

Biology B

Advanced

PAPER 1: Advanced Biochemistry, Microbiology
and Genetics

Thursday 5 June 2025 – Afternoon

Time: 1 hour 45 minutes

Diagram Booklet

THIS DOCUMENT MUST BE RETURNED TO
PEARSON AT THE END OF THE EXAMINATION

In the boxes below, write your name, centre number and
candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

INSTRUCTIONS

There may be spare copies of some diagrams.

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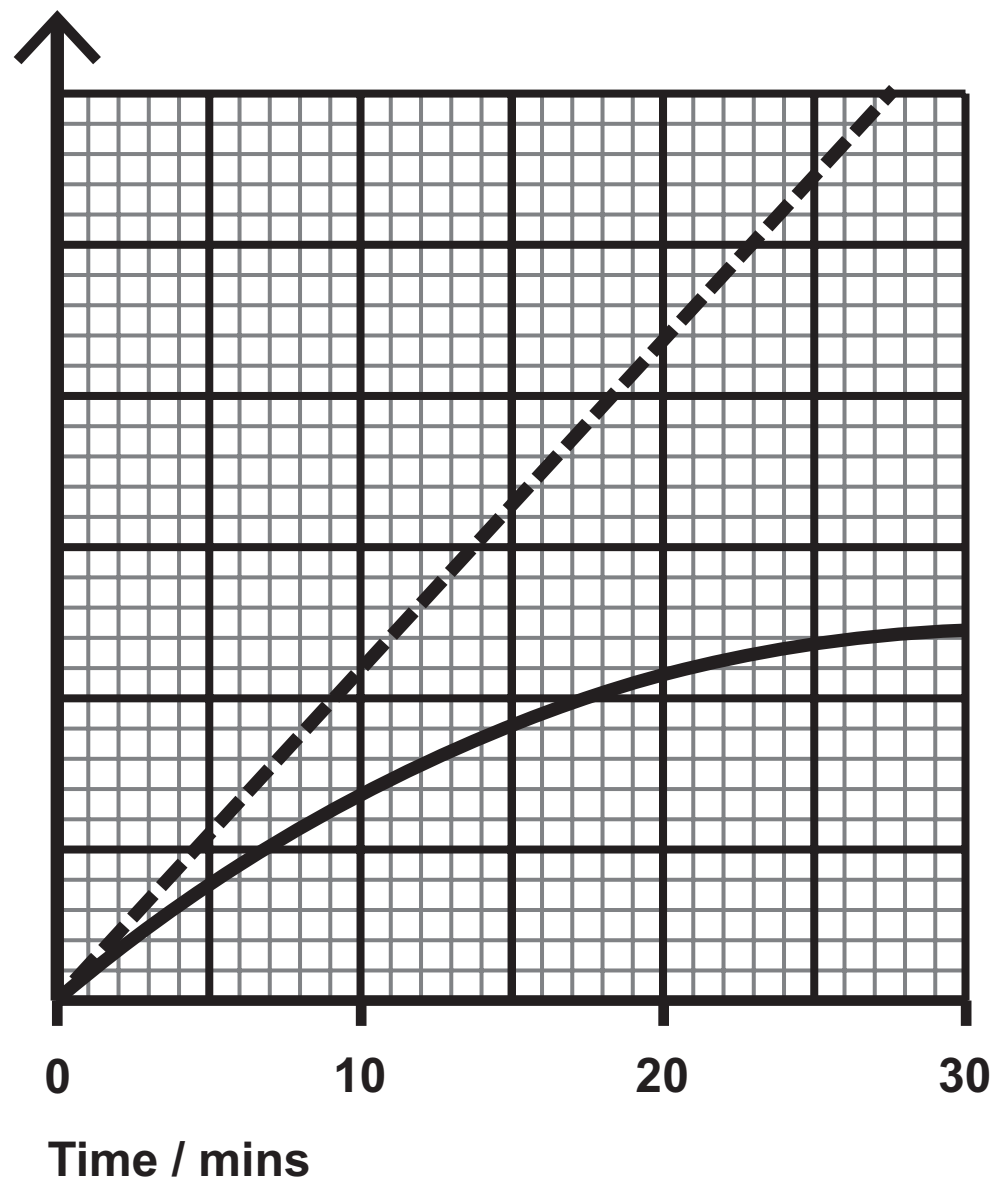
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Question 1(c)

