



**Paya Lebar Methodist Girls' School (Secondary)**  
**Preliminary Examination 2024**  
**Secondary 4 Express / G3**

CANDIDATE NAME		CLASS		CLASS INDEX NUMBER	
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CENTRE NUMBER				
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**SCIENCE (BIOLOGY)**

**5088 / 01**

**Paper 1 Multiple Choice**

**1 August 2024**

Additional Materials: Multiple Choice Answer Sheet

**30 minutes**

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**READ THESE INSTRUCTIONS FIRST**

Write in soft pencil.

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

Write your name and index number on all the work you hand in.

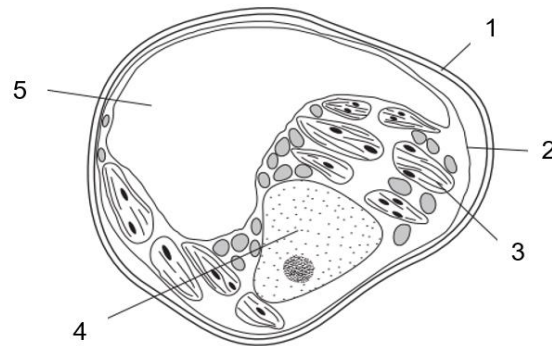
There are **twenty** multiple choice questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet.

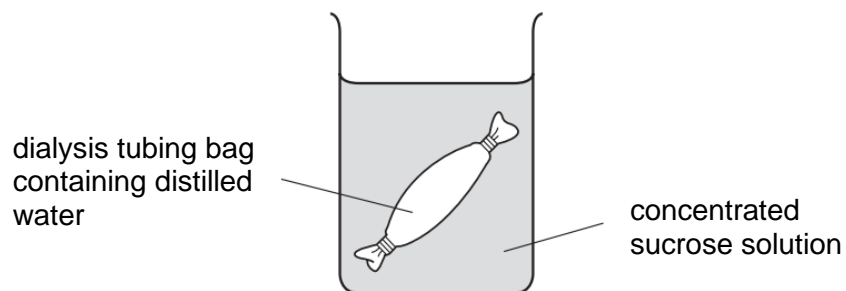
The use of an approved scientific calculator is expected, where appropriate.

- 1 The diagram shows a mesophyll cell.



Which structure(s) are not found in animal cells?

- A** 1 and 3  
**B** 1 and 4  
**C** 2 and 3  
**D** 2 and 5
- 2 The diagram shows some of the apparatus used in an osmosis investigation.



In this investigation a dialysis tubing bag was filled with distilled water, sealed and weighed.

The dialysis tubing bag was then immersed in concentrated sucrose solution for one hour.

After one hour the dialysis tubing bag was removed from the beaker, the surface was dried and the bag was reweighed.

Which row explains what will happen during the investigation?

	mass of the dialysis tubing bag at the end	net movement of sucrose molecules	net movement of water molecules
<b>A</b>	decreases	none	out of the bag
<b>B</b>	decreases	none	into the bag
<b>C</b>	increases	into the bag	into the bag
<b>D</b>	increases	into the bag	out of the bag

3 Which of the statements about the movement of substances involve diffusion?

- 1 movement of carbon dioxide from body cells into the bloodstream
- 2 movement of glucose from the ileum into the bloodstream
- 3 movement of mineral ions into root hair cells in plants

