NATIONAL SENIOR CERTIFICATE EXAMINATION
SUPPLEMENTARY EXAMINATION – OCTOBER 2015

LIFE SCIENCES: PAPER III

EXAMINATION NUMBER

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 have ten minutes reading time before you begin. 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 follow instructions.
5. Standard time concessions will apply to this examination.
6. Please answer the questions in the spaces provided. Should you need more space for answering, use the last page in this question paper only. DO NOT use any additional paper.
7. The Information Sheet is printed on separate yellow paper. Please read it **carefully** before you begin and **refer to it during the course of this examination**.

Invigilators are asked to please complete this grid after the examination.

Criteria		
Following instructions	0	1
Test tube contents	0	1
Manipulation	0	1
TOTAL		**3**

For Markers' USE ONLY

Procedure							**Total**

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Please read the Information Sheet carefully before you start. There are two parts to this question paper: Part 1 – the Investigation and Part 2 – Experimental design.

You are going to be investigating the effect of catalase concentration on the breakdown of hydrogen peroxide.

Before you begin your investigation make sure that you have the following equipment at your workstation:

- 100 ml hydrogen peroxide (20-volume)
- soaked mung beans (excess water removed) in a small container
- 50 ml clean sand
- ruler to measure
- three identical test tubes in a test tube rack
- wooden kebab stick
- permanent marker
- wooden splint
- 10 ml syringe
- access to water to rinse
- timing device
- three 5 ml measuring spoons
- spatula
- pestle and mortar
- matches

PART 1 INVESTIGATION

1. Label the three test tubes A, B and C using the marker.

2. Carefully measure out 20 ml of hydrogen peroxide into each of the three test tubes. Take care as hydrogen peroxide is acidic and is a bleach.

3. Using a clean measuring spoon, take 5 ml of mung beans and level off. Set aside.

4. With a new spoon, take another 5 ml of mung beans and using the pestle and mortar, grind the beans. Place the final paste into a measuring spoon.

5. With a new spoon, measure 5 ml of sand and place it next to the two spoons of mung beans that you have already measured out.

CALL THE INVIGILATOR BEFORE PROCEEDING FURTHER

6. Add the whole mung beans to test tube A.

7. Using a kebab stick, gently make sure that the beans are pushed to the bottom of the test tube.

8. Leave the test tube for three minutes.

9. While waiting, test for any gas in the tube by using a glowing splint. (Do this by lighting the splint of wood, let the wood burn for about 10 seconds and then gently blow the flame out.) Quickly put the glowing splint in the neck of the test tube and observe the splint. Do not put the splint in the liquid. Record your observation in the table (Question 13).

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10. Measure the height of the foam (in mm) in the tube using your ruler and record in the table on this page (Question 14).

11. Add the crushed mung beans to test tube B. Repeat steps 7 to 10.

12. Add the sand to test tube C. Repeat steps 8 to 10.

13. Describe exactly what you observed in each test tube.
Fill in your observations in the table below.

Observation	**Test tube A**	
	B	
	C	

(6)

