

FORM TP 2015151



TEST CODE 02207032

MAY/JUNE 2015

CARIBBEAN EXAMINATIONS COUNCIL
CARIBBEAN ADVANCED PROFICIENCY EXAMINATION®

BIOLOGY

UNIT 2 – Paper 032

ALTERNATIVE TO SCHOOL-BASED ASSESSMENT

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of THREE questions. Answer ALL questions.
2. Write your answers in the spaces provided in this booklet.
3. Do NOT write in the margins.
4. You may use a silent, non-programmable calculator to answer questions.
5. You are advised to take some time to read through the paper and plan your answers.
6. 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.**
7. **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.**

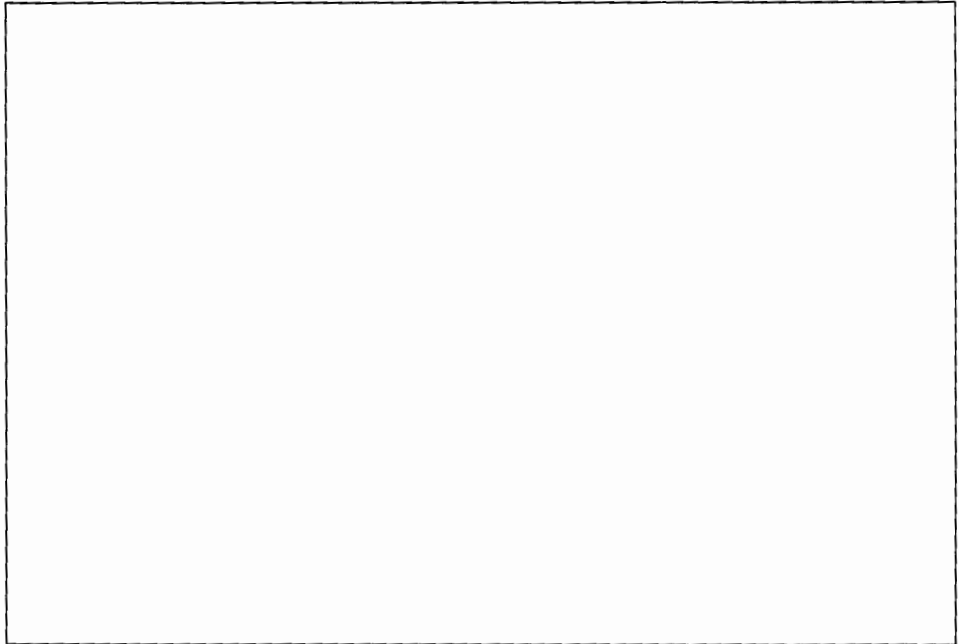
DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

Copyright © 2013 Caribbean Examinations Council
All rights reserved.

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

1. (a) Specimen A is a transverse section through a dicotyledonous leaf.
- (i) Observe Specimen A under the low power of a microscope and do a labelled plan drawing of the section, in the box below.



[6 marks]

- (ii) Select a tissue layer from your drawing in (a) (i) above, and comment on its role in leaf function.

.....

.....

.....

.....

.....

.....

[3 marks]



DO NOT WRITE IN THIS AREA

- (b) Figure 1 illustrates how the rate of photosynthesis of a leaf varies with increasing light intensity for a plant species at atmospheric CO₂ level (0.04% CO₂).

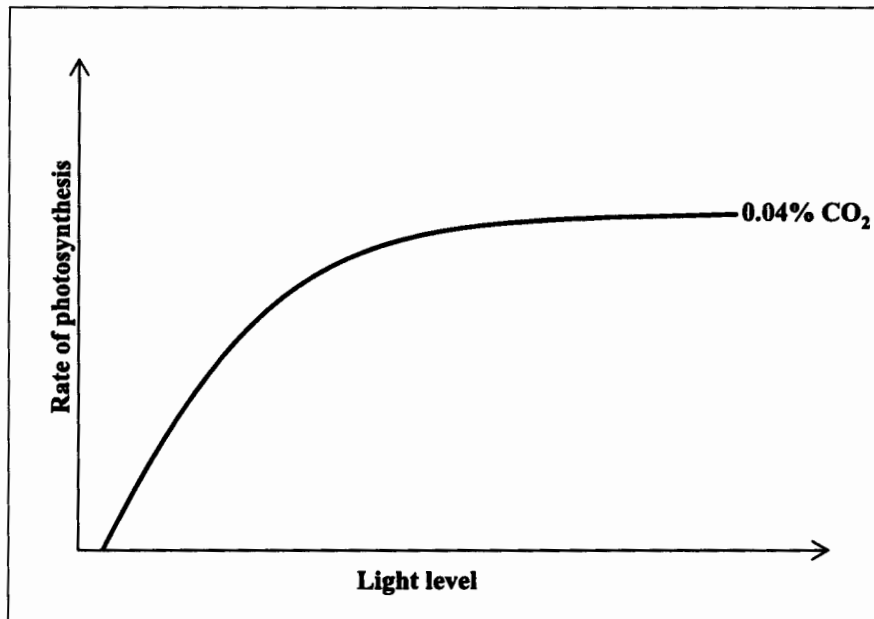


Figure 1. Photosynthetic response of leaves to increasing light intensity

- (i) On Figure 1, sketch and label a response curve to illustrate what is expected if measurements were made when the atmospheric CO₂ level is doubled. **[4 marks]**
- (ii) Account for differences and/or similarities between the two curves.