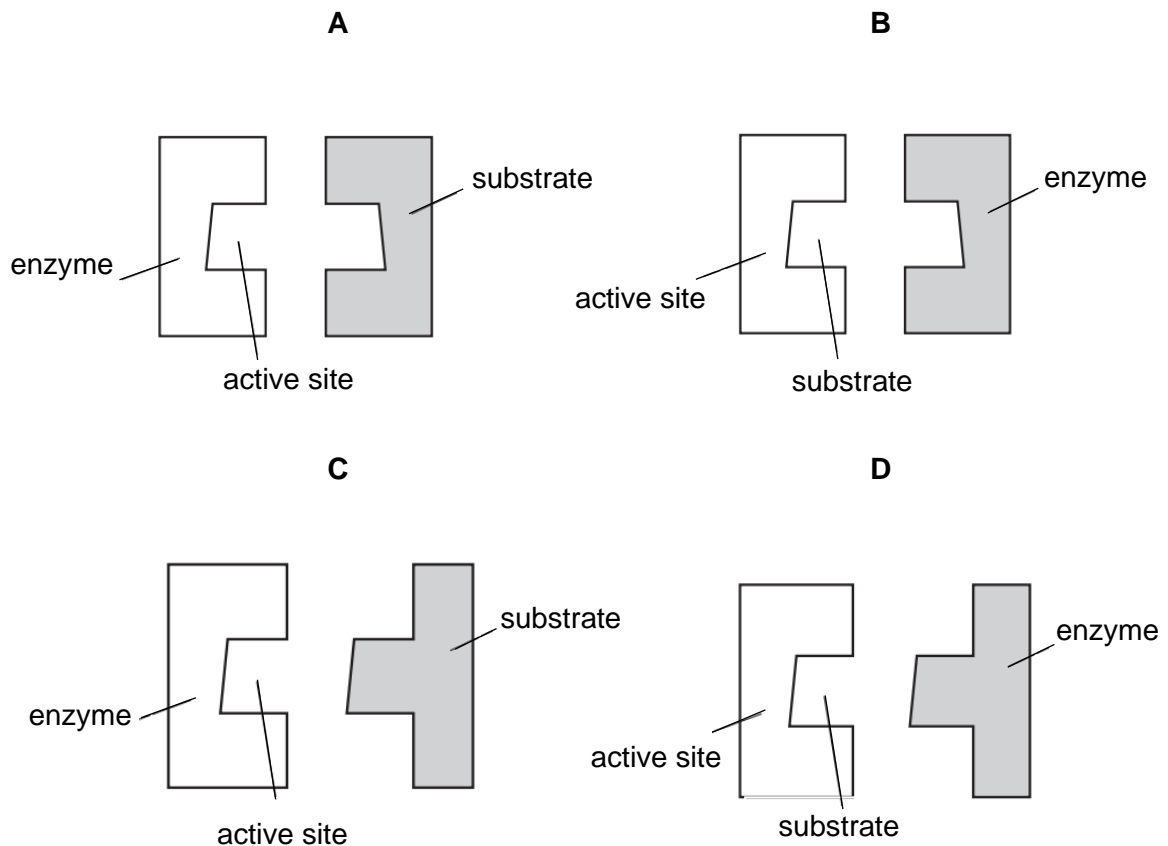
- A** 1 and 2 only  
**B** 1 and 3 only  
**C** 2 and 3 only  
**D** 1, 2 and 3

4 Large molecules are synthesised from smaller basic units.

What is the basic unit of maltose?

