



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**CO-ORDINATED SCIENCES**

**0654/05**

Paper 5 Practical Test

**For Examination from 2019**

**SPECIMEN CONFIDENTIAL INSTRUCTIONS**

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

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**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 email: [info@cie.org.uk](mailto:info@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.

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



**CAMBRIDGE**  
International Examinations

## 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.**

**All specimens should carry only the code letters and numbers as indicated and their identity should not be revealed to the candidates.**

Supervisors should ensure that all specimens have the correct identity attached to the specimen and that these are **not** removed during the examination.

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.

Supervisors are advised to remind candidates that **all** substances in the examination should be treated with caution. Only those tests described in the Question Paper should be attempted. Pipette fillers and safety goggles should be used where necessary.

In accordance with COSHH (Control of Substances Hazardous to Health) Regulations, operative in the UK, a hazard appraisal of the examination has been carried out.

The following codes are used where relevant.

**C** = corrosive

**MH** = moderate hazard

**HH** = health hazard

**T** = acutely toxic

**F** = flammable

**O** = oxidising

**N** = hazardous to the aquatic environment

The attention of Centres is drawn to any local regulations relating to safety, first-aid and disposal of chemicals.

'Hazard Data Sheets', relating to materials used in this examination, should be available from your chemical supplier.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

Centres are reminded that they are **not** permitted to open the question paper envelopes before the examination. Centres are also referred to the Handbook for Centres, the Security of Question Papers and Examination Materials section and the Practical Examinations in Science Subjects section.

If there are difficulties with any aspect of setting up this practical examination that the Centre is not able to resolve, it is essential for Centres to contact the Product Manager as soon as possible by email to [info@cie.org.uk](mailto:info@cie.org.uk), by phone to +44 1223 553554 or by fax to +44 1223 553558.

**For Question 1**

Each candidate will require

- (i) a fresh celery stalk of 5–6 cm length without leaves
- (ii) hand lens
- (iii) white tile
- (iv) knife or cutting blade
- (v) stopclock or sight of a clock with a seconds hand
- (vi) small beaker, e.g. 100 cm<sup>3</sup>, or shallow dish, with red coloured water to a depth of about 1 cm

**Notes**

- 1 Coloured water can be made using 1 cm<sup>3</sup> of red food colouring in 100 cm<sup>3</sup> distilled water.

**For Question 2**

Each candidate will require

- (i) 6 dropping pipettes
- (ii) a white spotting tile with deep wells, (five heavy glass watch glasses with flat bases placed on white paper may be used as an alternative)
- (iii) 10 cm<sup>3</sup> DCPIP (2,6-dichlorophenolindophenol) solution, labelled DCPIP. This will decolourise readily by oxidation with air and should be freshly prepared and kept in a stoppered bottle, preferably made of dark glass
- (iv) 10 cm<sup>3</sup> of each of the following concentrations of vitamin C

percentage concentration of vitamin C
0.25% (labelled 0.25% vitamin C)
0.50% (labelled 0.50% vitamin C)
0.75% (labelled 0.75% vitamin C)
1.00% (labelled 1.00% vitamin C)

- (v) 10 cm<sup>3</sup> of lemon juice or other locally available lightly coloured fruit juice, labelled fruit juice. See note 1.

**Notes**

- 1 The juice should be tested to ensure it will decolourise two drops of DCPIP solution using less than a full well of juice.
- 2 The apparatus should be tested to ensure that the spotting tiles/watch glass wells are deep enough. They should be big enough to contain two drops of DCPIP plus enough drops of 0.50% vitamin C to decolourise this amount of DCPIP.

**For Question 3**

Each candidate will require

- [HH][N] (i) 1.5 g of a mixture, made up of equal masses of copper(II) oxide and calcium oxide, labelled **H**  
 [C][MH]
- (ii) approximately 50 cm<sup>3</sup> distilled water labelled **distilled water**
- [C] (iii) approximately 30 cm<sup>3</sup> 1.0 mol dm<sup>-3</sup> nitric acid labelled **dilute nitric acid**
- [C][MH][N](iv) approximately 20 cm<sup>3</sup> 2.0 mol dm<sup>-3</sup> ammonia labelled **ammonia solution**
- [MH] (v) approximately 40 cm<sup>3</sup> 0.4 mol dm<sup>-3</sup> sodium hydroxide labelled **sodium hydroxide solution**
- (vi) three test-tubes (125 mm × 15 mm)
- (vii) one test-tube (150 mm × 25 mm)
- (viii) spatula
- (ix) stirring rod
- (x) two filter funnels (if 1 funnel is supplied it may need washing during the examination)
- (xi) three pieces of filter paper
- [F] (xii) full range Universal Indicator solution labelled **Universal Indicator** and with a suitable dropping pipette and chart
- (xiii) two small beakers (100 cm<sup>3</sup>)
- (xiv) Bunsen burner and the means to light it
- (xv) tripod and gauze
- (xvi) dropping pipette
- (xvii) red litmus paper
- (xviii) 25 cm<sup>3</sup> measuring cylinder
- (xix) paper towels

