Class	Register Number	Name

南洋女子中学校
NANYANG GIRLS' HIGH SCHOOL

A

End of Year Examination 2020
Secondary Three IP

IP BIOLOGY

Paper 2 Theory Paper **1 hour 45 minutes**
Monday **12 October 2020** **1015 – 1200**
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 A
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

Section B
Answer two questions.
Question 10 is in the form of an Either/Or question. Only one part should be answered.
Tick **10 Either** or **10 Or** in the grid-box on the cover page to indicate the question answered.

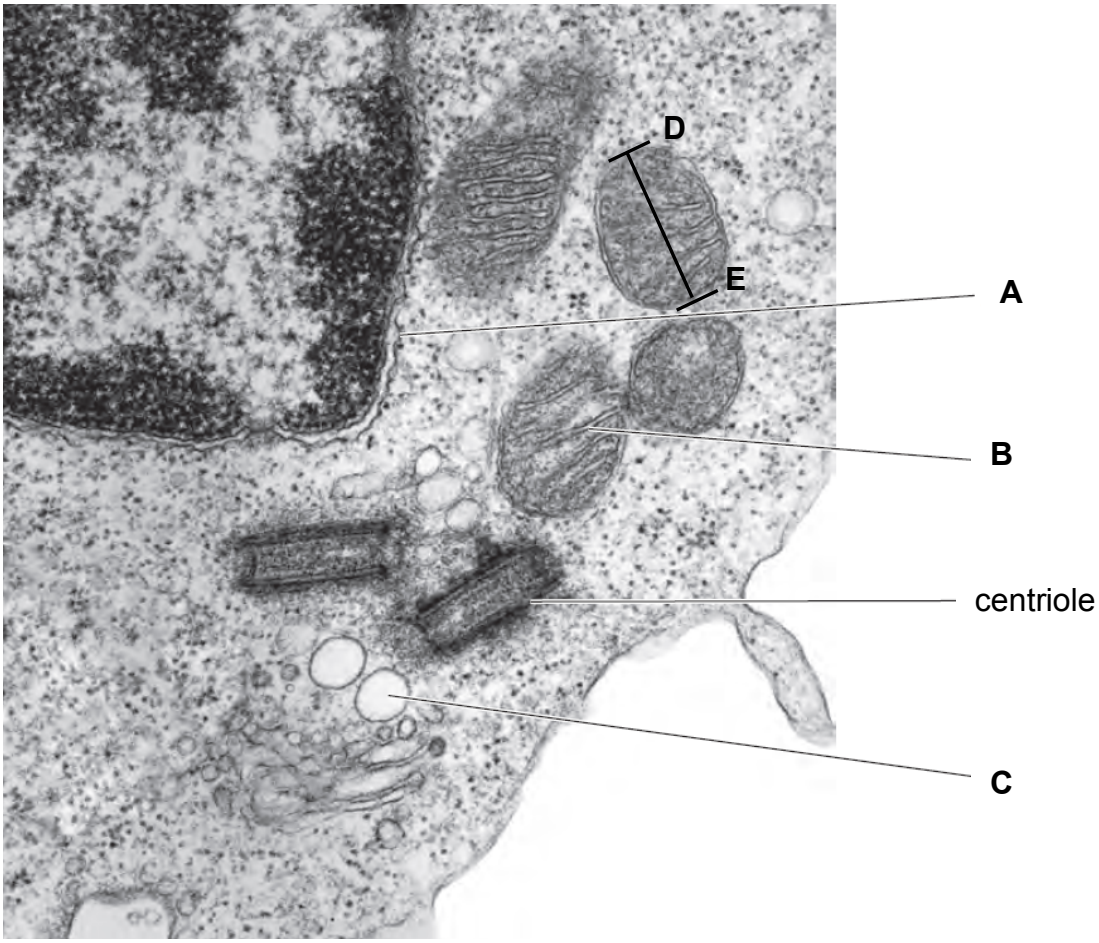
The intended number of marks is given in the brackets [ ] at the end of each question or part question.

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

EXAMINER'S USE	
Paper 1 (30 marks)	
Paper 2	
Section A (40 marks)	
1 (5 marks)	
2 (4 marks)	
3 (5 marks)	
4 (7 marks)	
5 (7 marks)	
6 (7 marks)	
7 (5 marks)	
Section B (30 marks)	
8 (10 marks)	
9 (10 marks)	
tick: 10 Either (10 marks)	
tick: 10 Or (10 marks)	
TOTAL (100 marks)	

Section A (40 marks)
Answer **all** questions.
Write your answers in the spaces provided.