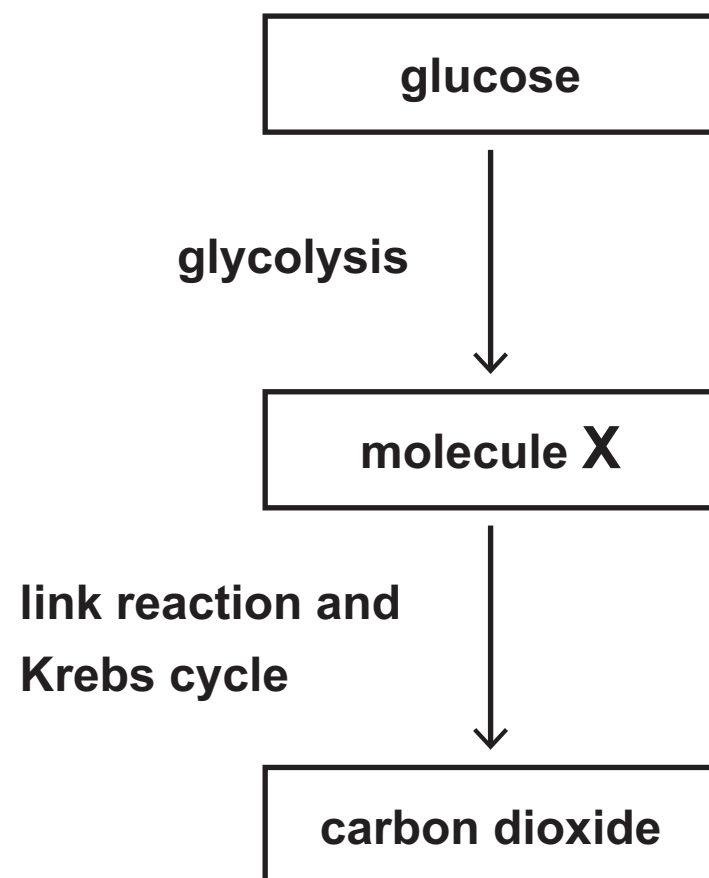
Key:

