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**CO-ORDINATED SCIENCES**

**0654/53**

Paper 5 Practical Test

**October/November 2017**

**CONFIDENTIAL INSTRUCTIONS**

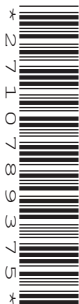
**Great care should be taken to ensure that any confidential information given does not reach the candidates either directly or indirectly.**

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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 Confidential Instructions, please contact Cambridge stating the Centre number, the nature of the query and the syllabus number quoted above.

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This document consists of 7 printed pages and 1 blank page.

**READ THESE INSTRUCTIONS FIRST**

These Confidential Instructions detail the apparatus, reagents and specimens required by each candidate for each experiment in this paper.

The Supervisor is **not** allowed to consult the Question Paper before the examination. This teacher should, as part of the preparation of the examination requirements, test the apparatus in order to ensure that it is satisfactory.

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

More material may be issued if required, without penalty, but this should not be necessary. If a candidate breaks any of the apparatus the matter should be rectified and a note made in the Supervisor's Report.

It is assumed that the ordinary apparatus of a science laboratory will be available, including a supply of purified water (distilled or deionised).

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. Suitable eye protection should be provided.

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.

Attention is drawn, in particular, to certain materials used in the examination. The following codes are used where relevant.

**C** corrosive substance

**MH** moderate hazard

**HH** health hazard

**T** acutely toxic

**F** flammable

**O** oxidising

**N** hazardous to the aquatic environment

Hazard data sheets should be available from your suppliers.

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**.

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

**Question 1**

Each candidate will require:

- (i) a medium sized potato
- (ii) 30 cm<sup>3</sup> 15 volume hydrogen peroxide, labelled **hydrogen peroxide**
- (iii) 4 large test-tubes (150 mm × 25 mm) and means of supporting them
- (iv) a stopclock
- (v) a 30 cm ruler graduated in mm
- (vi) 5 cm<sup>3</sup> syringe without needle
- (vii) 1 cm<sup>3</sup> dish-washing detergent with dropper, labelled **detergent**
- (viii) a means of marking glassware
- (ix) Petri dish
- (x) small container, labelled **waste**
- (xi) white tile
- (xii) knife or scalpel.

## Question 2

Each candidate will require:

- (i) hard glass test-tube (approx. 125 mm × 15 mm) containing approximately 2 cm depth of zinc carbonate solid, stoppered and the stopper labelled **H**
- (ii) approximately 1 g zinc carbonate solid, labelled **H**
- (iii) approximately 10 cm<sup>3</sup> 0.1 mol dm<sup>-3</sup> potassium iodide solution, labelled **J** (see note 2)
- [MH]**(iv) approximately 10 cm<sup>3</sup> limewater, labelled **limewater**
- (v) approximately 15 cm<sup>3</sup> 2.0 mol dm<sup>-3</sup> hydrochloric acid, labelled **hydrochloric acid**
- [MH]**(vi) approximately 50 cm<sup>3</sup> 0.4 mol dm<sup>-3</sup> sodium hydroxide, labelled **sodium hydroxide**
- (vii) approximately 5 cm<sup>3</sup> 0.1 mol dm<sup>-3</sup> barium nitrate solution, labelled **barium nitrate**
- [N]**(viii) approximately 5 cm<sup>3</sup> 0.05 mol dm<sup>-3</sup> silver nitrate solution, labelled **silver nitrate**
- (ix) approximately 5 cm<sup>3</sup> 0.13 mol dm<sup>-3</sup> (1% w/v) sodium chlorate(I) solution, labelled **chlorine water** (see note 1)
- (x) a delivery tube and bung to fit hard glass test-tube in (i)
- (xi) a stirring rod
- (xii) a spatula
- (xiii) 10 cm<sup>3</sup> measuring cylinder or test-tube with a mark at 1 cm<sup>3</sup>
- (xiv) 4 test-tubes (approx. 125 mm × 15 mm)
- (xv) 1 large test-tube (approx. 150 mm × 25 mm)
- (xvi) means to support test-tubes
- (xvii) Bunsen burner and means to light it
- (xviii) test-tube holders or stand and clamp for holding test-tube in (i)
- (xix) safety glasses or goggles.

## Notes

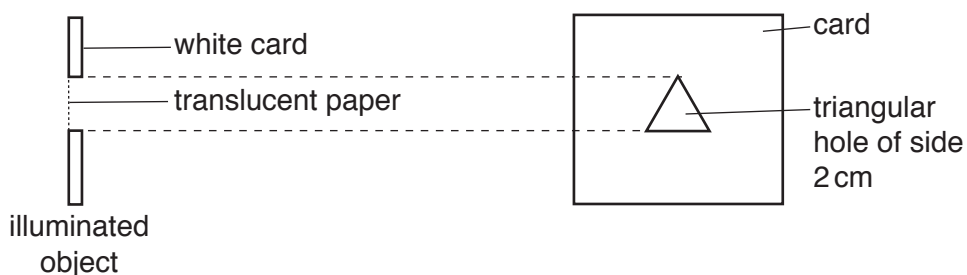
1. Small amounts of Cl<sub>2</sub> **[C]** **[T]**, which can cause respiratory distress in some people, may be produced. **The laboratory must be well ventilated.**
2. The potassium iodide solution should be made up close to the examination and kept in the dark so that it is a colourless solution.

Centres may provide fewer test-tubes, the minimum being 1 hard glass test-tubes (approx. 125 mm × 15 mm), 2 test-tubes (125 mm × 15 mm) and 1 large test-tube (approx. 150 mm × 25 mm). If this is the case, candidates will have to rinse test-tubes with distilled water so extra distilled water must be provided.

### Question 3

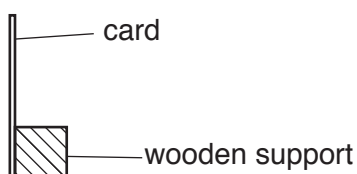
Each candidate will require:

- (i) a convex lens with focal length  $f = 15$  cm, with holder
- (ii) a metre rule
- (iii) an illuminated object with a hole in the shape of an equilateral triangle of side approximately 2 cm. The object is made by cutting a triangular hole in a piece of white card, and covering the hole with translucent paper, as shown in Fig. 3.1. The illumination can be provided by a 12 V, 24 W lamp, or similar, connected to a suitable power source. The lamp filament, the centre of the hole in the object card and the centre of the lens and screen should be arranged to be the same height above the bench.



**Fig. 3.1**

- (iv) a white screen. The screen can be made from a sheet of white card (10 cm × 10 cm approx.). Some means of supporting the screen vertically must be supplied (e.g. fixing the white card to a small block of wood, as shown in Fig. 3.2).



**Fig. 3.2**

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 done, out of sight of the candidates, using the same solutions, reagents, specimens and apparatus as the candidates.**

**A copy of the 'Supervisor's Results' should be returned with each packet of scripts. Failure to do so may cause candidates to be penalised.**



**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 6.**

**October/November 2017**

*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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