- A** amino acid  
**B** glycerol  
**C** glucose  
**D** starch

5 Which diagram of an enzyme, active site and substrate is correct?



6 What is the function of bile?

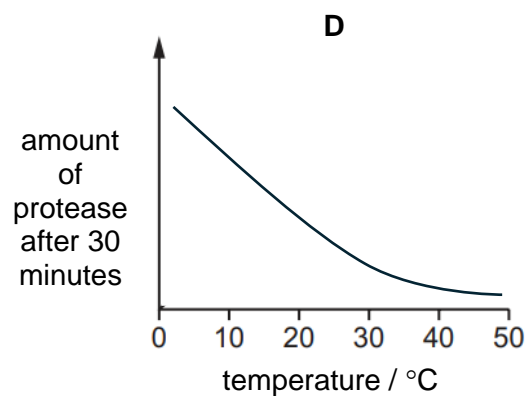
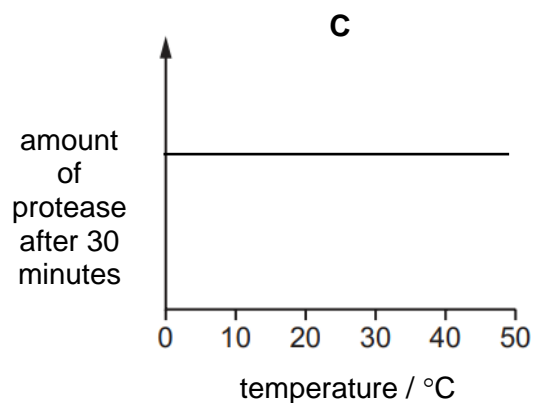
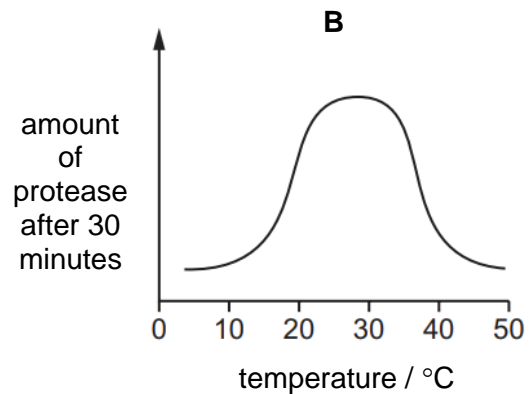
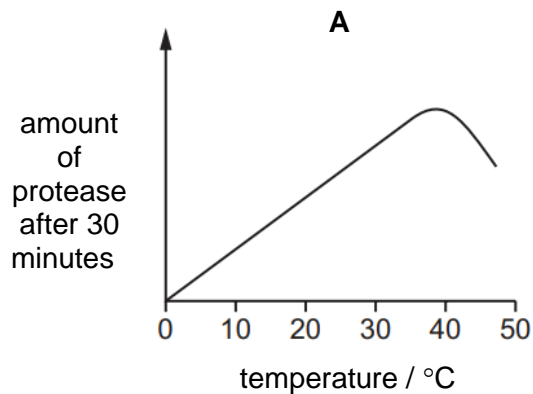
- A to acidify the food entering the duodenum
- B to break up fats into smaller droplets
- C to activate enzymes digesting glycerol
- D to produce fat-digesting enzymes

7 Proteases are enzymes that break down proteins into amino acids.

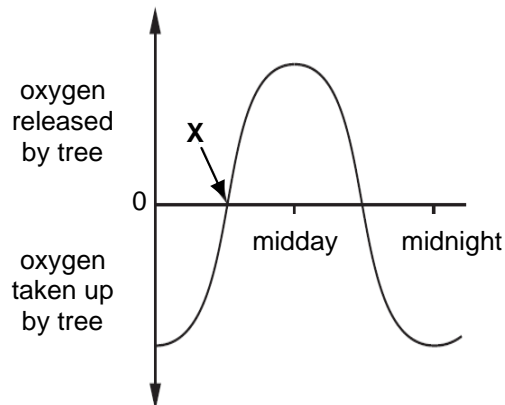
A student sets up an experiment to investigate the effect of different temperatures on the action of protease on egg albumin.

He measured the amount of protease in the solution after 30 minutes at different temperatures.

Which graph would you expect the student to draw from his result?



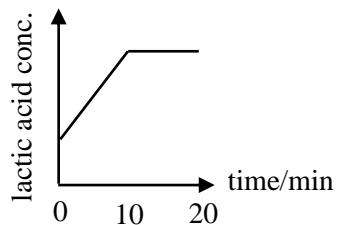
- 8 The graph shows the oxygen released and taken up by a tree during a 24 hour period.



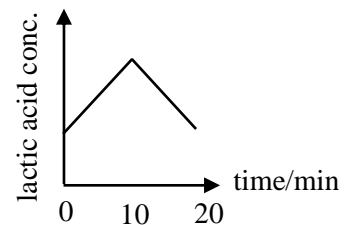
Which statement best describes the situation at point X?

- A Photosynthesis begins.
  - B Respiration stops.
  - C The rate of respiration equals that of the rate of photosynthesis.
  - D The rate of respiration is greater than the rate of photosynthesis.
- 9 Which graph shows the change of lactic acid concentration in a thigh muscle of a boy who jumps vigorously for 10 minutes and then sits down for another 10 minutes?