1 Fig. 1.1 is an electron micrograph showing part of a cell.



magnification x 10 000

Fig. 1.1

(a) Name the structures labelled **A** and **C**. State their functions.

A: …….

function of **A**:

……..

……..

C: …….

function of **C**:

……..

…….. [2]

(b) **B** is a mitochondrion.

Suggest why the mitochondria seen in Fig 1.1 are of different shapes.

……..

…….. [1]

(c) Calculate the actual length of **DE,** in cm**,** in Fig. 1.1. In your working, write down the formula used to make your calculation.

Show your working clearly.

actual length of **DE** = ……. cm [2]

[total: 5]

2 Fig. 2.1 is a photomicrograph of root tip cells at various stages of mitosis.

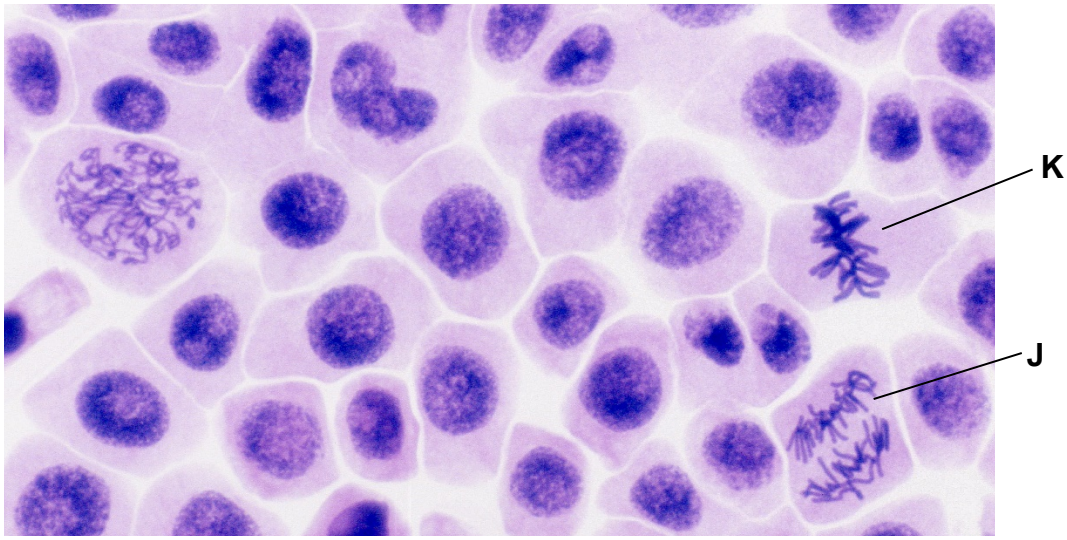


Fig. 2.1
https://www.researchgate.net/figure/Chromosomal-aberrations

(a) Identify the stages of cell division shown in cell **J** and **K**.

cell **J**

……

cell **K**

…… [1]

(b) Describe the changes occurring from the stage shown in cell **K** to the stage shown in **J**.

……

……

……

……

……

……

…… [3]

[total: 4]

3 **(a)** **(i)** Define *mutation*.

……...

……... [1]

(ii) State two ways in which mutation rate can be increased.

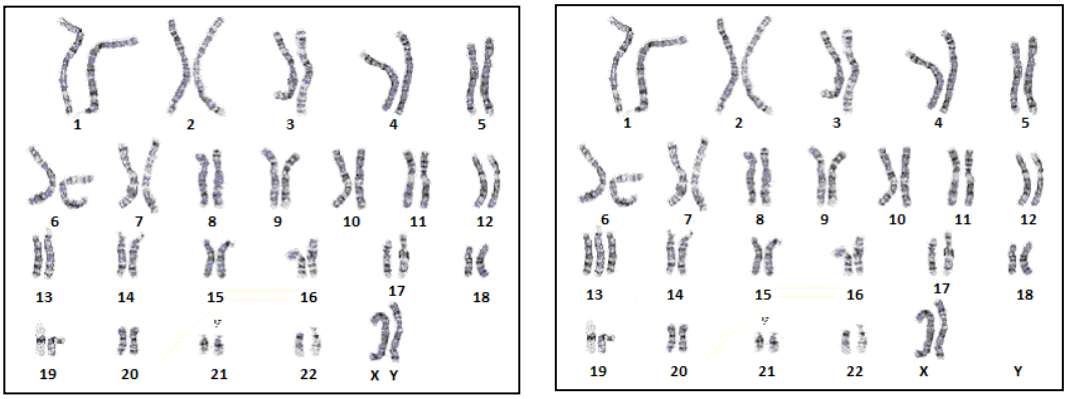
……

……

……

…… [2]

Fig. 3.1 shows the chromosomes from two infants, infant **A** and infant **B**.



infant **A** infant **B**

Fig. 3.1

(b) State two differences in terms of numbers and types of chromosomes between the two infants.