----- molecule A

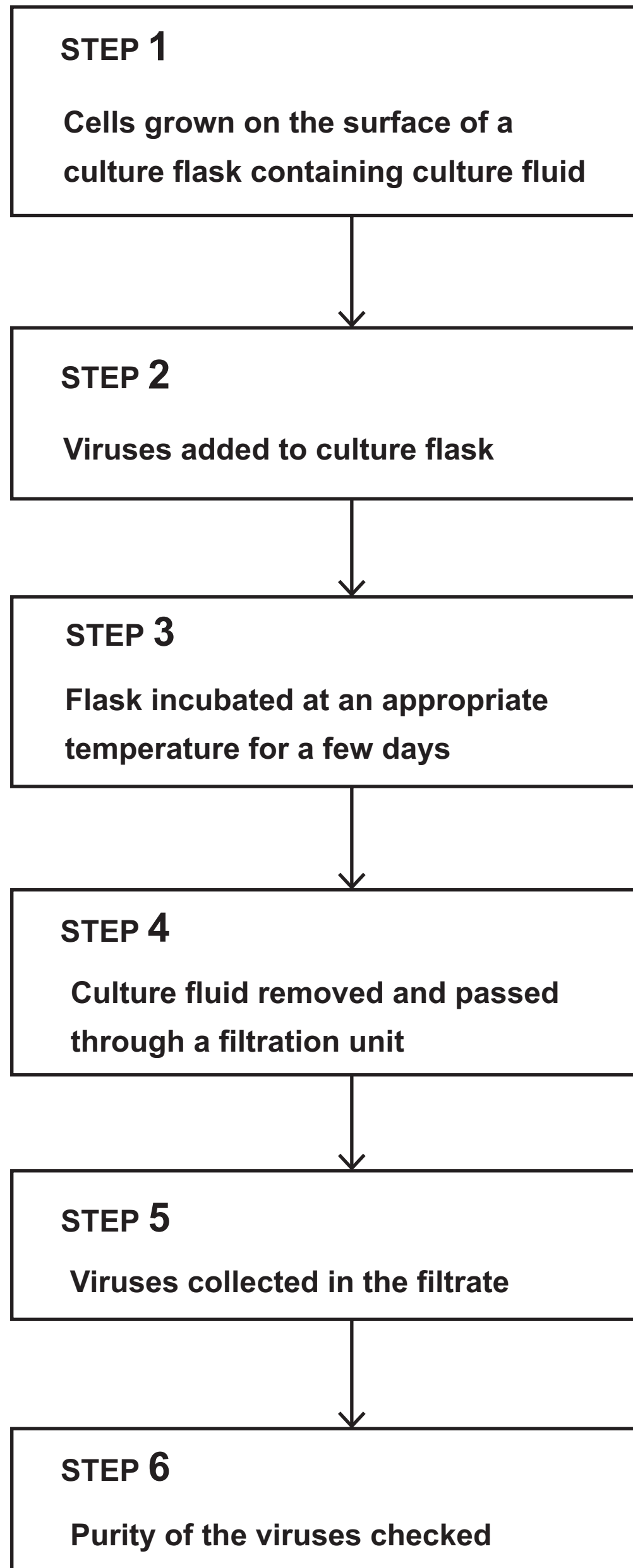
———— molecule B

Concentration of molecules
in the cytoplasm

Question 2

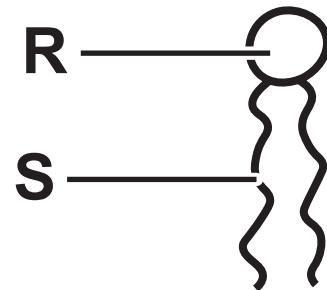


Question 3

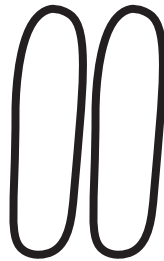


Question 4(a)

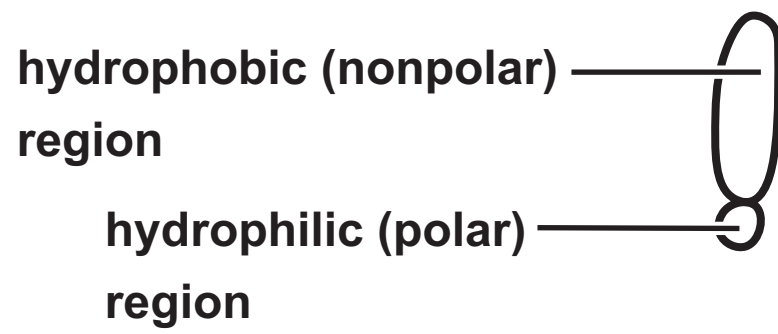
phospholipid



channel protein



cholesterol



Question 4(b)