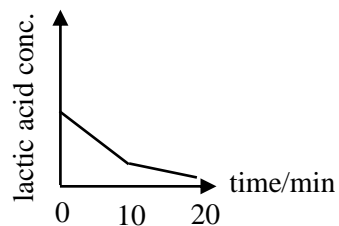
A



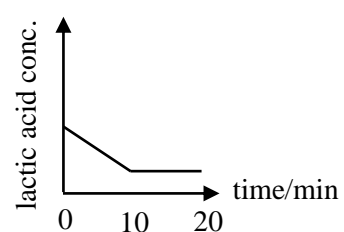
B



C

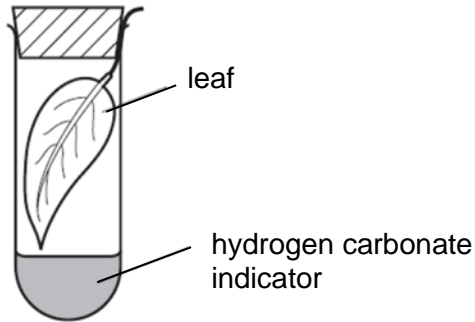


D



- 10 A green leaf is picked at time 0700h and immediately placed in a sealed test tube containing hydrogen carbonate indicator solution.

The test tube is kept near a window for 24 hours. The table below shows how the indicator changes in colour.

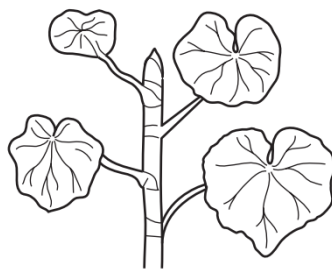


colour	amount of carbon dioxide compared to average atmospheric concentration
purple	less than normal
red	normal
yellow	more than normal

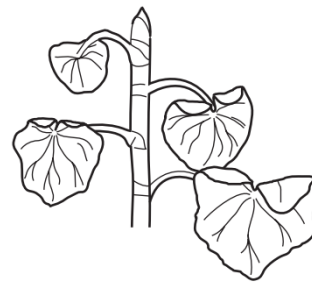
Which colour will the hydrogen carbonate indicator be at 1200h in the afternoon and 2300h at night?

	1200 h	2300 h
<b>A</b>	purple	yellow
<b>B</b>	red	purple
<b>C</b>	yellow	purple
<b>D</b>	yellow	red

- 11 The diagram shows a plant shoot and the same shoot six hours later.



plant shoot



same shoot six hours later

Which change in environmental conditions would **not** cause this change in the shoot?

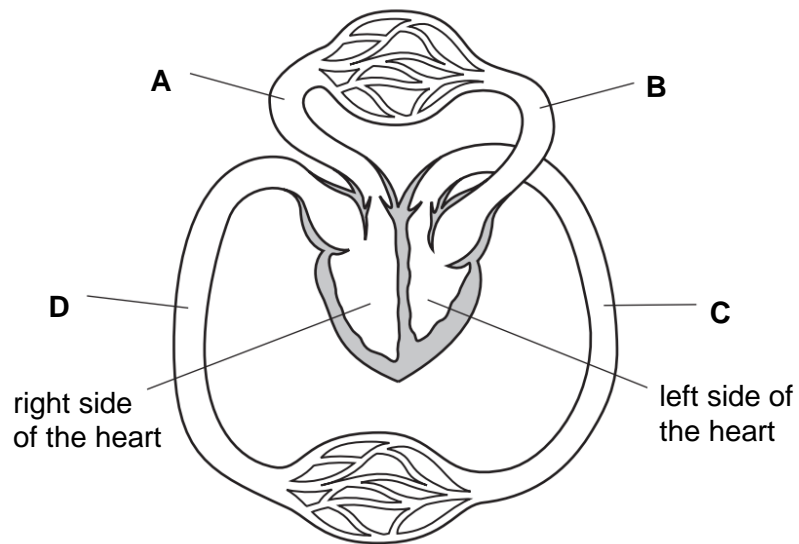
- A** an increase in temperature
- B** an increase in humidity
- C** an increase in wind speed
- D** an increase in light intensity