……

……

……

…… [2]

[total: 5]

4 Duchenne Muscular Dystrophy is a genetic disorder characterised by progressive weakening of muscles. The disorder is due to the absence of a key protein found in muscles called dystrophin. The gene that codes for this protein is found on the X chromosome.

(a) Using a genetic diagram, show how two parents who do not suffer from the disorder can have children who have Duchenne Muscular Dystrophy.

[5]

(b) **(i)** State the probability that a daughter born to this couple will be a carrier for Duchenne Muscular Dystrophy.

……... [1]

(ii) The couple have three daughters and when screened, none of them were carriers for the disorder.

Explain why this is so.

……...

……... [1]

[total: 7]

5 Fig. 5.1 shows the release of digestive enzymes from a small intestinal cell.

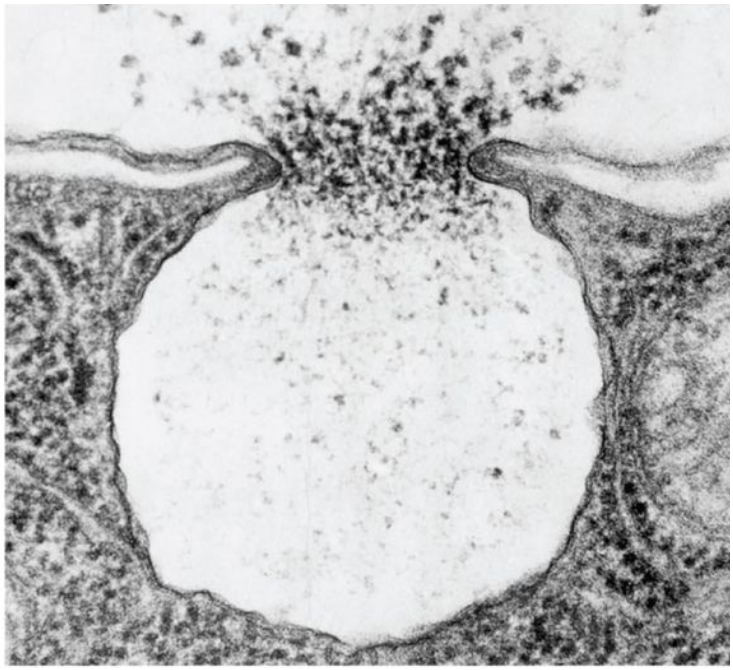


Fig. 5.1

(a) Suggest why there are no protein transporters for the movement of these digestive enzymes.

……

…… [1]

(b) Name and describe the process that allows the digestive enzymes to cross the membrane.

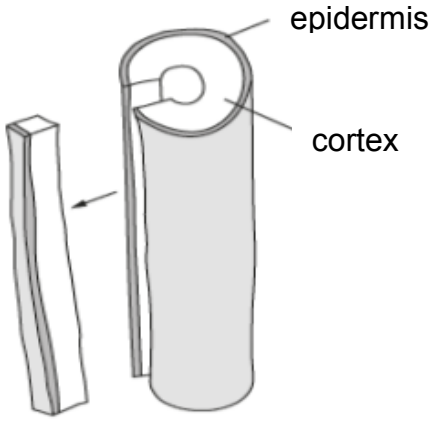
……

……

……

…… [2]

(c) A student conducted an investigation on osmosis in Chinese Leek. The stem of the plant has a hollow centre. The student cut strips from the stem of the plant as show in Fig 5.2.



strip cut from the stem

Fig. 5.2

A strip was placed in 1 % salt solution and 5 % salt solution for thirty minutes. The results are shown in Fig. 5.3.

strip placed in 1 % salt solution

Fig. 5.3

strip placed in 5 % salt solution

A strip was placed in distilled water for the same duration.

(i) In Fig. 5.4, draw the appearance of the strip in the box provided.

