CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

18 JANUARY 2018 (a.m.)

J1801207032

FILL IN ALL THE INFORMATION REQUESTED CLEARLY IN CAPITAL LETTERS.

TEST CODE | 0 | 1 | 2 | 0 | 7 | 0 | 3 | 2 |

SUBJECT BIOLOGY – Paper 032

PROFICIENCY GENERAL

REGISTRATION NUMBER | | | | | | | | | | |

SCHOOL/CENTRE NUMBER					

NAME OF SCHOOL/CENTRE

CANDIDATE'S FULL NAME (FIRST, MIDDLE, LAST)

DATE OF BIRTH | D | D | M | M | Y | Y | Y | Y |

SIGNATURE _____

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TEST CODE 01207032

JANUARY 2018

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

BIOLOGY

Paper 032 – General Proficiency

ALTERNATIVE TO SCHOOL-BASED ASSESSMENT

2 hours 10 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. Answer ALL questions.
2. Use this answer booklet when responding to the questions. For EACH question, write your answer in the space provided and return the answer booklet at the end of the examination.
3. DO NOT write in the margins.
4. You are advised to take some time to read through the paper and plan your answers.
5. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**
6. **If you use the extra page(s), you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

1. (a) You are required to conduct food tests on a sample of food.

(i) Use the measuring cylinder provided to measure and then pour 1 cm^3 of the sample into each of the four test tubes labelled A1, A2, A3 and A4.

(ii) Follow the procedure in Table 1 to test the sample in Test Tube A1 for protein. Record your observation in Table 1.

(iii) Follow the procedure in Table 1 to test the sample in Test Tube A2 for starch. Record your observation in Table 1.

(iv) Follow the procedure in Table 1 to test the sample in Test Tube A3 for sugar. Record your observation in Table 1.

(v) Follow the procedure in Table 1 to test the sample in Test Tube A4 for fat. Record your observation in Table 1.

(4 marks)

TABLE 1: RESULTS OF FOOD TESTS

Test	Procedure	Observation	Inference
Protein	Biuret test – add potassium hydroxide, stir and then add copper sulphate.		
Starch	Add a few drops of iodine.		
Sugar	Add 1 cm^3 Benedict's solution, shake then bring gently to a boil.		
Fat	Add ethanol and shake vigorously.		

GO ON TO THE NEXT PAGE

(vi) Write the inference for EACH of the tests in Table 1. **(4 marks)**

(vii) Pour the remaining 2 cm^3 of the food sample into a test tube then add 1 cm^3 of dilute Hydrochloric acid solution. Stir the mixture then place in the water-bath for 30 seconds. Using a dropper, carefully add sodium bicarbonate solution until the contents stop fizzing. Pour an equal amount of the mixture into two separate test tubes.

(viii) Repeat the test for starch in one of the test tubes and repeat the test for sugar in the other test tube. Record your observations in Table 2. **(2 marks)**

TABLE 2: TEST FOR STARCH AND SUGAR

Test	Observation	Inference
Starch		
Sugar		

(ix) Write the inference for EACH of the tests in Table 2.

(2 marks)

(b) Explain the observation recorded for sugar in (a) (viii) above.

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(2 marks)

(c) Write an aim for this experiment.

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(2 marks)

(d) Is this food better suited for an active teenager or an 80-year-old diabetic? Explain your answer.

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(3 marks)

Total 19 marks

2. Students in a class are required to use the following apparatus and materials to investigate transpiration.

- Coleus sp. (plant with transparent stem) roots intact
- Two flasks with same volume of dye, labelled A and B
- Fan
- Ruler
- Clock

(a) Write a suitable hypothesis for this investigation.

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(2 marks)

(b) Describe the procedure for this investigation.

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(6 marks)

(c) State ONE limitation of this investigation.

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(1 mark)

(d) The results obtained when the students conducted their investigation are recorded in Table 3.

TABLE 3: RESULTS OF TRANSPIRATION EXPERIMENT

Time (minutes)	Distance Dye Moved Up Stem (cm)	
	Flask A	Flask B
10	1	2
20	3	6
30	5	10
40	6	12
50	7	14

(i) Write a suitable conclusion for the data shown in Table 3.

