



Hee Xin Wei  
**OVERMUGGED**  
O Level Mock Paper

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**SCIENCE (CHEMISTRY, BIOLOGY)**

Paper 4 Biology

**5078/04**

**September 2021**

**1 hour 15 minutes**

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**INSTRUCTIONS TO CANDIDATES**

Write in dark blue or black pen.

You may use an HB pencil for diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

**Section A**

Answer **all** questions.

Write your answers in the spaces provided on the Question Paper.

**Section B**

Answer **any two** questions.

Write your answers in the spaces provided on the Question Paper.

Electronic calculators may be used.

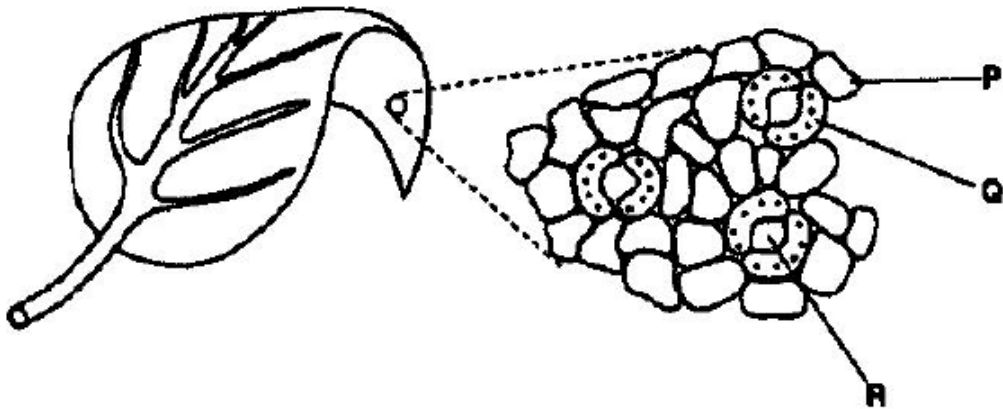
The number of mark is given in brackets [] at the end of each question or part question.

Section A

Answer **all** questions.

Write your answers in the spaces provided.

1. Figure 1.1 shows a leaf and a type of plant cells



(a) Label P, Q and R

P .....

Q .....

R .....

[3]

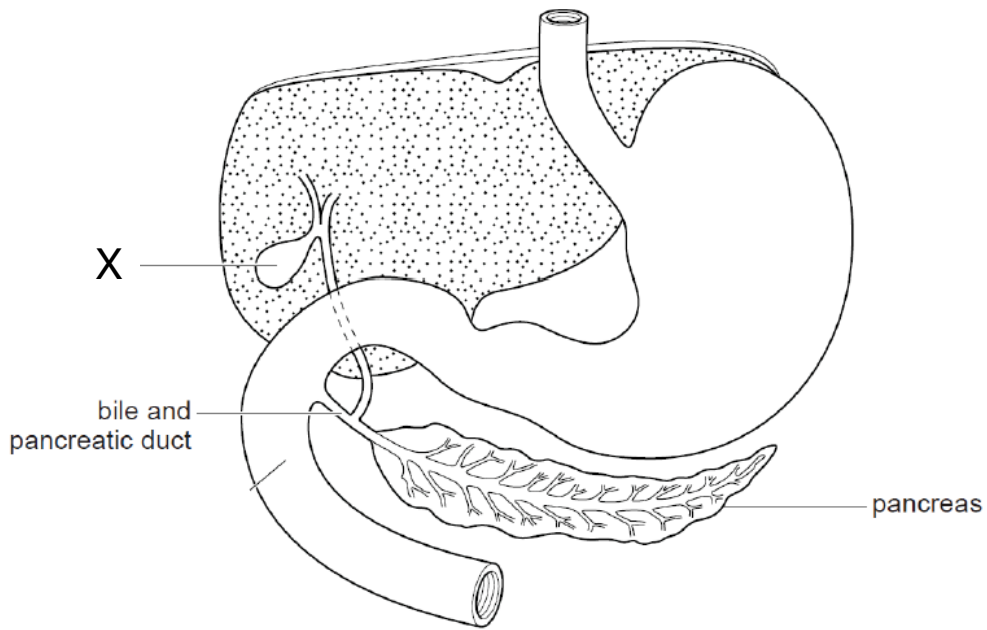
(b) Describe and explain how structure Q helps structure R to remain open and close.

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

[4]

[Total:7]

2. Figure 2.1 shows a section of human alimentary canal and its accessory organs



(a) Label X and state its function

X ..... [1]

Function ..... [1]

(b) One effect of cystic fibrosis is that the bile and pancreatic duct becomes blocked with mucus.

Suggest why a person whose bile and pancreatic duct is blocked may find it difficult to gain weight despite eating a balanced diet.

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

(c) Using your knowledge about the alimentary canal, why is medicine containing protein coated in lipid?