Clearly label the epidermis and cortex in your drawing. [1]

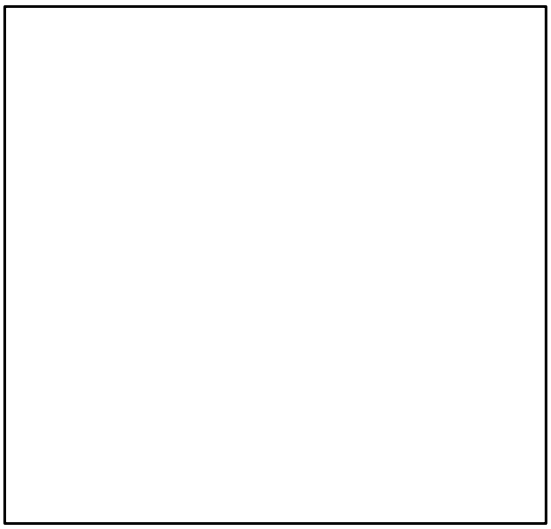


Fig. 5.4

(ii) Explain the appearance of the Chinese Leek you have drawn in Fig. 5.4.

……

……

……

……

……

……

…… [3]

[total: 7]

6 A starch agar with a cloudy appearance, was made by heating a starch suspension with agar powder. The starch agar mixture was then poured into a Petri dish and allowed to cool. After the agar was set, four wells were made in the starch agar.

Each well was filled with a different mixture as shown in Fig.6.1.

1 contained pancreatic amylase with buffer solution at pH 2.0
2 contained pancreatic amylase with buffer solution at pH 5.0
3 contained pancreatic amylase with buffer solution at pH 8.0
4 contained a solution that acts as a control

The Petri dish was kept at 40 °C for 2 hours. The results are shown in Fig.6.2.

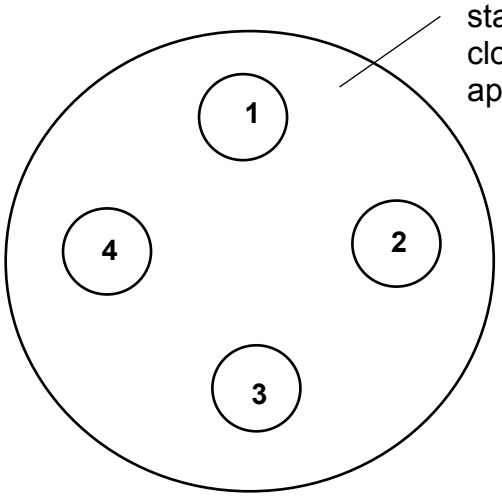


Fig. 6.1

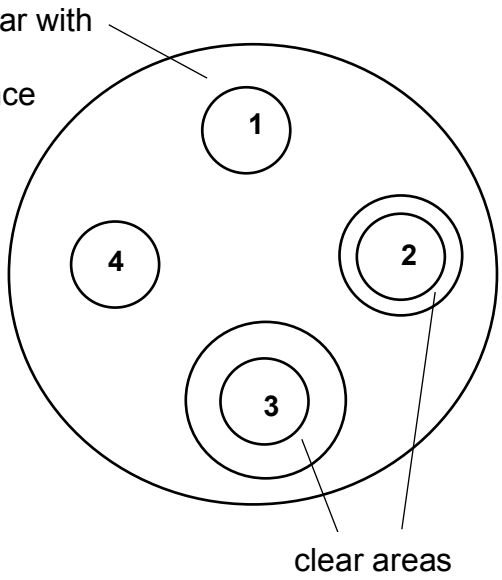


Fig. 6.2

(a) Explain the results of well 1.

……..

…….. [1]

(b) Describe and explain the results of wells 2 and 3.

……..

……..

……..

……..

…….. [3]

(c) Suggest the identity of the solution in well 4.

……

…….. [1]

(d) A student concluded from this experiment that the optimum pH of pancreatic enzyme was pH 8.0.

Outline how you would modify this experiment to find out if she was right.

…….....

…….....

…….....

……..... [2]

[total: 7]

7 Table 7.1 shows the rate of photosynthesis of two different plants over a range of light intensities. Light intensity is measured in lux.

Table 7.1

light intensity/ lux	rate of photosynthesis/ arbitrary units	
	Plant **A**	Plant **B**
5	2	3
10	4	11
20	8	29
30	19	46
40	29	49
50	40	52
60	47	55
70	59	58
80	70	58

(a) Write down the word equation for photosynthesis.

…….. [2]

(b) **(i)** Describe one difference in the effect of light intensity on both plants up to 50 lux.

……..

……..

……..

…….. [2]

(ii) Explain which plant grows better in the shade.

……..

……..

……..

…….. [1]

[total: 5]

End of Paper 2 Booklet