping pipette ;
- (v) 6 test-tubes. If fewer are provided some will require washing ;
- (vi) a 10 cm³ measuring cylinder ;
- (vii) about 15 cm³ of freshly made iron(II) sulfate solution containing dilute sulfuric acid, labelled "solution **X**". The concentration should be approximately 0.10 mol dm⁻³ (about 28 g / dm³ of FeSO₄.7H₂O) ;
- (viii) access to the following :
 - dilute sulfuric acid about 1 mol dm⁻³
 - dilute hydrochloric acid about 1 mol dm⁻³
 - sodium hydroxide solution about 1 mol dm⁻³
 - dilute nitric acid about 1 mol dm⁻³

 - silver nitrate solution
 - barium chloride solution
 - both solutions suitable for anion tests

It is suggested that sufficient 0.01 mol dm⁻³ potassium manganate(VII) solution is prepared to enable this to be diluted appropriately to form solution **B** and **C**.

The concentration of the iron(II) sulfate solution should be adjusted if necessary to ensure that no more than 10 drops are required to decolourise 3 cm³ of the lowest concentration of potassium manganate(VII) i.e. solution **C**.

These solutions should be made in sufficient bulk to supply all candidates with the same solutions.

Spare materials and equipment should be available and can be provided without penalty. **Candidates should be made aware of this.**

Information required from the Supervisor:

The Supervisor is asked to carry out the experiments and to enter the results on a spare copy of the examination paper, clearly marked 'Supervisor's Results' and showing the Centre number. This should be returned with the scripts. Failure to do so may cause the candidates to be penalised.

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This form must be completed and returned in the envelope with the scripts together with the seating plan and the Supervisor's Results mentioned on page 4.

October/November 2009

General

The Supervisor is invited 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) physical handicaps, e.g. short sight, colour blindness;
- (d) any other information that is likely to assist the Examiner, especially if this cannot be discovered in the scripts;
- (e) any help given to a candidate.

The Supervisor is asked to supply the following information:

Plan of work benches, giving details by candidate numbers of the places occupied by the candidates for each session and a copy of the 'Supervisor's Results'.

NAME OF CENTRE

SIGNED
Supervisor

CENTRE NUMBER

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.

NAME
(in block capitals)

SIGNED (Principal)



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