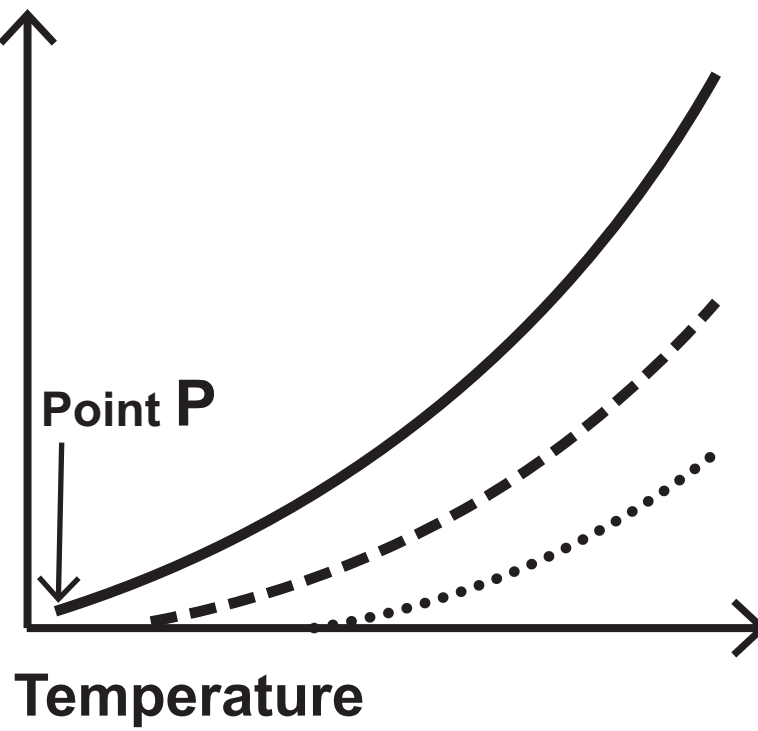
Key:

———— no cholesterol

- - - - 20% of lipid content is cholesterol

..... 50% of lipid content is cholesterol

Permeability
of membrane



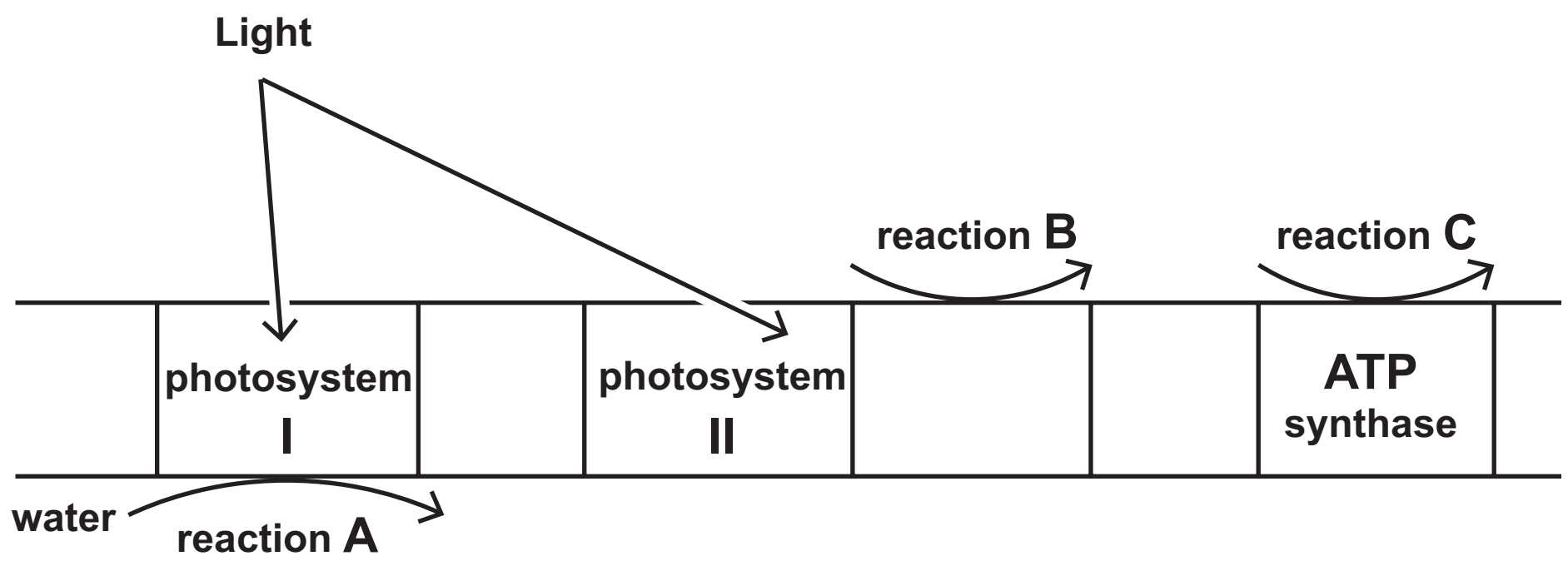
Question 5(c)(ii)

