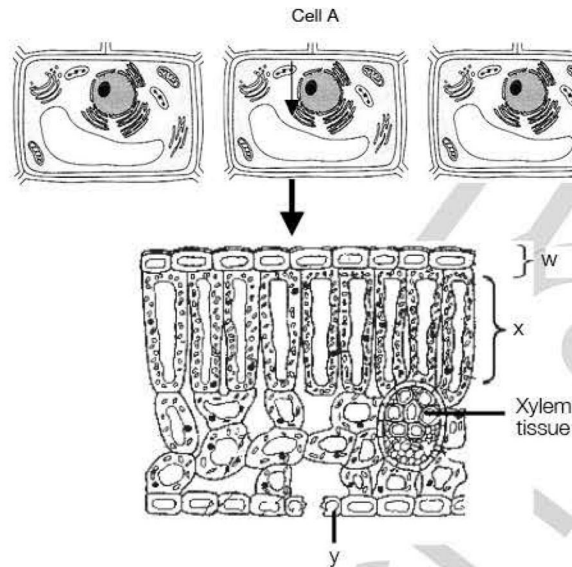


**Biology Paper 2**
**[4551/2]**
**SECTION A**
**[60 marks]**
**Answer All Questions In This Section.**

- 1 Diagram 1 shows cell organisation in plant. Cells A undergo differentiation and specialisation to form several tissues in a leaf of a green plant.


**Diagram 1**

- (a) Name tissue W and tissue X.

W: \_\_\_\_\_

X: \_\_\_\_\_

**[2 marks]**

- (b) State the function of cells W and Y in a leaf.

W: \_\_\_\_\_

Y: \_\_\_\_\_

**[2 marks]**

- (c) (i) Explain the differentiation of cells A to form the xylem tissue.

 \_\_\_\_\_  
 \_\_\_\_\_

**[2 marks]**

- (ii) During the formation of the xylem tissue, the plant was unable to synthesize lignin.  
Explain the effect on the function of the leaf.

 \_\_\_\_\_  
 \_\_\_\_\_

**[2 marks]**

- (d) Based on Diagram 1, state the meaning of cell specialization.

 \_\_\_\_\_  
 \_\_\_\_\_

**[2 marks]**

- (e) Leaf is the main photosynthetic organ of a plant. Explain the adaptation of tissue X to enable the leaf to carry out its function.

 \_\_\_\_\_  
 \_\_\_\_\_

**[2 marks]**

2 Diagram 2.1 shows the cell cycle of an organism.

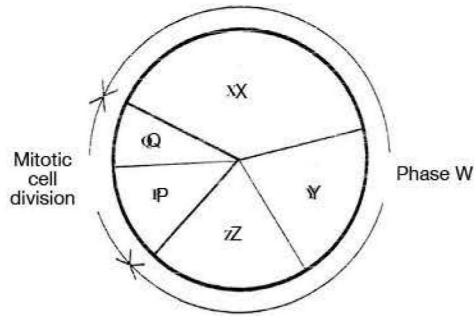


Diagram 2.1

(a) Name phase W in Diagram 2.1.

\_\_\_\_\_ [1 mark]

(b) Phase W is further divided into three sub phases, X, Y and Z. Describe what happens at sub phases X, Y and Z.

X: \_\_\_\_\_

Y: \_\_\_\_\_

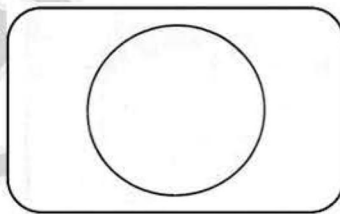
Z: \_\_\_\_\_ [3 marks]

(c) The number of chromosomes present in the nucleus of a somatic cell is 6. Diagram 2.2 shows a stage of cell division to produce gametes.



Diagram 2.2

Complete the diagram to show the chromosomes for a daughter cell produced at the end of sub-phase Q.