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

(d) State two functions of the liver.

.....  
.....  
.....  
..... [2]

[Total:10]

3. Table 3.1 shows the pressure changes in the left side of the heart during one cardiac cycle.

time /s	blood pressure / kPA	
	left atrium	left ventricle
0.0	0.7	0.3
0.1	1.0	2.0
0.2	0.1	12.5
0.3	0.2	15.3
0.4	1.0	4.5
0.5	0.5	1.0
0.6	0.6	0.3
0.7	0.7	0.3

(a) With reference to the table, explain when is the valve between the atrium and the ventricle closed.

.....  
.....  
.....  
..... [2]

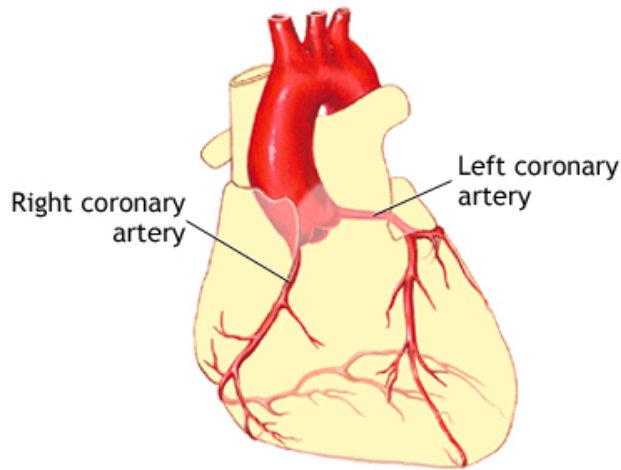
(b) The pressure in the ventricle is much higher than that in atrium. Suggest why is it so.

.....  
.....  
.....  
..... [2]

(c) How do blood vessels ensure that blood is moved only in one direction?

.....  
.....  
.....  
..... [2]

(d) Figure 3.2 shows a human heart



(i) Describe the route of oxygen from the alveoli being transported to the coronary artery.

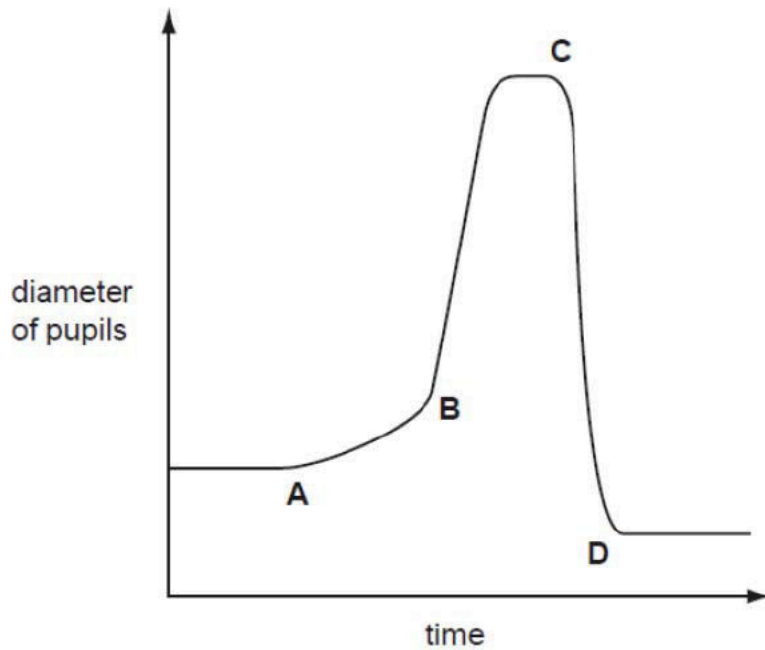
.....  
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..... [2]

(ii) Explain why it is advised that patients with coronary heart disease to not smoke.

.....  
.....  
.....  
..... [2]

[Total: 10]

4. Figure 4.1 shows the changes in the diameter of Norman's pupils



(a) (i) At which point did Norman walk from his outdoor garden to a storeroom that is not lit ..... [1]

(ii) With your understanding of a reflex action, explain the events that have happened in Norman's eyes when he walked from his outdoor garden to at the storeroom

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.....

..... [4]

(iii) Why is it important for the event from (ii) to happen?

.....

..... [1]

(b) It is recommended that students should not read too close to books or look too close to screens for a long period of time. Suggest why is that so.