Physical features	Mean value $\pm$ SD for each group of girls	
	With TS	Without TS
Age / years	11.9 $\pm$ 4.1	12.5 $\pm$ 4.0
Mass / kg	36.7 $\pm$ 14.8	45.2 $\pm$ 19.3
Height / cm	134.8 $\pm$ 20.0	146.3 $\pm$ 21.3
Standardised height score	-2.16 $\pm$ 0.95	-0.41 $\pm$ 0.50
Body mass index (BMI)	19.2 $\pm$ 3.3	19.7 $\pm$ 4.6

Question 5(c)(iii)

Immunological marker	Mean value $\pm$ SD for each group of girls	
	With TS	Without TS
IgA antibody / g dm ⁻³	1.08 $\pm$ 0.39	1.15 $\pm$ 0.42
IgG antibody / g dm ⁻³	9.14 $\pm$ 2.10	11.15 $\pm$ 3.29
CD4 lymphocytes / cells per μ l	656.3 $\pm$ 227.3	817.3 $\pm$ 350.1
CD8 lymphocytes / cells per μ l	597.6 $\pm$ 272.6	494.8 $\pm$ 188.3

Question 6(a)



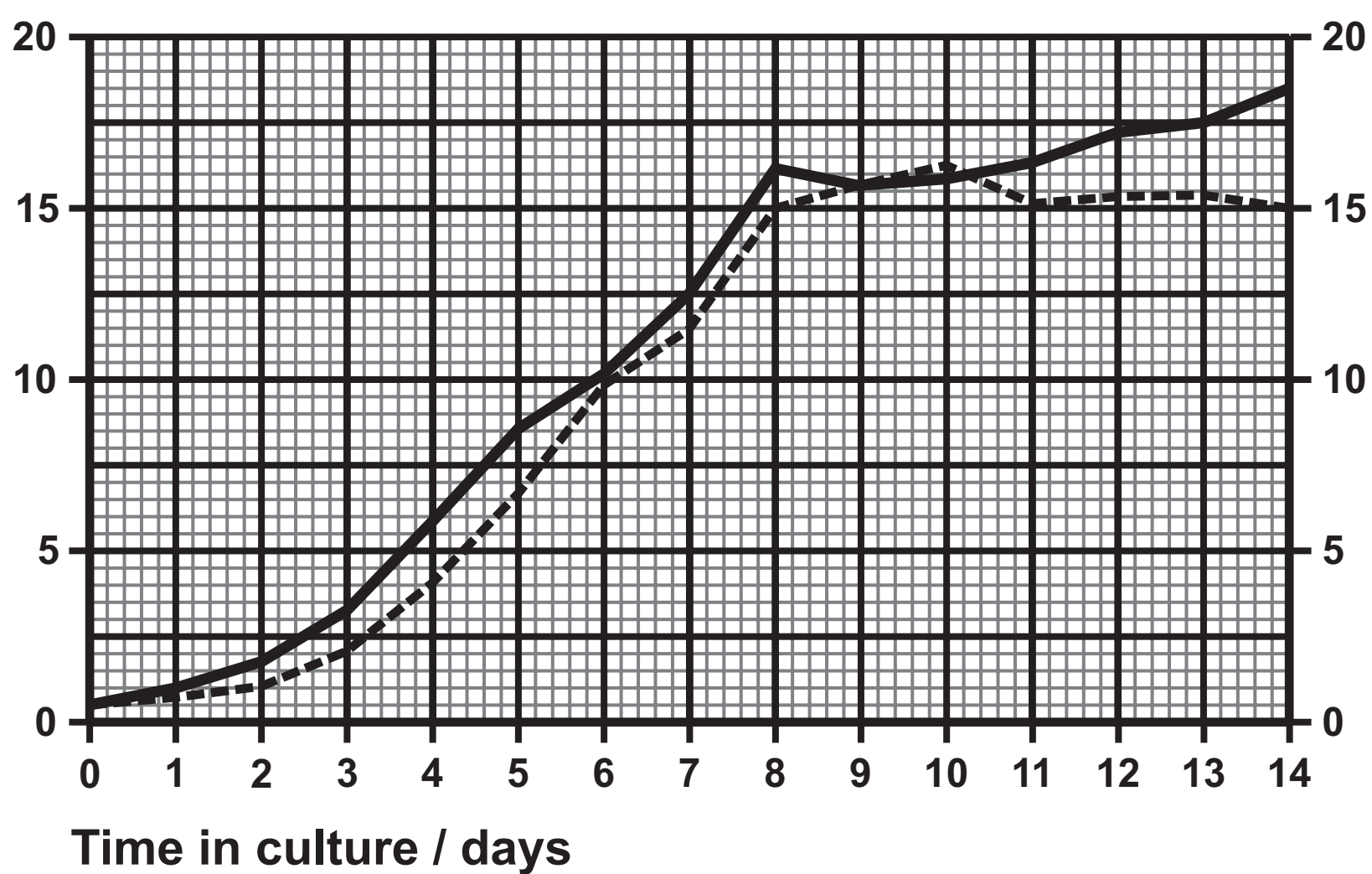
Question 6(b)

