Class	Register Number	Name

南洋女子中学校
NANYANG GIRLS' HIGH SCHOOL

B

End-of-Year Examination 2018
Secondary Three

IP BIOLOGY
Paper 2 Theory Paper

1 hour 45 minutes

Friday **5 October 2018** **1000 – 1145**

Additional materials: Nil

READ THESE INSTRUCTIONS FIRST

Do not open this document until you are told to do so.

Write your name, register number and class in the spaces at the top of this page.

Section B
Answer **three** questions. Question **8** is in the form of an **Either/Or** question. Only **one** part should be answered.
Write your answers in the spaces provided on the question paper.

At the end of the examination,
1. fasten all your work securely together;
2. tick **8 Either** or **8 Or** in the grid-box to indicate the question answered.

You are advised to spend no longer than 1 hour on **Section A**, and no longer than 45 minutes on **Section B**. The intended number of marks is given in the brackets [ ] at the end of each question or part question.

The use of an approved scientific calculator is expected, where appropriate.

Section B

Answer **three** questions.

Question **8** is in the form of an **Either/Or** question. Only **one** part should be answered.

Write your answers in the spaces provided on the question paper.

6 A student carried out an investigation on cellular respiration.

Glucose was dissolved in boiled and cooled water, before the yeast culture was added. 10 cm^3 of yeast culture in glucose solution was added each to test-tubes **A** and **B**.

In test-tube **B**, three drops of oil were carefully added to form a layer on the surface of the yeast culture. The apparatus was set up as shown in Fig. 6.1.

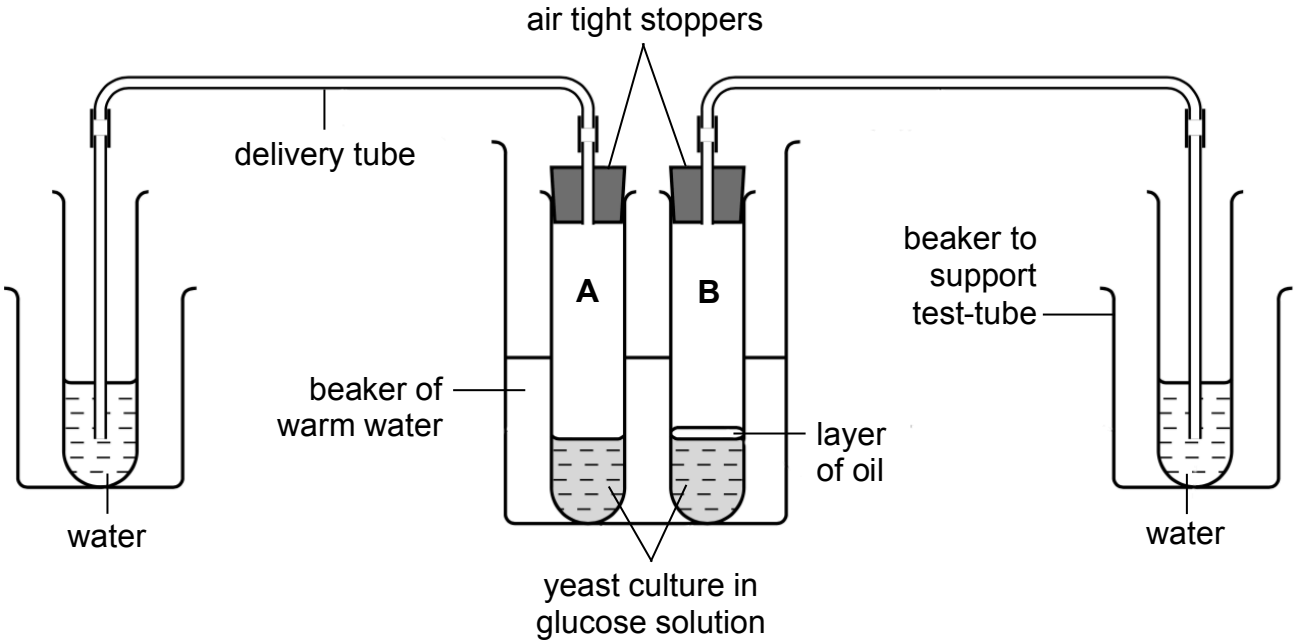


Fig. 6.1
[adapted from Biology March 2015/P6]

The appearance of the yeast cultures was recorded. The numbers of bubbles released from test-tubes **A** and **B** into the water were also counted and recorded.

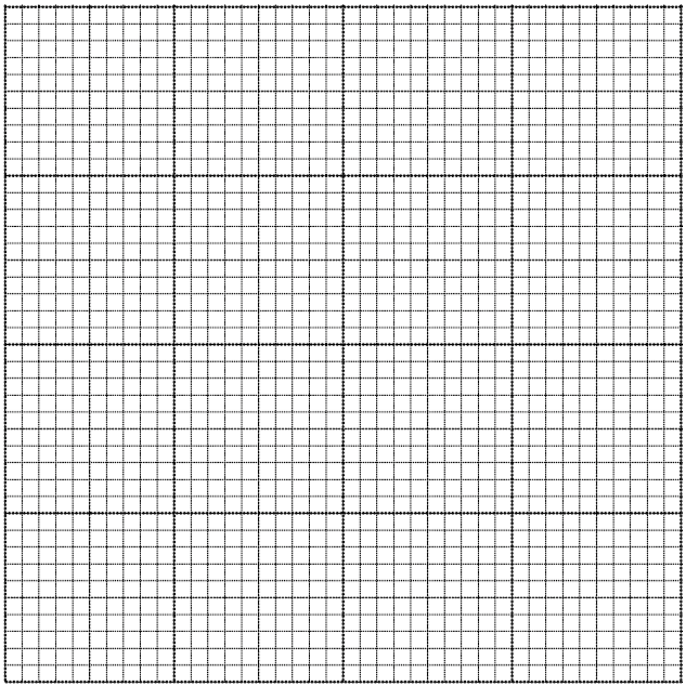
Observations and measurements were taken at five-minute intervals, the data was recorded in Table 6.1.

