

FORM TP 2018156



TEST CODE **02207020**

MAY/JUNE 2018

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN ADVANCED PROFICIENCY EXAMINATION®

BIOLOGY

UNIT 2 – Paper 02

2 hours 30 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections. 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.

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SECTION A

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

1. (a) An outline of the Krebs cycle is given in Figure 1, with compounds labelled A to G and selected points in the cycle numbered 1 to 5.

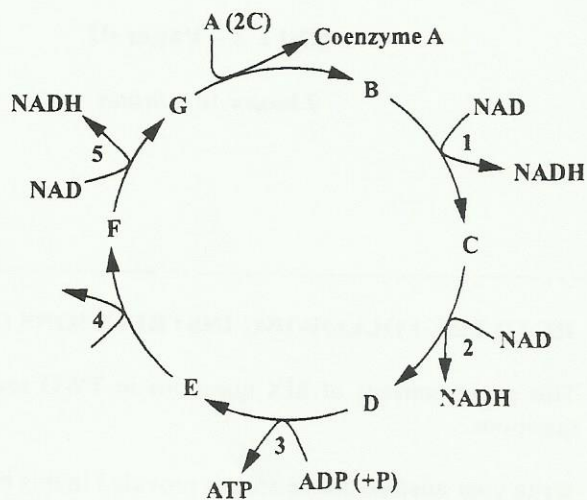


Figure 1. Outline of the Krebs cycle (NADH = reduced NAD)

- (i) Writing your answer in Figure 1, insert the number of carbon atoms contained in EACH of the compounds labelled B to G. An example is given for Compound A. [3 marks]
- (ii) Writing your answer in Figure 1, insert the input and product at the point numbered 4, as completed for the points numbered 1, 2, 3 and 5. [1 mark]



(iii) Explain the TWO MAIN roles of the Krebs cycle.

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[4 marks]

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- (b) The rate of photosynthesis is measured in individual leaves of a plant species at different light levels, and the data obtained are recorded in Table 1.

TABLE 1: RATE OF PHOTOSYNTHESIS IN INDIVIDUAL LEAVES AT DIFFERENT LIGHT LEVELS

Light Level (Standard Units)	Rate of Photosynthesis (Standard Units)
75	0
150	4
225	8
300	11
400	15
500	18
700	22
900	24
1200	25
1400	25
1600	25

- (i) On the grid provided on page 7, plot a line graph based on the data provided in Table 1. **[4 marks]**
- (ii) Using the concept of limiting factors, suggest **THREE** reasons for the shape of the graph drawn in b (i).

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[3 marks]

Total 15 marks

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2. (a) Figure 2A shows a cross-section of phloem tissue and Figure 2B shows a longitudinal section of phloem tissue.

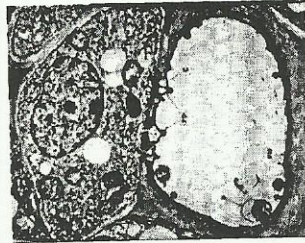
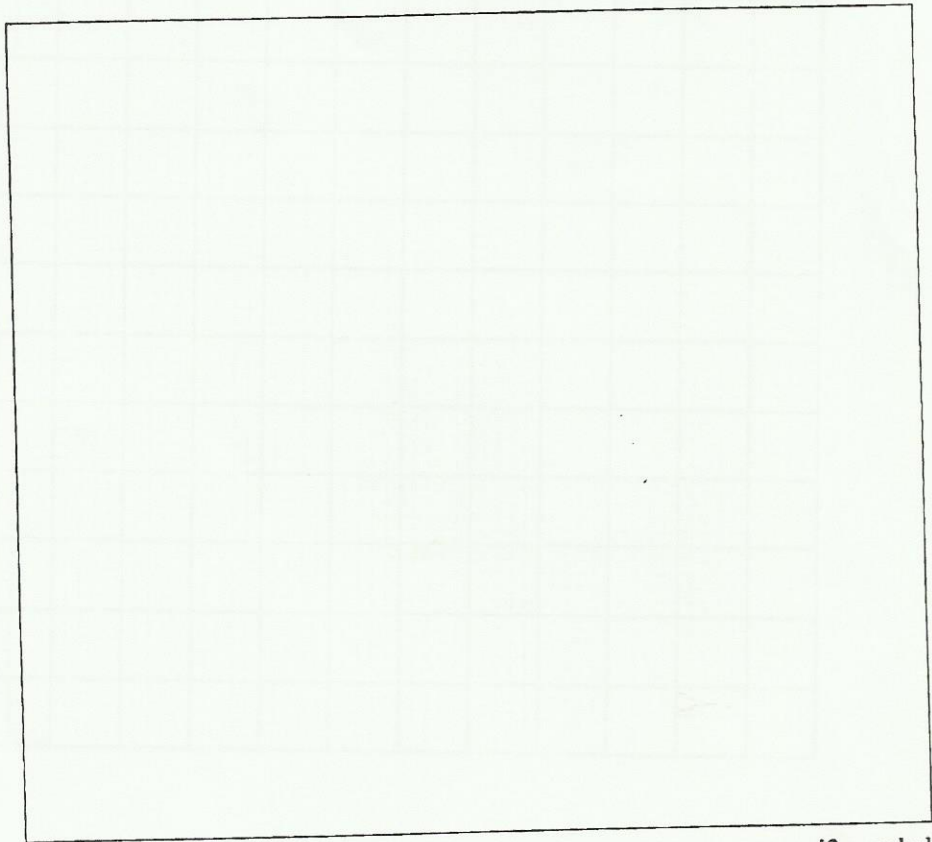