14. Complete the following table of results.

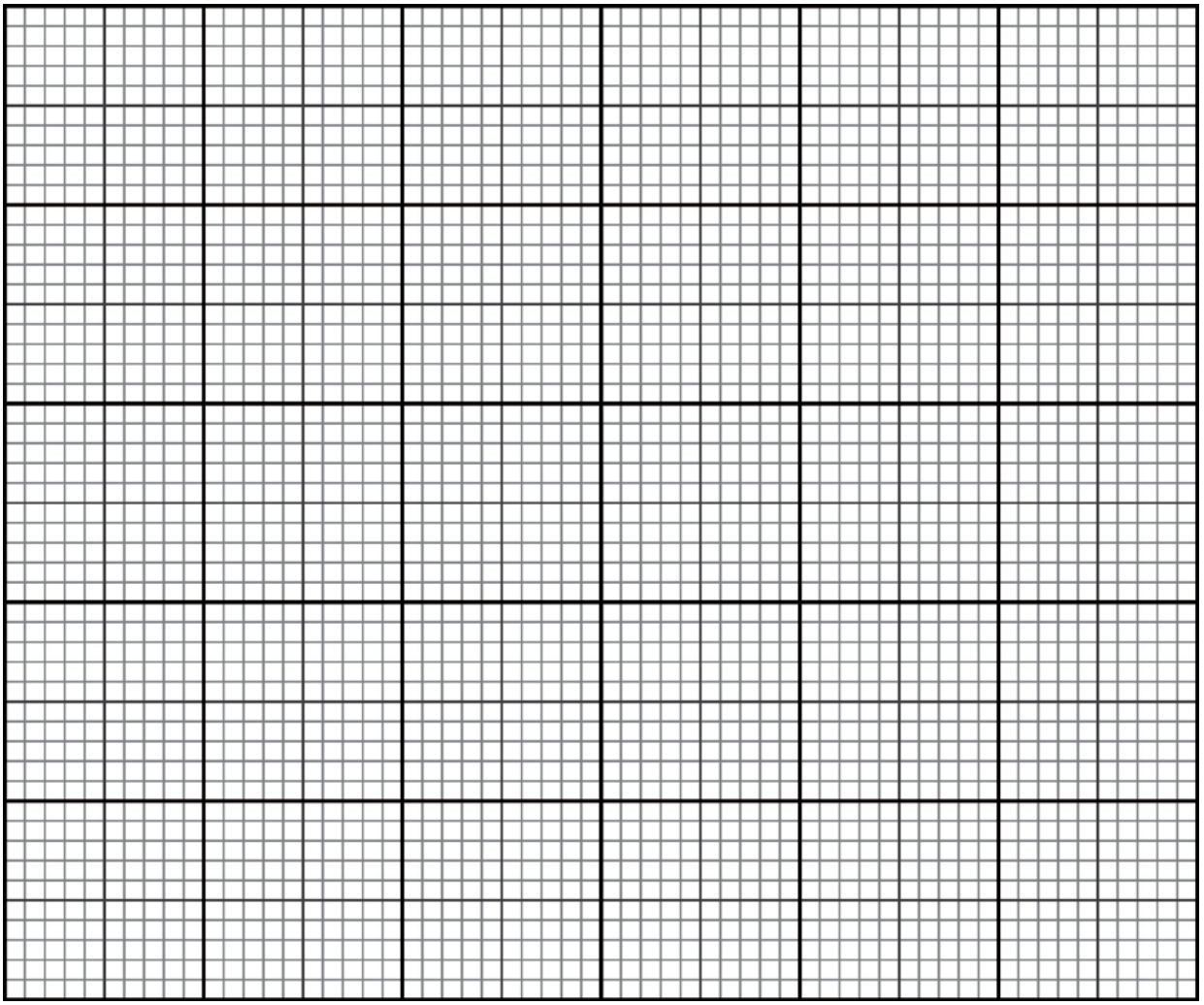
Test tube	**Amount of foam produced (……)**
A	
B	
C	

(2)

15. Draw a bar graph on the graph paper below to show the amount of foam produced in the test tubes.

Graph Heading: _____

_____ (2)



(5)

16. Write a conclusion for your observations to this investigation in the space below.

_____

_____

_____ (3)

17. What is the function of test tube C?

_____

_____

_____ (2)

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18. Identify the **independent** variable in this investigation.

_____ (2)

19. Identify the **dependent** variable in this investigation.

_____ (2)

20. When performing this investigation, how did you work carefully to get results that are as accurate as possible? Give TWO examples.

_____

_____

_____

_____

_____

_____ (4)

21. How could you make this investigation more reliable?

_____

_____ (2)

22. Peroxisomes are tiny cell organelles (much smaller than mitochondria) found in plant and animal cells. They contain the enzyme catalase.

In the space below, draw a simple line diagram of a single plant cell with its nucleus and two peroxisomes in its cytoplasm. Label the nucleus and the peroxisomes.

(4)

PART 2

EXPERIMENTAL DESIGN

You are to design a completely new investigation.

Design a simple experiment to show the effect of temperature on the action of catalase with hydrogen peroxide.

You need to use equipment that would be found in the school laboratory.

(Do not actually perform your experiment.)

1.1 Formulate a hypothesis for this experiment that you are designing.

_____

_____

_____ (3)

1.2 State the aim of the experiment.

_____

_____ (2)

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1.3 Outline your own method using numbered points.

(8)

Total: 50 marks

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ADDITIONAL PAGE (if needed)

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