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(2 marks)

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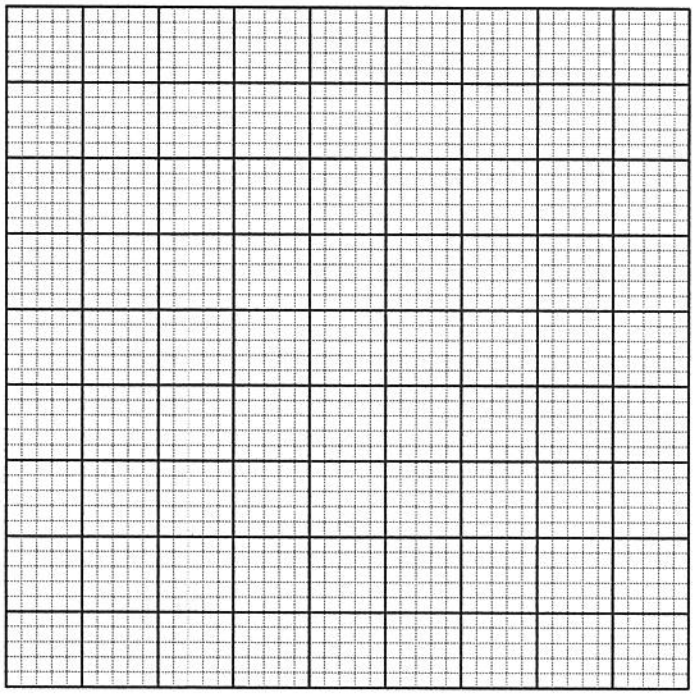
(ii) Plot the data from Table 3, **on page 8**, on the grid paper below.



(5 marks)

(e) Use your knowledge of transpiration to explain the difference in the results for the plants in Flask A and Flask B.

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(4 marks)

