

FORM TP 2016150



TEST CODE 02107020

MAY/JUNE 2016

CARIBBEAN EXAMINATIONS COUNCIL
CARIBBEAN ADVANCED PROFICIENCY EXAMINATION®

BIOLOGY

UNIT 1 – 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) Figure 1 shows the formation of sucrose.

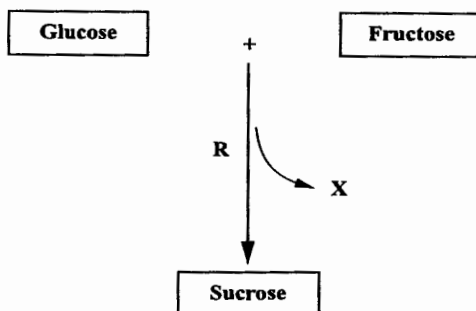


Figure 1. Formation of sucrose

- (i) Name the reaction labelled R and the reaction product labelled X in Figure 1.

R

X

[2 marks]

- (ii) In the box below, illustrate the full molecular ring structure of the glucose molecule involved in the reaction in Figure 1.

[2 marks]

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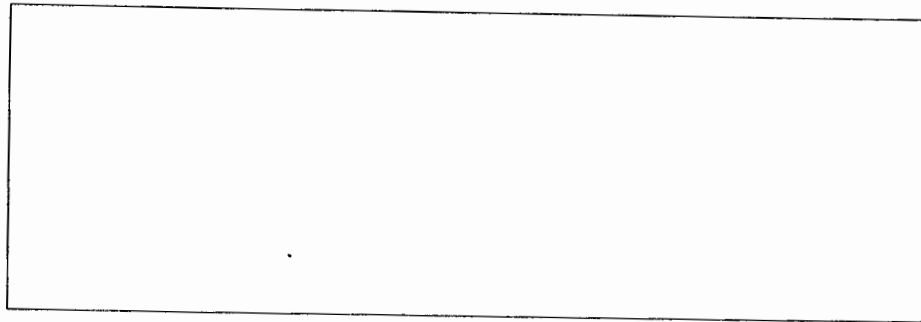
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- (iii) With reference to the molecular structure of sucrose, explain why sucrose has an advantage over glucose as a transport sugar in plants.

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[3 marks]

- (b) (i) Draw a simple labelled diagram to illustrate the fluid mosaic model of plasma membrane structure.



[5 marks]

- (ii) With reference to the fluid mosaic model, explain how large polar molecules can pass through the membrane.

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[3 marks]

Total 15 marks

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(iv) Using the table of probabilities provided below, and with reference to the calculated Chi-square value from Table 2, evaluate the validity of the hypothesis.

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[2 marks]

TABLE 3: CHI-SQUARE DISTRIBUTION

Degrees of Freedom	Probability											
	0.95	0.90	0.80	0.75	0.50	0.30	0.20	0.10	0.05	0.01	0.001	
1	0.004	0.02	0.06	0.15	0.46	1.07	1.64	2.71	3.84	6.64	10.83	
2	0.10	0.21	0.45	0.71	1.39	2.41	3.22	4.60	5.99	9.21	13.82	
3	0.35	0.58	1.01	1.42	2.37	3.66	4.64	6.25	7.82	11.34	16.27	
4	0.71	1.06	1.65	2.20	3.36	4.88	5.99	7.78	9.49	13.28	18.47	
5	1.14	1.61	2.34	3.00	4.35	6.06	7.29	9.24	11.07	15.09	20.52	
6	1.63	2.20	3.07	3.83	5.35	7.23	8.56	10.64	12.59	16.81	22.46	
7	2.17	2.83	3.82	4.67	6.35	8.38	9.80	12.02	14.07	18.48	24.32	
8	2.73	3.49	4.59	5.53	7.34	9.52	11.03	13.36	15.51	20.09	26.12	
9	3.32	4.17	5.38	6.39	8.34	10.66	12.24	14.68	16.92	21.67	27.88	
10	3.94	4.86	6.18	7.27	9.34	11.78	13.44	15.99	18.31	23.21	29.59	
	Nonsignificant								Significant			

Total 15 marks

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3. (a) Figure 2 is a photomicrograph showing a cross section of a mature anther.