Key:

— Alternating twelve-hour
periods of light and dark

---- Natural light

Concentration of *Chlorella*
/ $\times 10^6$ cells cm^{-3}



Question 6(b)(ii)

Time in culture / days	Observation	
	Chlorella grown in alternating periods of light and dark	Chlorella grown in natural light
17	Dark green cells The number of cells had not increased since the previous day	Light green cells The number of cells had increased since the previous day
18	Cells had entered the death phase	Cells had not entered the death phase

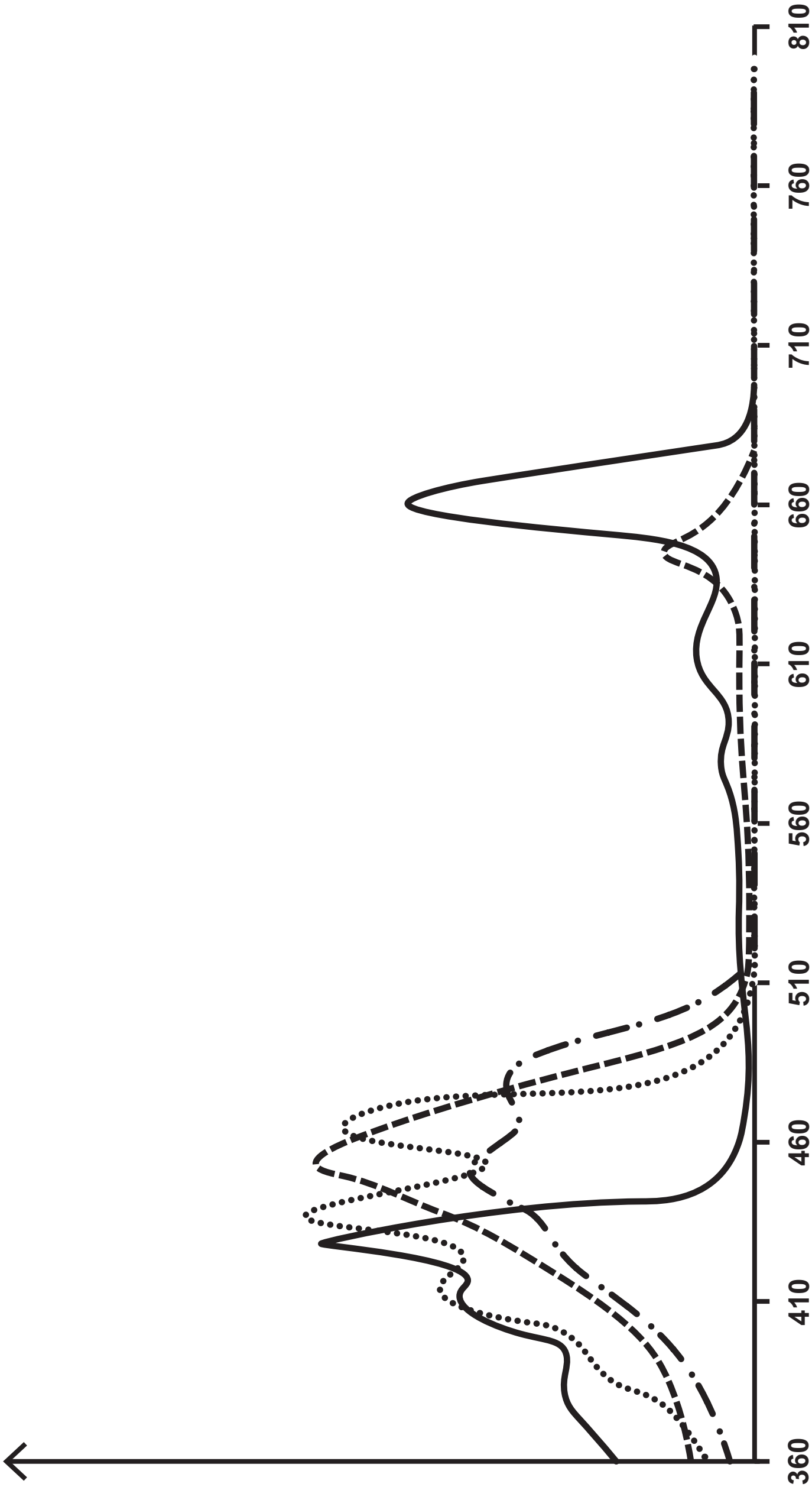
Key:

- · — · —

β-carotene
- — — — —

Chlorophyll b
- Chlorophyll a
- Violaxanthin

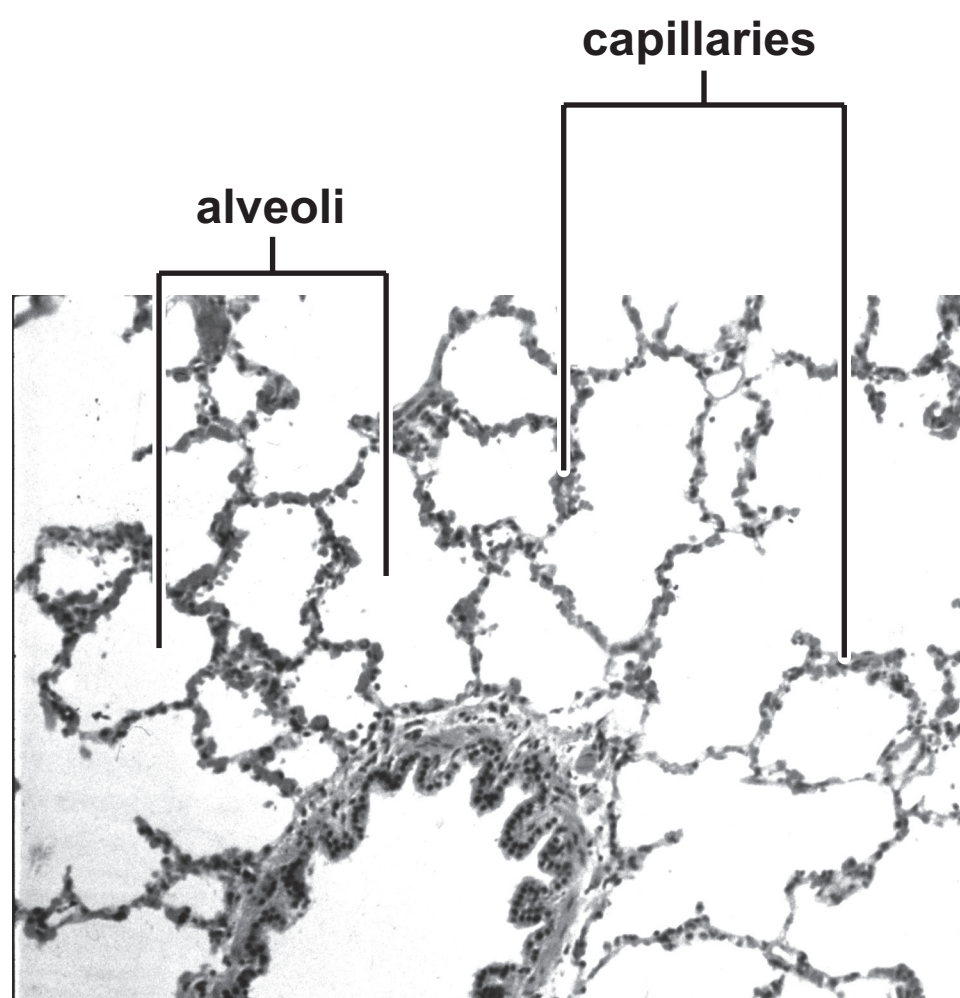