Total 20 marks

3. The apparatus and materials shown in Figure 1 are set up to investigate tropism in young pea plants.

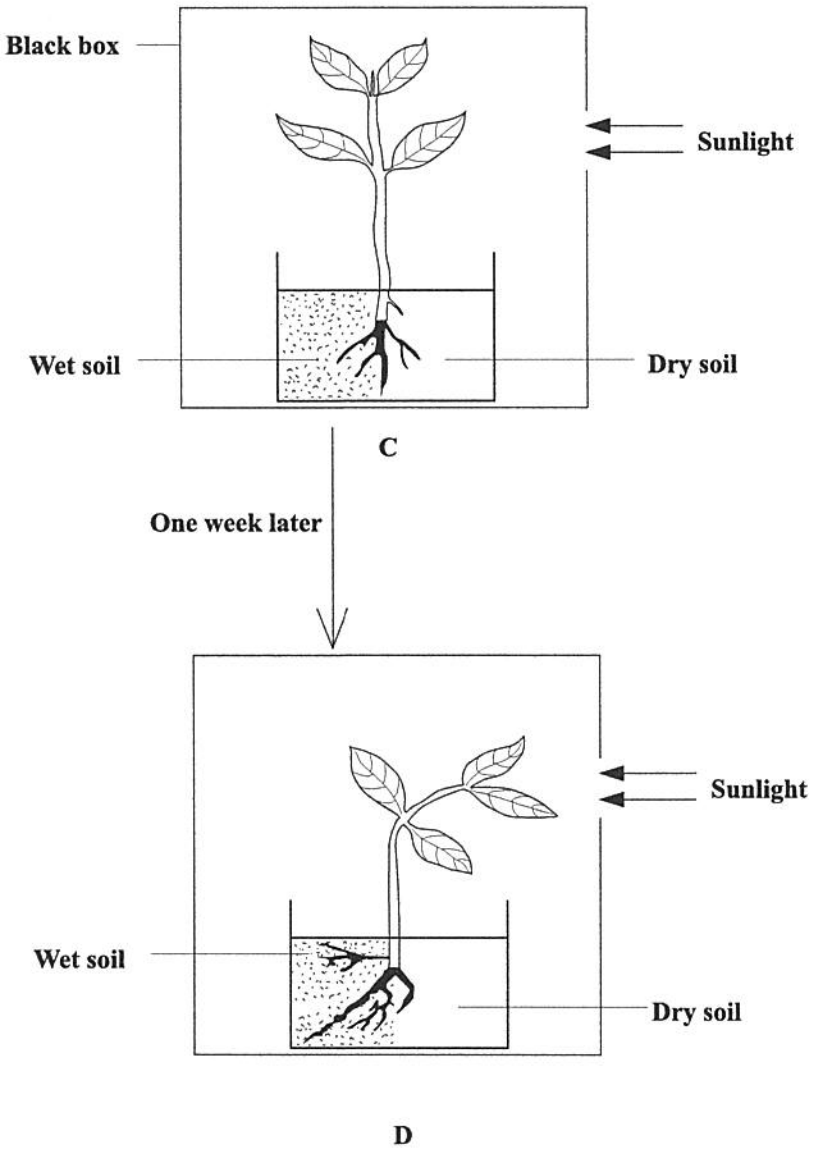

Figure 1. Investigation to demonstrate tropism in pea plants

(a) Write TWO different hypotheses that could be tested using the apparatus and materials shown in Figure 1.

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(2 marks)

(b) State ONE limitation of this investigation.

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(1 mark)

(c) State TWO conclusions that could be made from the outcome (D), shown as one week later in Figure 1.

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(2 marks)

(d) Explain the importance of sunlight to plants.

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(2 marks)

(e) Outline THREE benefits of water to plants.

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(3 marks)

(f) Small invertebrates also show simple responses to the stimuli of light and water. Figure 2 shows the apparatus used to investigate an organism's response to light.

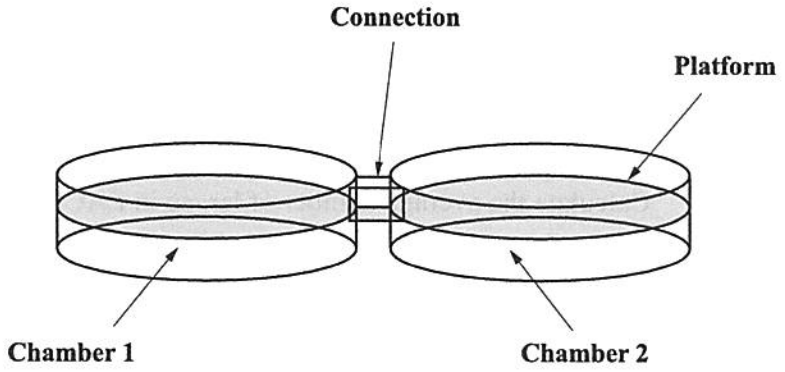

Figure 2. Apparatus for investigating the response of small invertebrates to light

(i) Describe how the apparatus shown in Figure 2 could be used to demonstrate the response of fly larvae to light.

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(4 marks)

(ii) State ONE limitation of this investigation.

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(1 mark)

(iii) In another experiment, the apparatus shown in Figure 2 is used to investigate the response of fly larvae to moisture. Two trials are done and 30 larvae are used for each trial. After the time allotted for the first trial, the investigators counted 20 larvae in the moist chamber, while 10 larvae were found in the dry chamber. At the end of the second trial, 23 larvae were counted in the moist chamber, while 7 were counted in the dry chamber.

In the space below, construct a table to record the results of these two trials. Calculate the average number of larvae in EACH chamber.

(5 marks)

(g) Suggest why the type of response to moisture shown by these invertebrates may be important for their survival.

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(1 mark)

Total 21 marks

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

EXTRA SPACE

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Question No. [ ]

EXTRA SPACE

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Question No. ☐

EXTRA SPACE

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Question No. [ ]

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CANDIDATE'S RECEIPT

INSTRUCTIONS TO CANDIDATE:

1. **Fill in all the information requested clearly in capital letters.**

TEST CODE: | 0 | 1 | 2 | 0 | 7 | 0 | 3 | 2 |

SUBJECT: BIOLOGY – Paper 032

PROFICIENCY: GENERAL

REGISTRATION NUMBER: | | | | | | | | | | |

FULL NAME: _____

(BLOCK LETTERS)

Signature: _____

Date: _____

2. **Ensure that this slip is detached by the Supervisor or Invigilator and given to you when you hand in this booklet.**

3. **Keep it in a safe place until you have received your results.**

INSTRUCTION TO SUPERVISOR/INVIGILATOR:

Sign the declaration below, detach this slip and hand it to the candidate as his/her receipt for this booklet collected by you.

I hereby acknowledge receipt of the candidate's booklet for the examination stated above.

Signature: _____
Supervisor/Invigilator

Date: _____

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