



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2012

LIFE SCIENCES: PAPER III

EXAMINATION NUMBER

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Time: 1½ hours

50 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. Write your examination number in the space above.
2. This question paper consists of 8 pages and an Information Sheet of 1 page. Please make sure that your question paper is complete.
3. You are advised to read carefully and spend time planning your work.
4. Perform the tasks with care. You will be assessed on your ability to work independently.
5. Standard time concessions will apply to this examination.
6. Please answer the questions in the spaces provided. Should you need more space please use the back page. **DO NOT** use loose folio paper.
7. The Information Sheet is printed on yellow paper. Please read it carefully before you begin and refer to it during the course of this examination.

Teachers are asked to complete this grid after the examination.

Criteria		
Test tubes labelled correctly	1	0
Equal amount of solutions in each test tube	1	0
Evidence of ensuring contamination does not occur	1	0
Use of thermometer to test temperature of the water	1	0
Working independently	1	0
TOTAL	(max 5)	

For Markers USE ONLY

Procedure							Total

You will now carry out a short investigation to find out the effect a potassium OR sodium hydroxide solution together with a copper sulphate solution will have on a variety of substances. This effect shows the amount of protein each substance contains.

Before you begin with your investigation, make sure that you have the following equipment at your 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

EXPERIMENT

[21 marks]

1. Using your marking pen clearly label each test tube A, B, C and D and place them into a test tube rack.
2. Mix a small amount of glucose powder (approximately 2 ml) in a small beaker OR container with 10 ml warm water.
3. Half fill the large beaker with luke-warm water. Use the thermometer to check the water is at a temperature of 37 °C.
4. Using your syringe, measure:
 - 4 ml egg-white solution into test tube A
 - 4 ml milk in test tube B
 - 4 ml enzyme solution in test tube C
 - 4 ml glucose solution in test tube D

CALL YOUR TEACHER BEFORE YOU PROCEED ANY FURTHER

5. Place a small amount of potassium OR sodium hydroxide solution to each test tube A, B, C and D and then add an **equal** amount of copper sulphate solution.
6. Gently swirl the test tubes to mix the solutions.
7. Stand all of the test tubes in the beaker of warm water and leave for about 15 minutes. You may allow the water to cool during this time.

WHILST WAITING FOR THE REACTIONS YOU MAY START THE QUESTION ON GRAPHING SKILLS ON PAGE 5.

8. Observe and describe the reactions in the four test tubes in the table below. Remember to give your table a suitable heading.

(6)

9. Write a conclusion for this experiment.

(2)

10. Describe TWO ways in which you worked carefully in order to get results that are as accurate as possible.

(4)

11. How could the design of the investigation given above be improved? Explain TWO improvements to **this** design.

(4)