**12** Which processes take place in the liver?

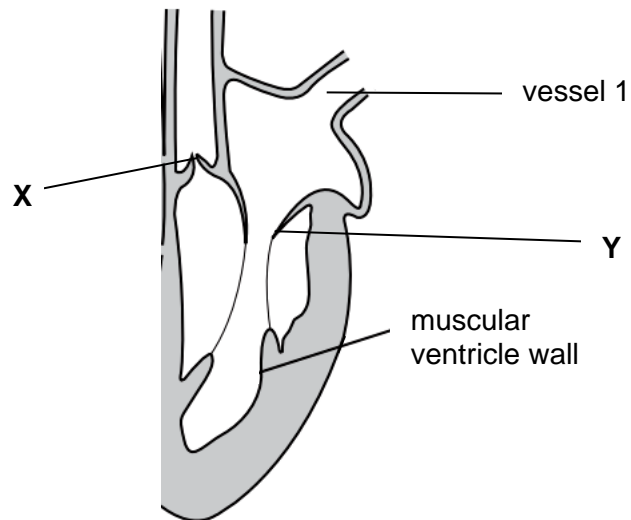
- 1 conversion of glucose to glycogen
- 2 conversion of glycogen to glucose
- 3 production of amino acids from urea
- 4 conversion of harmful substances to harmless ones

- A** 1 and 3
- B** 2 and 4
- C** 1, 2 and 3
- D** 1, 2 and 4

**13** The diagram represents part of the human circulatory system.  
Where is the blood pressure highest?



- 14** The diagram shows the left-hand side of the human heart when the ventricle is relaxed.



What happens when the ventricle contracts?

	valve at <b>X</b>	valve at <b>Y</b>	type of blood in vessel 1
<b>A</b>	closed	open	oxygenated
<b>B</b>	closed	open	deoxygenated
<b>C</b>	open	closed	oxygenated
<b>D</b>	open	closed	deoxygenated

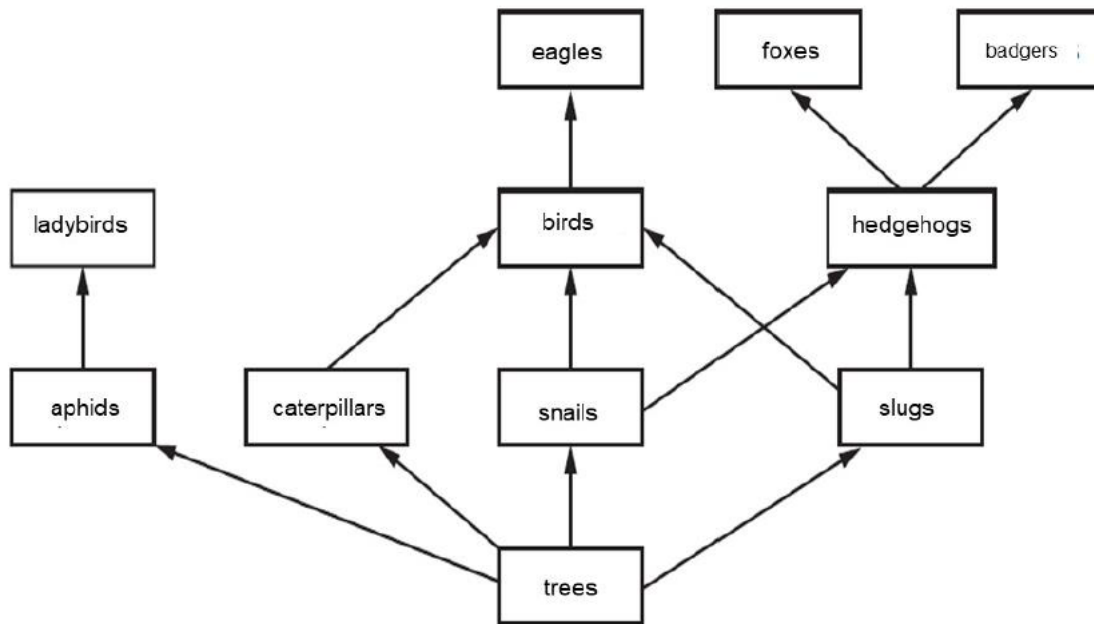
- 15** Human Immunodeficiency Virus (HIV) and influenza are examples of infectious diseases. What are the similarities between them?