Table 6.1

time / min	appearances of yeast culture in **A** and **B**		number of bubbles released in one minute	
	A	**B**	**A**	**B**
0	some bubbles	no bubbles	0	0
5	foam starting to form on top	some bubbles	7	4
10	thick foam on top	foam starting to form below oil	12	7
15	thicker foam on top	thin foam below oil	16	9
20	foam 3.0 cm in depth	foam 0.5 cm in depth	20	10

(a) (i) On the gridlines below, using the same set of axes, plot the number of bubbles released in one minute against time for test-tubes **A** and **B**.

Label each graph clearly.



[5]

(ii) Using Table 6.1, compare **and** explain by comparing the results and observations for test-tubes **A** and **B**.

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(b) Suggest why the number of bubbles released per minute would decrease for both test-tubes **A** and **B** after a period of 24 hours.

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……[1]

[Total: 10]

7 Ribulose 1,5-bisphosphate carboxylase/oxygenase (rubisco) is an important enzyme

involved in the light-independent stage of photosynthesis. This stage combines carbon dioxide (CO_2) with RuBP to form molecules essential for glucose production. The reaction steps are illustrated in Fig. 7.1.

$$CO_2 + RuBP \xrightarrow{\text{rubisco}} \rightarrow \rightarrow \rightarrow \text{glucose}$$

Fig. 7.1

In certain situations, the active site of rubisco becomes occupied by a sugar-phosphate group, making the enzyme inactive. Rubisco can become active again in the presence of another enzyme, rubisco phosphatase.

(a) Write the overall chemical equation for photosynthesis.

……..…[2]

(b) Suggest how rubisco phosphatase can activate rubisco.

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……..…[1]

(c) The rate of photosynthesis in some plants can be affected by a process known as photorespiration. In photorespiration, rubisco combines oxygen with RuBP.

During a particular botany research at high light intensities, the following observations were recorded:

- a decrease in the rate of photosynthesis,
- an increase in the rate of photorespiration.

Suggest possible reasons for **both** changes in the rate of photosynthesis and photorespiration.

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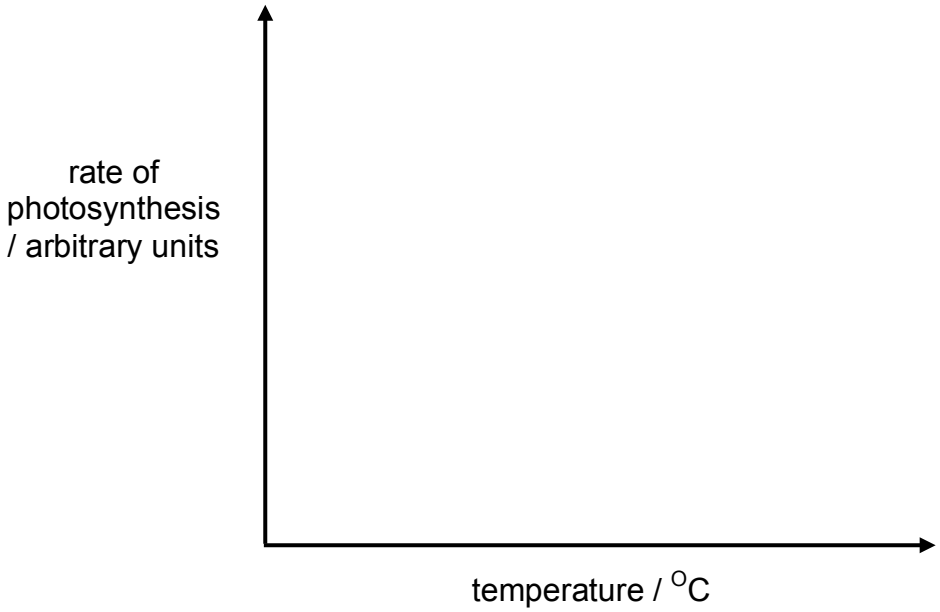
(d) **(i)** Sketch a line graph on the axes below to show the effect of temperature on the

rate of photosynthesis.

Assume all other factors are kept constant.



[1]

(ii) Explain the shape of your graph in **(d) (i)**.

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[Total: 10]

Question **8** is in the form of an **Either/Or** question. Only **one** part should be answered.

The quality of written communication will be highly regarded in your answer to this question.

8 Either

(a) Describe the role of carbonic anhydrase in the excretion of carbon dioxide.

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(b) Define double circulation of blood in humans and explain its significance.

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[Total: 10]

8 Or

(a) Explain why lipids are the preferred energy storage molecules in the human body.

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(b) Describe the route taken and fate of excess amino acids from their site of absorption to their site of removal from the human body. The names of blood vessels are **not** required.

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[Total: 10]

END OF SECTION B