Figure 2A. Cross-section of phloem tissue



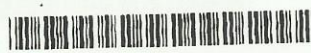
Figure 2B. Longitudinal section of phloem tissue

- (i) In the space below, draw and label a diagram of the TWO phloem cell types shown in Figure 2B.



[3 marks]

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(ii) Describe TWO features of EACH phloem cell type shown in Figure 2B.

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[2 marks]

(iii) State the **major** function of EACH of the TWO phloem cell types.

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[2 marks]

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(b) John is a 62-year-old male who recently began using the antidepressant fluoxetine, to deal with the loss of his wife. His blood pressure and pulse rate are monitored for one hour after he ingests the antidepressant. Ten minutes into the monitoring process, John falls asleep. Blood tests show that 30 minutes after ingestion, fluoxetine enters John's bloodstream. Figure 3 shows the data collected on John's systolic and diastolic blood pressure, and his pulse rate over the one-hour period.

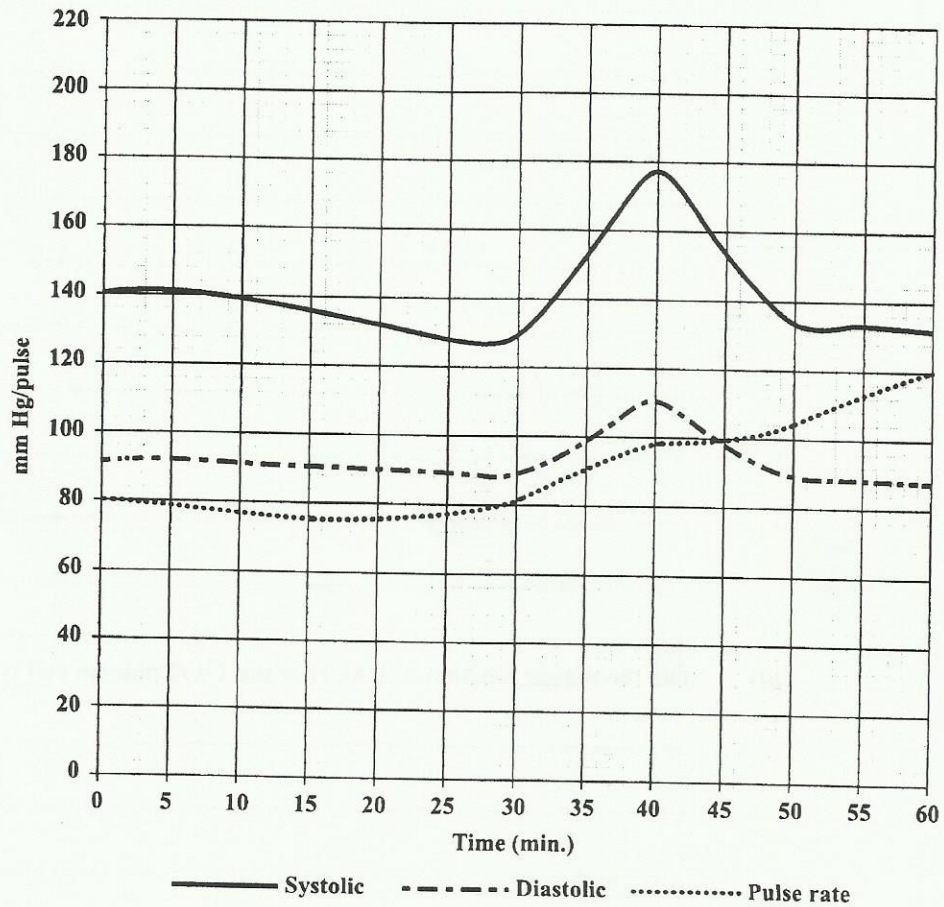


Figure 3. Systolic and diastolic blood pressure and pulse rate over a one-hour period



(i) Explain what is meant by EACH of the following terms:

Blood pressure

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[2 marks]

Pulse

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(ii) Describe the effect of EACH of the following parameters on blood pressure and pulse rate:

Sleep

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[1 mark]

Fluoxetine

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[1 mark]

(iii) Should John continue to take fluoxetine? Give a reason for your answer.

