NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2020

LIFE SCIENCES: PRACTICAL ASSESSMENT TASK

Time: 1½ hours 50 marks

INSTRUCTIONS TO TEACHERS AND LABORATORY TECHNICIANS

It is important that teachers read through **this entire set** of instructions carefully – well ahead of the PAT.

This PAT will be written on **16 September 2020** as per the IEB circular sent to schools. It is essential that all workstations and equipment are tested and ready ahead of candidates entering the venue.

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 if you do.
- Do **NOT** open the PAT packs before the day that the PAT is to be written.
- Do **NOT** try the experiments out first or 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. **All** candidates must complete this PAT at the same time. It is designed so that it can be carried out in any venue and may be invigilated by any staff member, including Life Sciences teachers. Invigilators are to be carefully briefed before the PAT on how to complete the grid for procedural and manipulative skills.

Special attention is drawn to the instructions (at the end of this document) to be given to invigilators so they can perform their duty on the day.

The following equipment is to be laid out for EACH candidate at each individual workstation.

This must be done prior to the 45 minutes briefing session with the invigilators.

The security bag containing the scripts will be opened in the venue(s) by the chief invigilator 45 minutes before the commencement of the PAT. This will give the Life Sciences teacher enough time to prepare the invigilator(s).

- Four identical test tubes in a test tube rack
- 2 × pipettes or droppers
- Syringe (20 ml)
- Syringe (10 ml)
- A thermometer
- Cup or beaker containing 100 ml distilled water and bicarbonate of soda (labelled 'D')
- One empty cup or beaker for preparing a water bath (labelled 'M')
- Sugar solution (2%) in a cup or beaker (labelled 'S')
- Cup or beaker containing 50 ml yeast solution (labelled 'Y')
- Polystyrene cup or beaker containing rinsing water (labelled 'R')
- Polystyrene cup or beaker containing tap water (labelled 'T')
- Access to boiling water
- Access to hydrogen peroxide
- Bromothymol blue
- Paper towel
- Permanent marker
- One A4 sheet of plain white paper
- Access to a wall clock or watch
- Stirring rod or kebab stick

NOTES ABOUT THE APPARATUS AND MATERIALS

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

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

Test tubes – four identical test tubes. Must each be able to hold 40 ml of liquid.

2 × Pipettes or droppers – each candidate must have access to two pipettes or droppers for use with bromothymol blue indicator solution and/or hydrogen peroxide and/or bleach solution.

10 ml and 20 ml syringes – these can be obtained cheaply from your local pharmacy or chemical supplier. Have some spares available in case some are problematic.

Thermometer – each candidate should have access to a thermometer (can be shared between candidates). A standard thermometer (alcohol or mercury), able to measure up to 100 °C.

Cup or beaker with distilled water and bicarbonate – each candidate should have a cup or beaker containing 90 ml distilled water and 10 ml of a 2% bicarbonate solution labelled ‘D’.

> **2% Bicarbonate solution** is made up by dissolving 2 g of bicarbonate of soda (available from your local supermarket) in 100 ml distilled water.

Cup or beaker for mixing – each candidate should have an empty cup or beaker able to hold 200 ml, labelled 'M'.

Sugar solution (2%) – each candidate should be provided with a container or beaker (labelled 'S') with a sugar solution made up by dissolving 2 g of sugar in 100 ml of distilled water.

Cup or beaker containing 50 ml yeast solution – each candidate must have a cup or beaker with 50 ml yeast solution labelled 'Y', made up as follows:

> For 1 litre: dissolve one sachet of dried yeast (10 g; obtained from your local super-market) in 1000 ml of distilled water. Make fresh on the morning of the PAT.

Polystyrene/plastic cup or beaker containing tap water for rinsing – each candidate should be provided with a cup/beaker containing 200 ml tap water, labelled 'R'.

Polystyrene/plastic cup or beaker containing tap water – each candidate should be provided with a cup/beaker containing 200 ml tap water, labelled 'T'.

Access to boiling water – each candidate must have access to an urn or a kettle with boiling water.

Access to hydrogen peroxide – each candidate should have access to a bottle of hydrogen peroxide (10 vol) which is available from your chemical supplier or pharmacy. Each candidate will require only about 5 drops. Bottles can be shared between candidates.

Bromothymol blue – each candidate should have access to a beaker containing 30 ml bromothymol blue which is available from your chemical supplier.

Paper towel – have spare towels available in the venue.

Permanent marker – any brand of marker. The candidates may be asked to bring their own.

Sheet of A4 plain white paper – each candidate requires one sheet of A4 plain white paper.

Access to a wall clock or watch – for timing.

Stirring rod or kebab stick for stirring.

GENERAL INSTRUCTIONS

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

Several skills are to be assessed during this PAT. The observations to be marked by invigilator(s) must be discussed between the invigilators and the Life Sciences teacher in the 45 minutes **before** the PAT commences. The venues must be fully prepared by this time.

A grid that can be photocopied and used on clipboards by the invigilators during the PAT is attached. Make sure that sufficient copies of the grid are made for each venue before the PAT commences.

The information contained in these grids **MUST** be transposed by the invigilator (**in red pen**) to the front cover of EACH candidate's script after completion of the PAT. This needs to be checked by the Chief Invigilator at the school, not only by the invigilators.

If a script does not have the marks written on the front cover of the PAT, the candidate will lose these marks.

The completed original grids must be sent back to the IEB in an envelope, together with the completed scripts.

There must be no candidate names or names of schools on any of the scripts.

The completed scripts must be arranged in the PAT number order (in packs of 20). Absentees must be clearly recorded on the forms supplied.

Invigilators are asked to please transfer this after the PAT on to the front of the script in red pen.

EXAMINATION NUMBER:		
CRITERIA		
Following instructions	0	1
Procedural skills	0	1
Manipulative skills	0	1
TOTAL		**(3)**

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CRITERIA		
Following instructions	0	1
Procedural skills	0	1
Manipulative skills	0	1
TOTAL		**(3)**

An alternative method: Invigilators are asked to please transfer this after the PAT to the front of the script in red pen.

EXAMINATION NUMBER	**Following instructions (1)**	**Procedural skills (1)**	**Manipulative skills (1)**	**Total (max 3)**