[2 marks]

(d) Radiotherapy is a method to treat cancer by using radiation. Explain how this treatment stops the growth of cancer cells.

\_\_\_\_\_  
\_\_\_\_\_ [2 marks]

(e) (i) An oil palm planter wants to produce good variety of oil palm. Suggest a suitable method to be used and explain how the method named can increase the crop yield.

\_\_\_\_\_  
\_\_\_\_\_ [3 marks]

(ii) State a problem that can occur when using this method.

\_\_\_\_\_  
\_\_\_\_\_ [1 mark]

- 3 Diagram 3 shows the exchange of respiratory gases X and Y between the alveolus, blood capillary and the body cells and the transport of the gaseous.

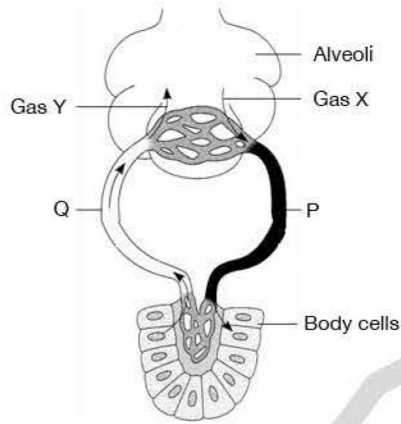


Diagram 3

- (a) (i) Name gas X and Y.

Gas X : \_\_\_\_\_

Gas Y : \_\_\_\_\_

[2 marks]

- (ii) Explain how the alveolus is structured to increase the efficiency of gaseous exchange.

\_\_\_\_\_

\_\_\_\_\_

[2 marks]

- (b) Explain the difference between the concentration of gas X and Y in blood vessel Q.

\_\_\_\_\_

\_\_\_\_\_

[2 marks]

- (c) The concentration of gas X transported in blood vessel P of a cigarette smoker is usually lower than the one in healthy individual. Explain why does this occur?

\_\_\_\_\_

\_\_\_\_\_

[2 marks]

- (d) In an experiment, a boy takes part in an 800 metre track event. His exhaled air was obtained three times which were before running, right after he finished running and 10 minutes after running to determine the percentage of carbon dioxide. Table 3.1 shows the result of the experiment.

	Before running	Right after he finishes running	After 10 minutes running
Percentage of carbon dioxide (%)	4 %	7.5 %	4 %

Table 3.1

Based on table 3.1, explain how the percentage of carbon dioxide is returned to normal after 10 minutes running.

\_\_\_\_\_

\_\_\_\_\_

[4 marks]

- 4 Two individuals P and Q were given injections to acquire immunity. The level of antibodies in the blood of individual P and Q is shown in Diagram 4.1 and 4.2 respectively.

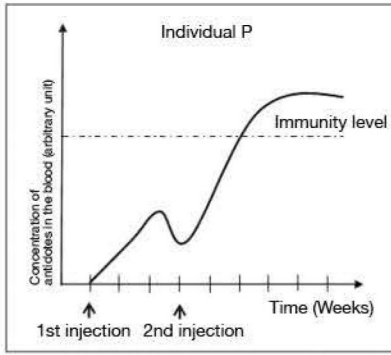


Diagram 4.1

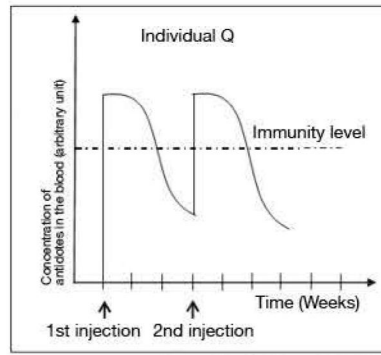


Diagram 4.2

- (a) What is the substance injected into the blood of individual P and individual Q?

P: \_\_\_\_\_  
Q: \_\_\_\_\_

[2 marks]

- (b) State the type of immunity obtained by individual P and individual Q.