.....

.....

.....

.....

.....

.....

[3 marks]

Total 16 marks

GO ON TO THE NEXT PAGE



2. (a) Table 1 gives data on the average number of days to reach the peak of respiratory climacteric (which occurs at the onset of ripening) in mango fruits exposed to different concentrations of ethylene.

TABLE 1: ETHYLENE CONCENTRATION AND RESPIRATORY CLIMACTERIC

Ethylene Concentration (ppm)	Time to Reach Peak of Respiratory Climacteric (days after harvest)
0	10.0
1	6.0
4	4.5
10	3.2
20	2.5
30	2.0
40	2.0

Data adapted from Plant Physiol. 1962 March; 37(2): 179-189

- (i) **On the grid on page 5**, plot the data given in Table 1 as a line graph with ethylene concentration on the *x*-axis. **[5 marks]**
- (ii) Based on your graph in (a) (i) above, describe the effects of ethylene exposure on fruit ripening.

.....

.....

.....

.....

.....

.....

[3 marks]



DO NOT WRITE IN THIS AREA

(iii) Discuss the importance of the information provided in (a) (ii) to the fruit industry.

.....

.....

.....

.....

.....

.....

.....

.....

[4 marks]

DO NOT WRITE IN THIS AREA

GO ON TO THE NEXT PAGE



- (b) Figure 2 shows an image of human blood.

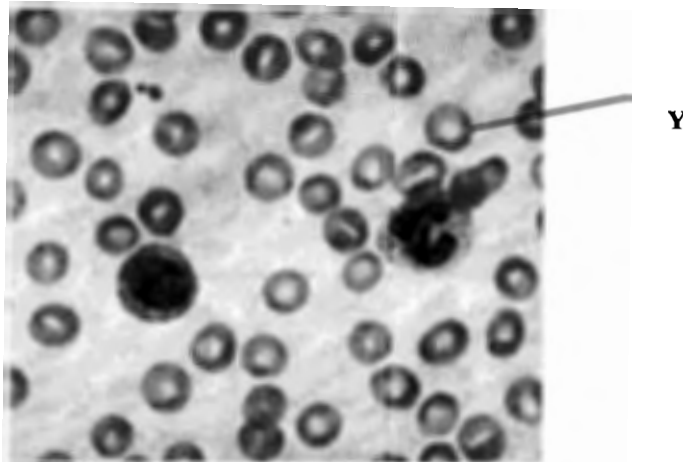


Figure 2. Image of human blood ($\times 10\ 000$)

Source: http://medsci.indiana.edu/histo/images/bld_smr1.jpg

- (i) Identify the structure labelled Y in Figure 2.

.....
[1 mark]

- (ii) State the main function of Y, and comment on ONE structural characteristic that makes Y well suited for its function.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
[3 marks]

Total 16 marks

GO ON TO THE NEXT PAGE



DO NOT WRITE IN THIS AREA

3. (a) Table 2 shows data on persons with diabetes mellitus in Latin America and the Caribbean in the year 2000.

**TABLE 2: DATA ON PERSONS WITH DIABETES MELLITUS
IN LATIN AMERICA AND THE CARIBBEAN IN YEAR 2000**

	Mexico	Spanish Caribbean	English Caribbean	Central America
Population ($\times 10^3$)	91 145	25 911	5150	32 115
Total number of people with diabetes mellitus ($\times 10^3$)	3738.0	926.0	317.2	1192.6
Deaths related to diabetes mellitus	19 139	15 689	5555	18 770

Source: Bulletin of the World Health Organization 2003, 81 (1) 21.

- (i) Calculate the mortality rate related to diabetes mellitus (as a percentage of the population) in the English Caribbean. **Show your calculations.**

[2 marks]



DO NOT WRITE IN THIS AREA

- (ii) Compare the mortality rates for diabetes mellitus (as a percentage of number of people with diabetes) among the four regions indicated in Table 2.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4 marks]

- (iii) Discuss TWO risks factors for Type 2 diabetes.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4 marks]

GO ON TO THE NEXT PAGE



DO NOT WRITE IN THIS AREA

- (b) (i) Describe how pulse rate is typically measured.

.....
.....
.....

[2 marks]

- (ii) You have to design an experiment to study the immediate effects of physical exercise on pulse rate. Outline the procedure for your experiment.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

[4 marks]

Total 16 marks

END OF TEST

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



DO NOT WRITE IN THIS AREA