



LIFE SCIENCES: PAPER III

Time: 1½ hours

50 marks

INSTRUCTIONS TO TEACHERS AND LABORATORY TECHNICIANS

PLEASE NOTE:

This is an open-ended practical and, as such, results can be **HIGHLY** variable from one school to another and also from one candidate to another. There is no **CORRECT** result for this investigation. It is imperative that candidates write up and discuss **EXACTLY** what they get. They **MUST NOT** try to guess the result and make their data 'fit' the expected result.

Do **NOT** open the examination packs before the day that the examination is to be written. Do **NOT** try the experiments out first and adjust any of the instructions or volumes/amounts of reagents.

You may **NOT** run successive sessions in order to accommodate all the candidates on an individual basis. This examination must run at the same time for **all** candidates. It is designed so that it **can** be carried out in any venue and invigilated by staff members that do not have a Life Sciences background. If invigilators are not Life Sciences teachers then they should be briefed before the examination on how to complete the grid for procedural and manipulative skills.

The following equipment is to be laid out for **EACH** candidate at an individual workstation:

- Three identical test tubes
- Test tube rack
- Table salt
- Cornstarch
- Unknown white powder from crime scene
- Spatula/ice-cream stick
- Cutting tile/petri dish
- Permanent marking pen
- Piece of paper towel
- 5 ml syringe
- Benedict's solution
- Iodine solution
- Dropper pipette/eye-dropper
- 100 ml cold tap water
- Test tube holder

You must also have access to a beaker of boiling water to use as a boiling water bath for your test tubes.

NOTES ABOUT THE APPARATUS AND MATERIALS

The above items are to be set out for each candidate at a dedicated workstation.

Water – candidates must have a small container of cold tap water at their workstation (about 100 ml) or be close to a cold tap in a lab.

Boiling water bath – candidates must have access to a source of boiling water such as a beaker on a hot plate or anything similar. The water must be kept at boiling point. Make sure that the water level is not too high in the beaker or else the test tubes will float and tip once inserted and the boiling water may overflow. Ideally, a depth of about 6 cm is required. You may use a water bath if you have one.

Test tubes – wider boiling tubes would be most suitable but the narrower test tubes will work just fine. Make sure that all three are identical per candidate.

Test tube rack – make sure that the test tubes fit properly in the holes. If you are stuck then give each candidate an old tin to support their test tubes in.

Table salt – use the fine table salt. Coarse salt may be difficult for the candidates to work with. Each candidate needs one teaspoonful (5 ml). Label this as 'Table salt'.

Cornstarch – sold as 'Maizena'. Each candidate needs one teaspoonful (5 ml). Label this as 'Cornstarch'.

Unknown white powder from crime scene – this will be provided by the IEB and delivered together with your question papers. Each candidate needs half a teaspoonful (about 2,5 ml). Label this as 'Unknown powder from crime scene'.

Benedict's solution – this is a standard laboratory reagent which must be ordered from your chemical supplier, e.g. Rutland Industries. It is a clear blue liquid. Each candidate must have about 10 ml supplied to them in a small container/beaker. Label this 'Benedict's solution'.

Iodine solution – this is a standard laboratory reagent which is used to test for the presence of starch and must be ordered from your chemical supplier. It is a dark orange/brown liquid. Each candidate will use approximately 10 drops (1 ml). You may supply this in dropper bottles at strategic places in the venue or else in a small container/beaker. Label this 'Iodine solution'.

Dropper pipette/eye-dropper – You must supply each candidate with one of these if you do not provide the Iodine solution in a dropper bottle.

5 ml Syringe – these can be obtained cheaply from your local pharmacy or chemical supplier.

Spatula/ice-cream stick – each candidate needs a chemical spatula as sold by your chemical supplier. Alternatively, provide each candidate with a wooden ice-cream stick.

Cutting tile/petri Dish – each candidate must be provided with a cutting tile OR a petri dish that is at least 10 cm in diameter. Cheap plastic disposable petri dishes are available from your laboratory supplier. Each candidate needs only one half, i.e. the lid or the base.

Test tube holder – anything suitable to use to remove hot test tubes from water bath.

Permanent marker – any brand of marker which will not come off in hot water.

Paper towel – one piece per candidate.

GENERAL INSTRUCTIONS

Candidates must supply their own pen, sharp HB pencil, ruler, eraser and calculator.

Candidates may be requested to bring their own watches/stopwatches and marking pens if not supplied above.

Invigilators must be told to be observant for evidence of washing or wiping of equipment to avoid contamination between samples.

Several skills are to be assessed in this examination. Attached is a suitable grid which can be photocopied and used on clipboards by the invigilators during the examination. Make sure that sufficient copies of the grid are made before you commence the examination.

The information contained in these grids **must** be transposed to the front cover of EACH candidate's script after completion of the examination.

Grid is supplied on next page.

CANDIDATE'S NAME: _____

Teachers are asked to complete this grid during the examination.

Sufficient care taken to prevent cross-contamination of powders on tile/petri dish	1	0
Iodine solution contained in each sample and not running between samples	1	0
Same amount of solution in all three test tubes	1	0
Test tubes correctly labelled	1	0
Working independently	1	0
TOTAL	/max 5	

CANDIDATE'S NAME: _____

Teachers are asked to complete this grid during the examination.

Sufficient care taken to prevent cross-contamination of powders on tile/petri dish	1	0
Iodine solution contained in each sample and not running between samples	1	0
Same amount of solution in all three test tubes	1	0
Test tubes correctly labelled	1	0
Working independently	1	0
TOTAL	/max 5	

CANDIDATE'S NAME: _____

Teachers are asked to complete this grid during the examination.

Sufficient care taken to prevent cross-contamination of powders on tile/petri dish	1	0
Iodine solution contained in each sample and not running between samples	1	0
Same amount of solution in all three test tubes	1	0
Test tubes correctly labelled	1	0
Working independently	1	0
TOTAL	/max 5	