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

(c) Describe the differences between a reflex action and a voluntary action

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.....  
..... [1]

[Total:10]



5. (a) Briefly describe the cause of each of the following:

(i) Down's Syndrome

.....  
..... [1]

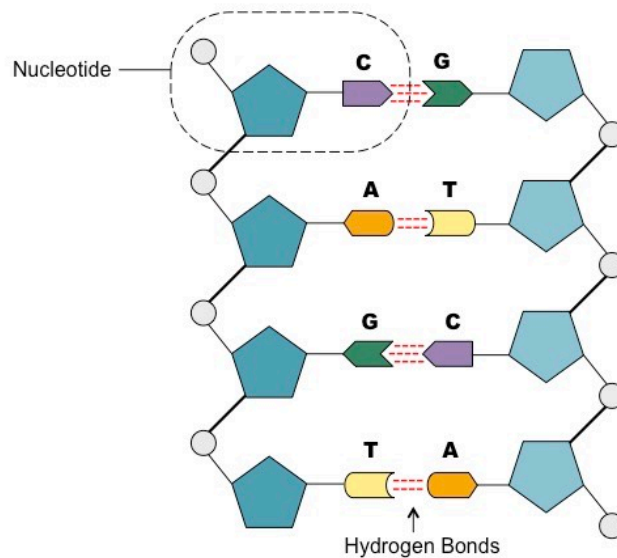
(ii) Sickle cell anaemia

.....  
..... [1]

(b) Name one factor that may increase the rate of Down's Syndrome or sickle cell anaemia

..... [1]

(c) Figure 5.1 shows a DNA molecule



(i) Describe two ways how a DNA molecule is different from a polypeptide

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.....  
..... [2]

(ii) outline the relationship between genes, chromosomes, and DNA

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

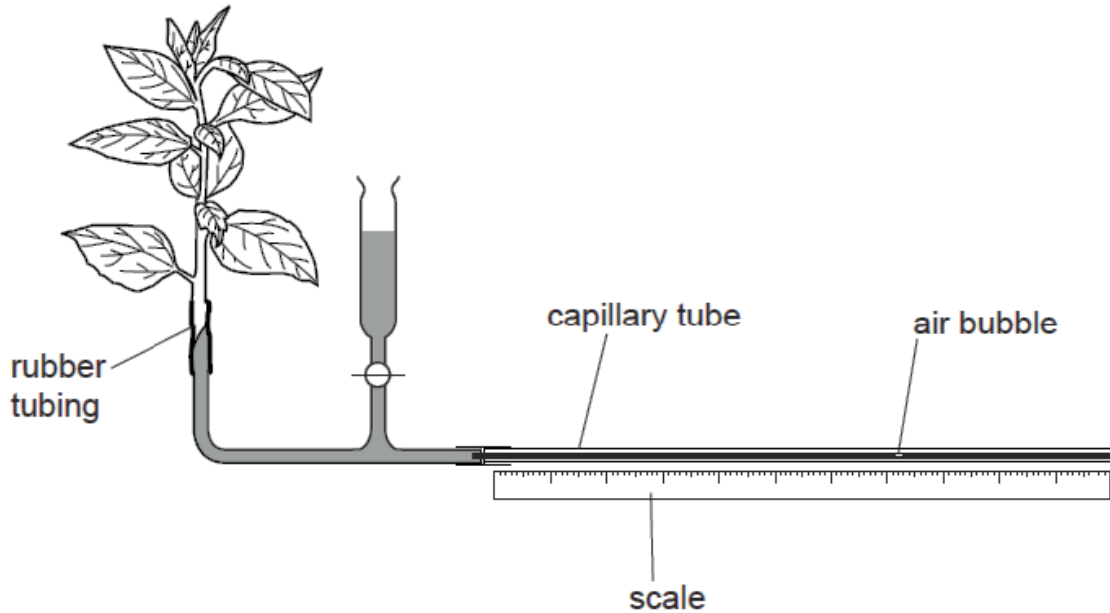
[Total:8]

Section B

Answer any two questions.

Write your answers in the spaces provided.

6. Figure 6.1 shows an apparatus used to investigate the uptake of water by a cut stem of a fresh green plant.



- (a) Draw an arrow on Fig. 8.1 to show the direction in which the air bubble moves when the plant takes up water. [1]

- (b) The water enters the cut stem of the plant.

Describe the detailed process where the water enters the cut stem and leave to the atmosphere, and the importance of this process.

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..... [6]

(c) When this cut stem is placed in the soil, it started developing roots. Suggest how this plant reproduces and two advantages of this method.

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..... [3]

7. (a) Describe the levels of hormone oestrogen and progesterone and its effect in the menstrual cycle.

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..... [5]

(b) Describe the importance of hormone to human, with named examples.

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..... [5]

8. Resistance to the widely used poison warfarin is now extremely common in rats. Warfarin interacts with vitamin K to prevent its normal functions in the blood clotting mechanism. Warfarin resistance in rats is determined by a single dominant allele.

(a) Explain the blood clotting process

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..... [3]

(b) With the aid of a genetic diagram, explain how can the genotype of a warfarin resistance rat be determined

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..... [5]

(c) If there are only 6 offspring, explain the challenge of using this method to determine the genotype

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..... [2]