P: \_\_\_\_\_  
Q: \_\_\_\_\_

[2 marks]

*A boy was bitten by a snake. He was unconscious and he was hospitalized.*

- (c) Using your biological knowledge, describe how you could save this boy.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[4 marks]

- (d) Table 4.1 shows a schedule of immunisation given for every new born Malaysian until the age of two.

Age	Types of Immunity	
New born	Tuberculosis (B.C.G) Hepatitis B	( First dose )
1 month	Hepatitis B	( Second dose )
3 month	Triple Antigen Polio	( First dose )
5 month	Triple Antigen Polio	( Second dose )
	Hepatitis B	( Third dose )
9 – 24 month	Germans measles	
1 ½ - 2 year	Triple Antigen Polio	( Third dose )

Table 4.1

- (i) Based on Table 4.1, state the type of pathogen which causes the above diseases.

\_\_\_\_\_

[1 mark]

- (ii) Explain why there is a need for second and third doses for the immunisation.

\_\_\_\_\_  
\_\_\_\_\_

[3 marks]

5 Diagram 5 shows various types of fingerprints.

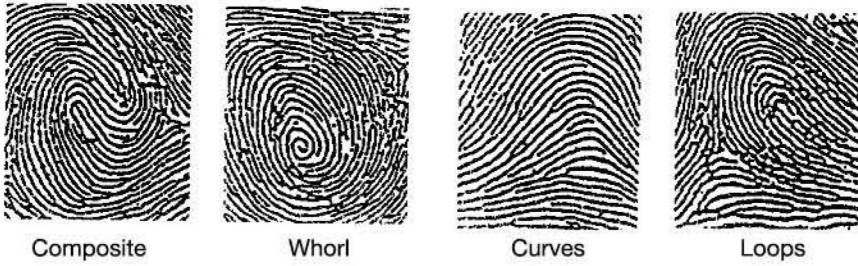




Diagram 5

(a) (i) Based on Diagram 5, name the type of fingerprints of students X and Y below.

Student X	Student Y
	
Type of fingerprint:	Type of fingerprint:

[2 marks]

(ii) State **one** factor that causes variation in the fingerprints of students X and Y.

\_\_\_\_\_ [1 mark]

(iii) State how the factor in (a) (ii) causes variation.

\_\_\_\_\_ [1 mark]

(b) (i) What is the type of variation shown in Diagram 5?

\_\_\_\_\_ [1 mark]

(ii) State **two** traits, other than fingerprint, which show the same type of variation as in (b)(i).

Trait 1 : \_\_\_\_\_

Trait 2 : \_\_\_\_\_ [2 marks]

(c) Height is a type of variation. Explain the differences between the type of variation shown by fingerprints and height.

\_\_\_\_\_  
 \_\_\_\_\_ [2 marks]

(d) Explain how variation can ensure the survival of a species.

\_\_\_\_\_  
 \_\_\_\_\_ [3 marks]

**SECTION B**

[40 marks]

Answer any **two** questions.

6 Diagram 6.1 shows the beginning and the end of an experiment to illustrate a physical process.



Diagram 6.1

(a) (i) Give a brief explanation of the process shown in Diagram 6.1. [4 marks]

- (ii) • Fresh milk  
• Fish

Explain one method by which the above food can be preserved for a long period of time. [6 marks]

(b) Diagram 6.2 shows a plant cell immersed in different concentrations of sucrose solution.