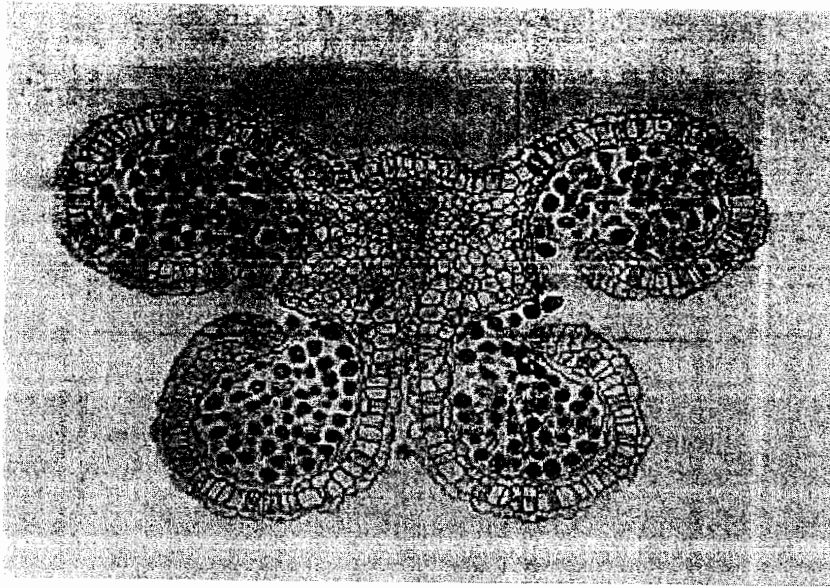
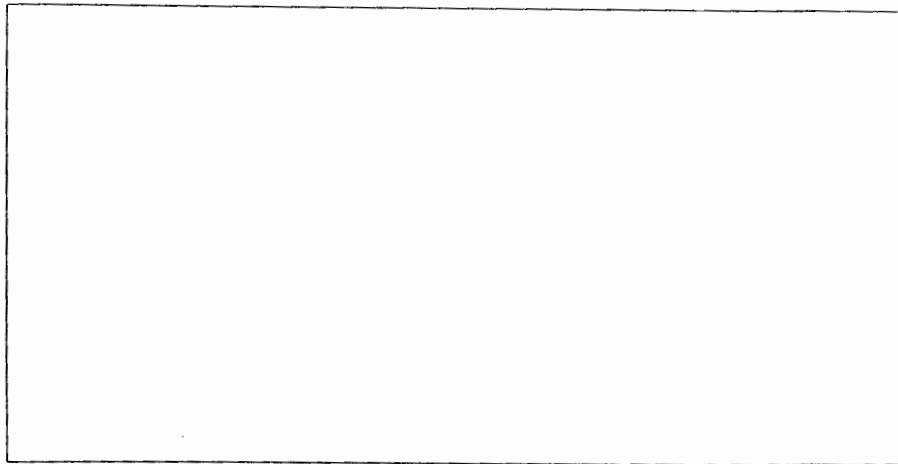


Figure 2. Photomicrograph of a mature anther

Source: <http://www.microscopyview.com/MENU/M14-BOTA/S14A-01-16/S1402A.html>

In the box below, make a plan drawing of the anther in Figure 2. Use annotated labels to identify TWO tissues.



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SECTION B

Answer ALL questions.

Write your answers in the spaces provided in this booklet.

4. (a) According to the endosymbiotic theory, organelles such as mitochondria and chloroplasts are thought to have evolved from prokaryotes.
- (i) Explain what is meant by the term 'endosymbiosis' and how it relates to the origin of these organelles in eukaryotes.

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[3 marks]

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[7 marks]

(b) Explain the steps involved in the use of recombinant DNA technology for the production of human insulin from bacteria under the following headings:

- Gene isolation
- Gene insertion into a vector

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