



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2013

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** the results they get. They **MUST NOT** try to guess the result and make their data 'fit' the expected result.

- Do **NOT** share any of this information with your candidates. It will be considered an irregularity.
- 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 chemicals.

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 they should be carefully 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:

- test tube rack
- 4 test tubes of equal size and diameter
- large beaker or similar container large enough to support 4 test tubes
- 3 polystyrene or plastic or paper cups or similar cups of the same size
- permanent marker pen
- access to water of approximately 40 °C
- 50 ml lukewarm water for mixing with yeast
- 50 ml milk at room temperature in a beaker or similar container
- 100 ml distilled water in a beaker or similar container
- teaspoon
- small beaker (at least 100 ml in size) or similar container
- 4 stirring sticks or kebab sticks
- dropper or micropipette
- 10 ml dry yeast in a beaker or similar container
- 5 ml syringe
- 10 ml syringe
- thermometer
- access to a beaker or similar container of methylene blue solution
- clock or other timing device

NOTES ABOUT THE APPARATUS AND MATERIALS

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

Water – candidates should have access to warm water. The water should be at a temperature of approximately 40 °C. Candidates will need to collect this at a certain point during the investigation to ensure that the temperature remains as close to 40 °C for as long as possible. The water should be collected in the large beaker. Candidates will also need 50 ml of lukewarm water for mixing with the yeast.

Candidates should also have access to water which can be used to clean apparatus. This could be in a large beaker, basin or laboratory sink.

Test tubes – any diameter test tube may be used. Make sure all four test tubes are identical per candidate.

Polystyrene OR Plastic OR Paper cups – each candidate needs 3 of these. They are needed to mix solutions which will then be poured into test tubes so please ensure that this is easy to do.

Test tube rack – make sure that the test tubes fit properly in the holes. If you do not have sufficient, a large beaker or other container which will be able to support the test tubes may be used.

Small beaker or container – each candidate needs to have a small container (at least 100 ml in size) in which to mix yeast.

Large beaker – this container needs to be large enough to support the 4 test tubes being used.

Milk – each candidate needs to have 50 ml of milk. It does not matter whether the milk is low fat, fat free or full cream. Label this as 'Milk'. This needs to be at room temperature and not kept in the fridge just prior to the practical.

Distilled water – each candidate needs at least 100 ml distilled water. Label this as 'Distilled water'.

Methylene blue solution – each candidate needs access to methylene blue solution. This should be placed in a beaker in strategic places in the venue. This can be purchased from a chemical supplier. Label this as 'Methylene blue solution'.

Yeast – each candidate needs at least 10 ml dry yeast in a small container. Label this as 'Dry yeast'.

Stirring or kebab sticks – each candidate needs at least 4 of these. These can be purchased from any supermarket.

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

10 ml syringe – these can be obtained cheaply from your local pharmacy or chemical supplier.

Teaspoon/spatula – each candidate needs a spatula or teaspoon.

Thermometer – each candidate needs access to a regular laboratory thermometer.

Permanent marker – any brand of marker.

Paper towel – one piece per candidate.

Timing device – any clock or watch provided by the learner or the teacher.

Dropper – any dropper purchased from a chemist will do or a micropipette.

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.

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 the completion of the examination.

You **MUST** send the completed original grids with the completed scripts in an envelope to the IEB.

CONFIDENTIAL INFORMATION; DO NOT SHARE WITH THE CANDIDATES

OBSERVATIONS TO BE MARKED BY INVIGILATORS

1. Note spills of liquids as they are transferred to test tubes from cups and messy work station (reference number 6 of experiment).
2. The correct serial dilution will result in the levels of liquid in all 4 test tubes being the same.
3. Check that the solutions have turned white in A, B and C only (when called by candidate).