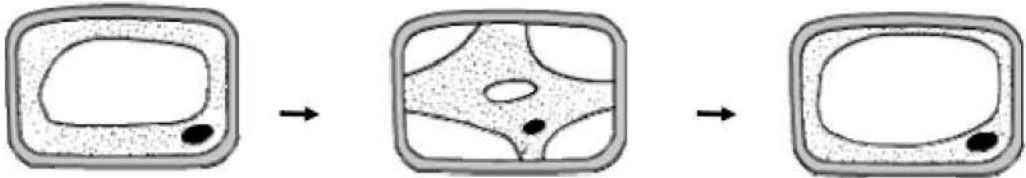


Diagram 6.2

**Solution A**  
Cell in 5% sucrose solution for 30 minutes

**Solution B**  
Cell in 30% sucrose solution for 30 minutes

**Solution C**  
Cell in 0.1% sucrose solution for 30 minutes

Explain what happens to the cell in each of the different concentrations of sucrose solution as shown in Diagram 6.2. [10 marks]

7

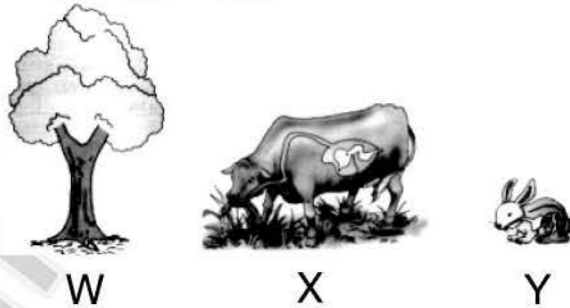


Diagram 7

(a) (i) Describe the type of nutrition in W and X. [4 marks]

(ii) Explain one similarity and four differences for the alimentary canals and types of nutrition between X and Y. [10 marks]

(b) **Poor eating habits result in health problems such as obesity, anaemia and constipation.**

Based on the statement above, state the causes and suggest ways on how to overcome the health problems mentioned in the statement. [6 marks]

8 Diagram 8 shows relationship between K and L of placental blood circulatory system.

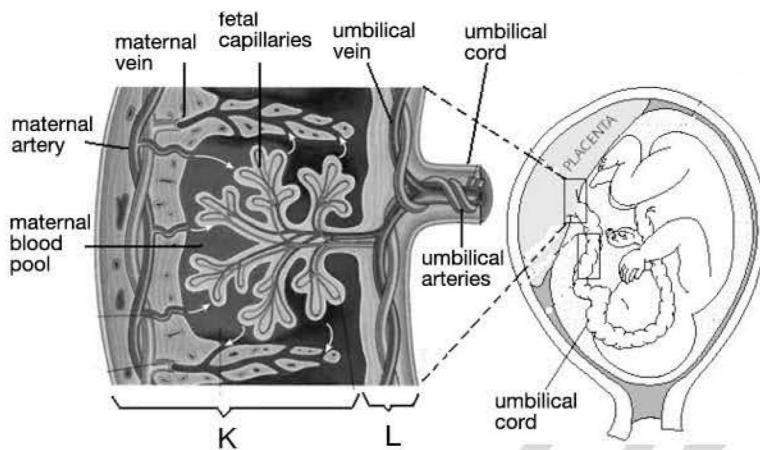


Diagram 8

(a) Explain why K and L circulatory system are not directly connected to each other.

[10 marks]

(b)

***Preventing pregnancy and difficulty in having children are two main problems in human reproduction***

Based on the statement, discuss the moral issues related to application of Science and Technology in overcoming human reproduction's problems.

[10 marks]

9. The following organisms are found in a paddy field community.

*Grasshopper, Paddy plant, Caterpillar,  
Frog, Owl, Snake, Rat*

These organisms interact with each other in the community.

- (a) (i) Based on the above organisms, construct :
- A food chain consisting of 4 trophic levels.
  - A pyramid of numbers consisting of four trophic levels.
  - A food web showing the interaction between organisms consisting of at least 3 food chains.
- [6 marks]
- (ii) Grasshoppers and caterpillars are pests for paddy plants. How can the population of the grasshoppers and caterpillars be controlled? Explain the impact of the control methods on the paddy field community.
- [6 marks]
- (b) A paddy field area is developed into an industrial area.  
Discuss the good and the bad social, economic and environmental effects of this development.
- [8 marks]

**END OF QUESTIONS PAPER**