**Notes**

- 1 Centres may provide fewer test-tubes, the minimum being two test-tubes (125 mm × 15 mm). If this is the case, candidates will have to rinse test-tubes with distilled water which must be provided.

**For Question 4**

Each candidate will require

- (i) stopwatch
- (ii) thermometer  $-10^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$  with  $1^{\circ}\text{C}$  graduations
- (iii) plastic cup
- [F][N] (iv) 3g of fresh zinc powder labelled **L**
- (v)  $25\text{ cm}^3$  measuring cylinder
- [MH][N] (vi)  $30\text{ cm}^3$   $200\text{ g dm}^{-3}$  copper sulfate,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , labelled **N**
- (vii) stirring rod

**Notes**

- 1 The heavy metals in this experiment should be disposed of in a way that does not harm the environment.

**For Question 5**

No apparatus is required for this question.

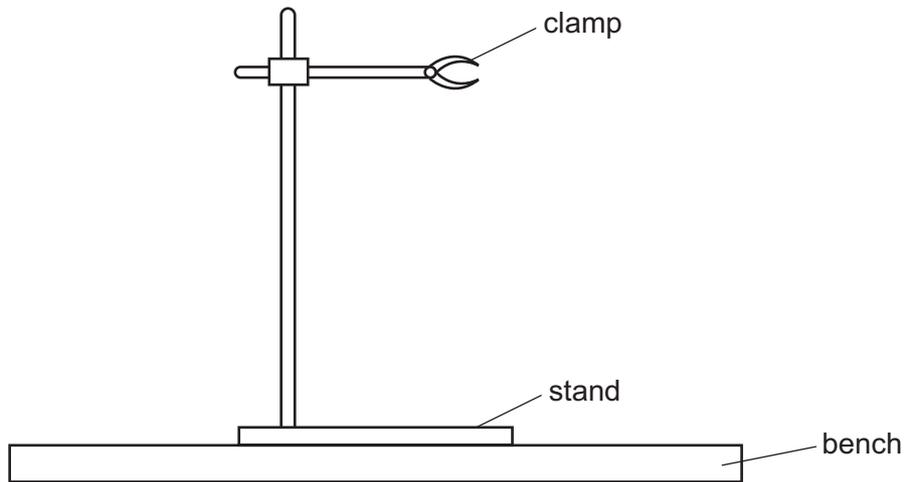
**For Question 6**

Each candidate will require

- (i) steel spring. An expendable steel spring is suitable, for example a 55mm long spring of diameter 15mm. The spring must be capable of supporting at least 600g without overstretching
- (ii) clamp, stand and boss set up as shown in Fig. 6.1. See note 1.
- (iii) masses of 0.1 kg, 0.2 kg, 0.3 kg, 0.4 kg and 0.5 kg. A 0.1 kg mass hanger with four 0.1 kg slotted masses is ideal; if these are not available, a suitable lightweight hook must be provided so that the masses can be hung from the spring
- (iv) stopwatch measuring to at least 0.1 s.

**Notes**

- 1 The stand may need to be clamped securely to the bench to avoid toppling.



**Fig. 6.1**

**For Question 7**

Each candidate will require

- (i) a piece of modelling clay of mass approximately 100 g. The modelling clay should be softened and moulded into a rough spherical shape
- (ii) 30 cm ruler capable of measuring to 1 mm
- (iii) pivot – a prism or wooden block placed on the bench
- (iv) metre rule capable of measuring to 1 mm
- (v) a 50 g mass fixed to the metre rule with its centre above the 10.0 cm mark on the rule

**Action at changeover**

Modelling clay should be remoulded into a roughly spherical shape.

Check that 50 g mass is secured to the metre rule with its centre over the 10.0 cm mark on the rule.

**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.

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

**This form must be completed and returned in the envelope with the scripts together with the seating plan and the Supervisor's Results as mentioned on page 7.**

*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 Supervisor)

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..... (Supervisor)

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