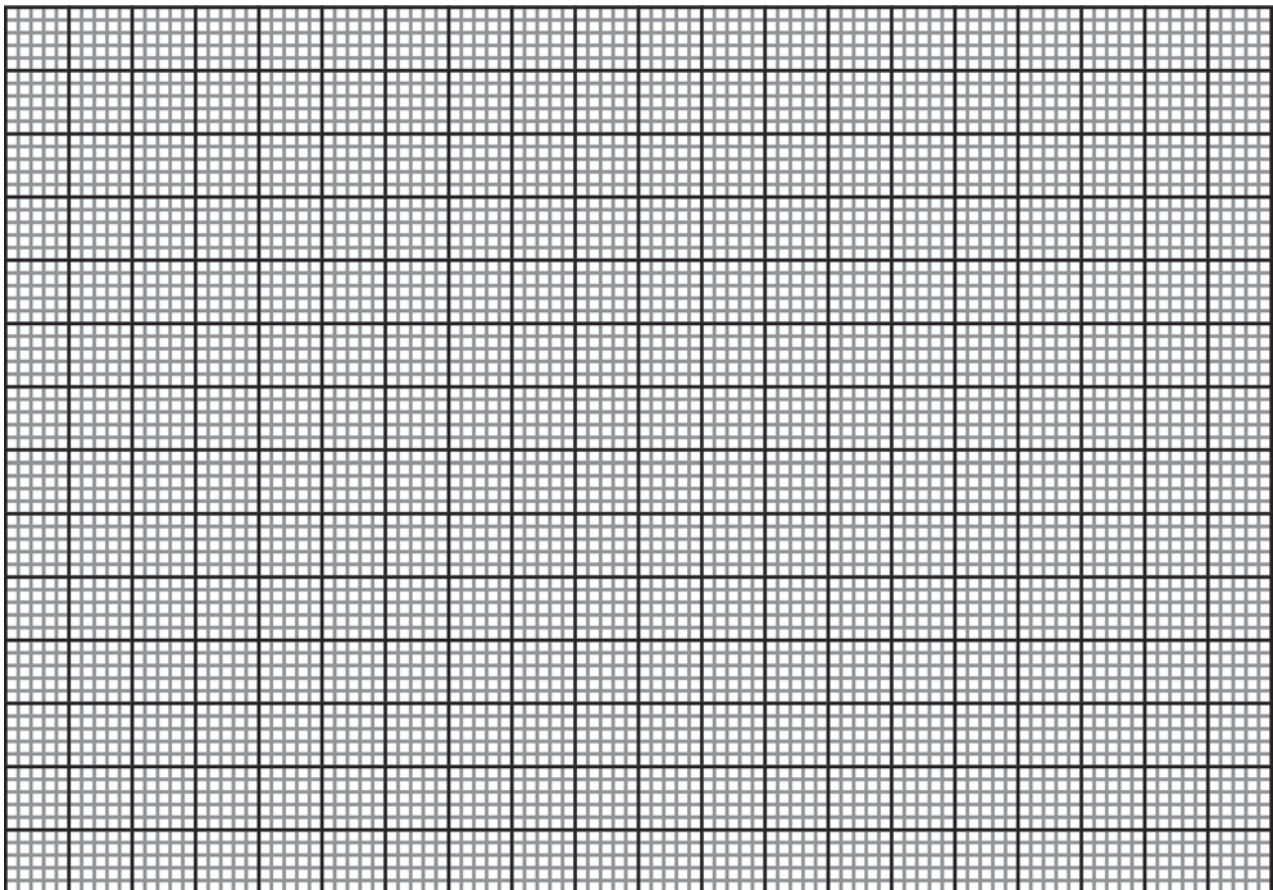
DATA RESPONSE QUESTION REQUIRING GRAPHING SKILLS**[8 marks]**

The table below shows the number of American children between the ages of 2 months and 2 years who have died as a result of being left in a hot car for a minimum of 10 minutes. The data was collected over a period of 2 years.

Carefully study the tabulated data given below and then display the data given as line graphs on the graph grid supplied below.

Temperature °C	2010	2011
38	3	4
42	17	8
46	24	15
50	4	3
52	1	0

A table to show the number of deaths due to hyperthermia in children in the USA between the ages of 2 months and 2 years over a 2 year period.



EXPERIMENTAL DESIGN**[21 marks]**

Before you continue with the next task please refer back to the article: *Baby dies after being left in hot car* on the Information Sheet. Pay particular attention to the lines 16 to 22.

Design an experiment in which you determine if proteins are sensitive to temperature. You may use any apparatus that you would find in your school laboratory. Do not simply rewrite the experiment you have just completed.

1. State your hypothesis.

(3)

2. State your aim.

(2)

3. Identify the dependent variable.

(2)

4. Identify the independent variable.

(2)

5. List any **TWO** controlled/fixed variables and state precisely **how** they will be controlled in your experiment to ensure fair testing.

(4)

6. Outline your own **new** method using numbered points or bullet points.

[illegible]

(8)

50 marks

Total: 50 marks