



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2012

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** 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 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:

- Four identical test tubes
- A large 500 ml beaker or similar jug OR yoghurt pot OR container, into which 4 test tubes can stand
- A smaller beaker (250 ml) or polystyrene cup in which glucose powder can be mixed
- Test tube rack
- A thermometer
- Small containers which contain:
 - 20 ml egg white solution
 - 20 ml milk
 - 1 teaspoon glucose powder
 - 20 ml enzyme solution
- Access to:
 - luke-warm water
 - copper sulphate solution
 - potassium OR sodium hydroxide solution (Please handle with care as these solutions are corrosive)
 - water for cleaning
- 5 ml syringe
- Permanent marking pen
- Teaspoon OR spatula
- Timing device
- Dropper pipette OR eye dropper
- A piece of paper towel

NOTES ABOUT THE APPARATUS AND MATERIALS

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

Water – Candidates should have access to luke-warm water. This should be in the large beaker or be close to a source of luke-warm water. 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.

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.

Thermometer – Any regular laboratory thermometer may be used. Candidates may share should there not be enough for each candidate to have his/her own.

Egg white solution – Separate the yolk from the egg white. Throw the egg yolk away. Add the egg white to 200 ml water and mix well. Each candidate should have at least 20 ml of egg white solution. Label this as 'egg white solution'.

Milk – Each candidate should have at least 20 ml of milk. It does not matter whether it is full cream, low fat or fat free milk. Label this as 'milk'.

Glucose – Each candidate needs approximately 1 teaspoonful of glucose powder. This may be purchased from your local supermarket. Label this as 'glucose'.

Enzyme powder – Enzyme powder will be sent to the schools in September by the IEB. Mix a heaped teaspoon of the powder to 1 litre of luke-warm water and mix well. Each candidate needs 20 ml of the enzyme solution. Label this as 'enzyme'.

Copper sulphate solution – Each candidate needs a small amount of copper sulphate solution. The amount you will need for the class will depend on the number of candidates. You may purchase this from a chemical supplier. The standard mixing proportion for a litre of the solution is 159,6 g/litre of water. You may prepare this and leave it somewhere in the venue so that candidates can get to it, alternatively give approximately 50 ml to each candidate. Label this as 'copper sulphate solution'.

Potassium hydroxide solution – Please remember that this chemical is corrosive and must be handled with care. If you do not have potassium hydroxide you may use sodium hydroxide instead. Each candidate will need a small amount of the solution. The amount you will need for the class will depend on the number of candidates. You may purchase this from a chemical supplier. Use the normal (1 Mol) solution. You may prepare it yourself (56 g/litre of water). Leave it somewhere in the venue so that candidates can get to it, alternatively give approximately 50 ml to each candidate. Label this as 'potassium hydroxide solution'.

Sodium hydroxide solution – If you do not have potassium hydroxide you may use sodium hydroxide instead. Please remember that this chemical is corrosive and must be handled with care. You may purchase this from a chemical supplier. Use the normal (1 Mol) solution. You may prepare it yourself. The standard mixing proportion for a litre of the solution is 40 g/litre of water. You may prepare this and leave it somewhere in the venue so that candidates can get to it, alternatively give approximately 50 ml to each candidate. Label this as 'sodium hydroxide solution'.

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

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

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.

Small beaker or cup – Each candidate needs this to mix glucose and water.

Dropper pipette or eye dropper – 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 the completion of the examination.

You are advised to send the completed grids with the completed scripts to the IEB.