- 1 Both can be treated by antibiotics.
- 2 Both can be spread through respiratory droplets.
- 3 Both can spread from one person to another.
- 4 Both can be spread through contaminated food.

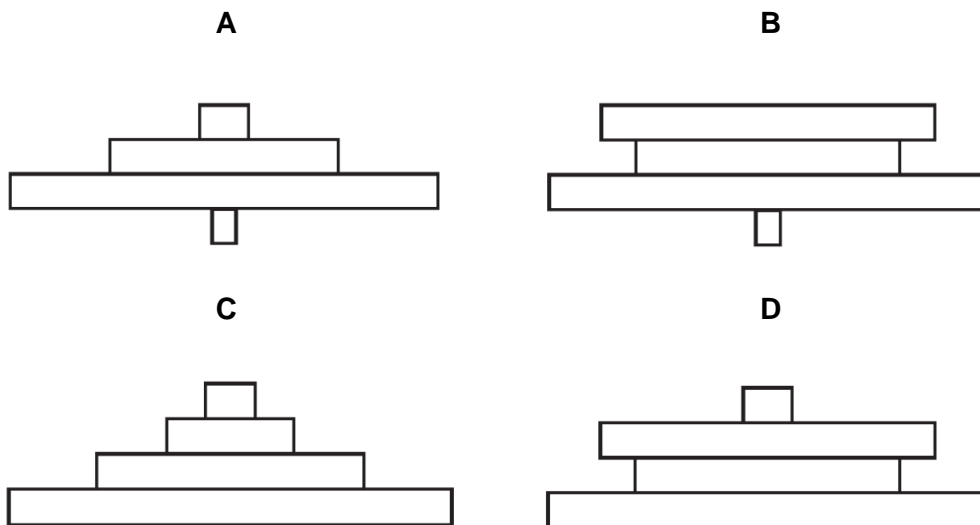
- A** 3 only  
**B** 1 and 2  
**C** 2 and 3  
**D** 1, 3 and 4



16 The diagram shows part of a food web.



Which pyramid of numbers is based on this food web?




17 Which statement **incorrectly** describes the function or structure of a gene?


- A A change in gene sequence is known as a mutation.
- B A gene codes for the production of more than one type of nucleotide.
- C A gene consists of a sequence of nucleotides.
- D A gene is a unit of inheritance.

- 18** A woman's menstrual period started on the 5th of December.

December						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

key:

 : menstruation

 : ovulation

On which date will the progesterone levels most likely be the highest?

- A** 4 December  
**B** 17 December  
**C** 25 December  
**D** 31 December
- 19** Two persons have mutations in their cells. One has albinism and the other has Down's syndrome.

What is the type of mutation and how many chromosomes do they have in their body cells?

	albinism		Down's syndrome	
	type of mutation	number of body chromosomes	type of mutation	number of body chromosomes
<b>A</b>	gene	47	chromosome	23
<b>B</b>	gene	46	chromosome	47
<b>C</b>	chromosome	23	gene	46
<b>D</b>	chromosome	24	gene	47

- 20** In a species of mice, grey fur colour is dominant and brown fur colour is recessive.

Two parents with grey fur produce offspring which all have grey fur. Later that year, the same parents produced more offspring. One of these offspring has brown fur.

Which statement about fur colour is correct?

- A** Both parents are homozygous.
- B** Only one of the parents is homozygous.
- C** Both parents are heterozygous.
- D** Only one of the parents is heterozygous.

**END OF PAPER**