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[2 marks]

Total 15 marks

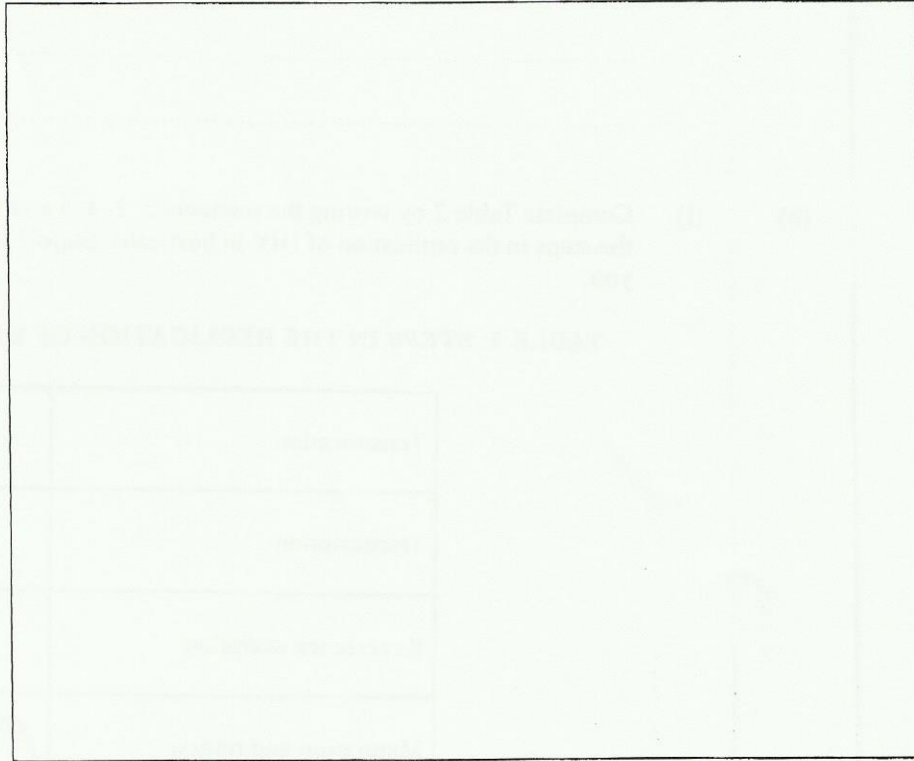
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3. (a) Alcohol consumption can have short-term and long-term effects on the liver.

(i) In the box provided below, draw a flowchart to illustrate the stages in the detoxification of alcohol in the liver, including the enzymes and coenzyme involved.



[4 marks]

(ii) Explain how the metabolism of alcohol can lead to a short-term effect on the liver.

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[3 marks]

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(iii) Describe how alcohol-induced cirrhosis occurs and its effects on the liver.

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[2 marks]

- (b) (i) Complete Table 2 by writing the numbers 2, 3, 4, 5 and 6 to indicate the order of the steps in the replication of HIV in host cells. Steps 1 and 7 have been done for you.

TABLE 2: STEPS IN THE REPLICATION OF HIV IN HOST CELLS

Transmission	1
Transcription	
Reverse transcription	
Maturation and release	7
Integration	
Infection	
Translation	

[3 marks]



(ii) Describe THREE ways by which HIV can be transmitted.

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[3 marks]

Total 15 marks

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SECTION B

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

4. (a) "For a top carnivore to be numerous in an ecosystem, it must feed at many different levels of the food chain and not just the one beneath it." Discuss the veracity of this statement.

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[6 marks]



- (b) Within any ecosystem, biodiversity exists at three levels: genetic, species and ecosystem. Discuss the interaction among these three levels of biodiversity. Include in your answer an explanation of EACH level — genetic, species and ecosystem biodiversity.

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5. (a) An athlete loses a considerable amount of water by sweating during training, after which he has a high intake of fluids. Explain the mechanism by which water balance is maintained in this athlete's body.

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[8 marks]



6. (A) Chronic diseases, which are increasing in both incidence and prevalence, are precipitated by lifestyle choices, and are having a marked effect on mortality in the Caribbean. Explain this phenomenon, referring to a chronic disease as an example.

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- (b) Joseph contracts dengue fever and recovers. Three months later, he goes to another town to take care of his grandmother who is suffering from dengue fever. He decides to take her to the hospital where both his blood and his grandmother's blood are tested. The antibody concentration of Joseph's blood is found to be abnormally high, even though he does not have any symptoms of the disease. Discuss why Joseph's immune response is heightened even though he does not appear ill.

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[8 marks]

Total 15 marks

END OF TEST

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

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