Absorbance



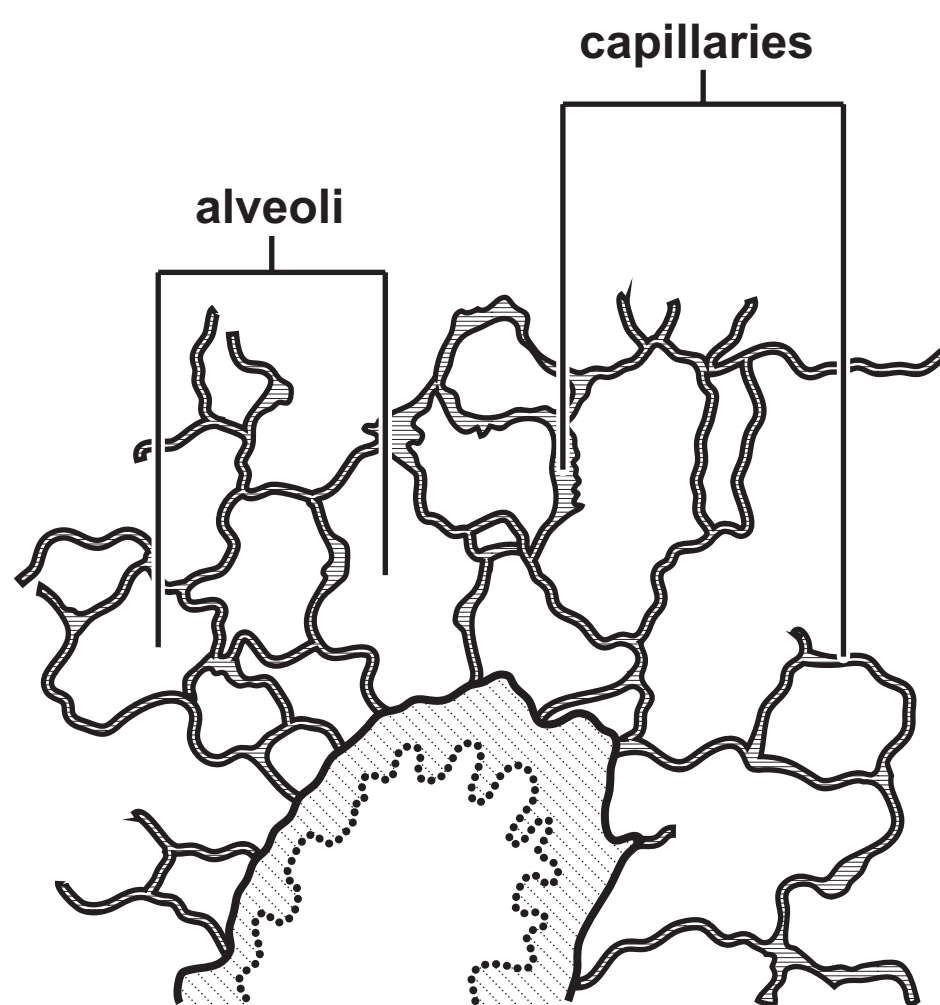
Wavelength of light / nm

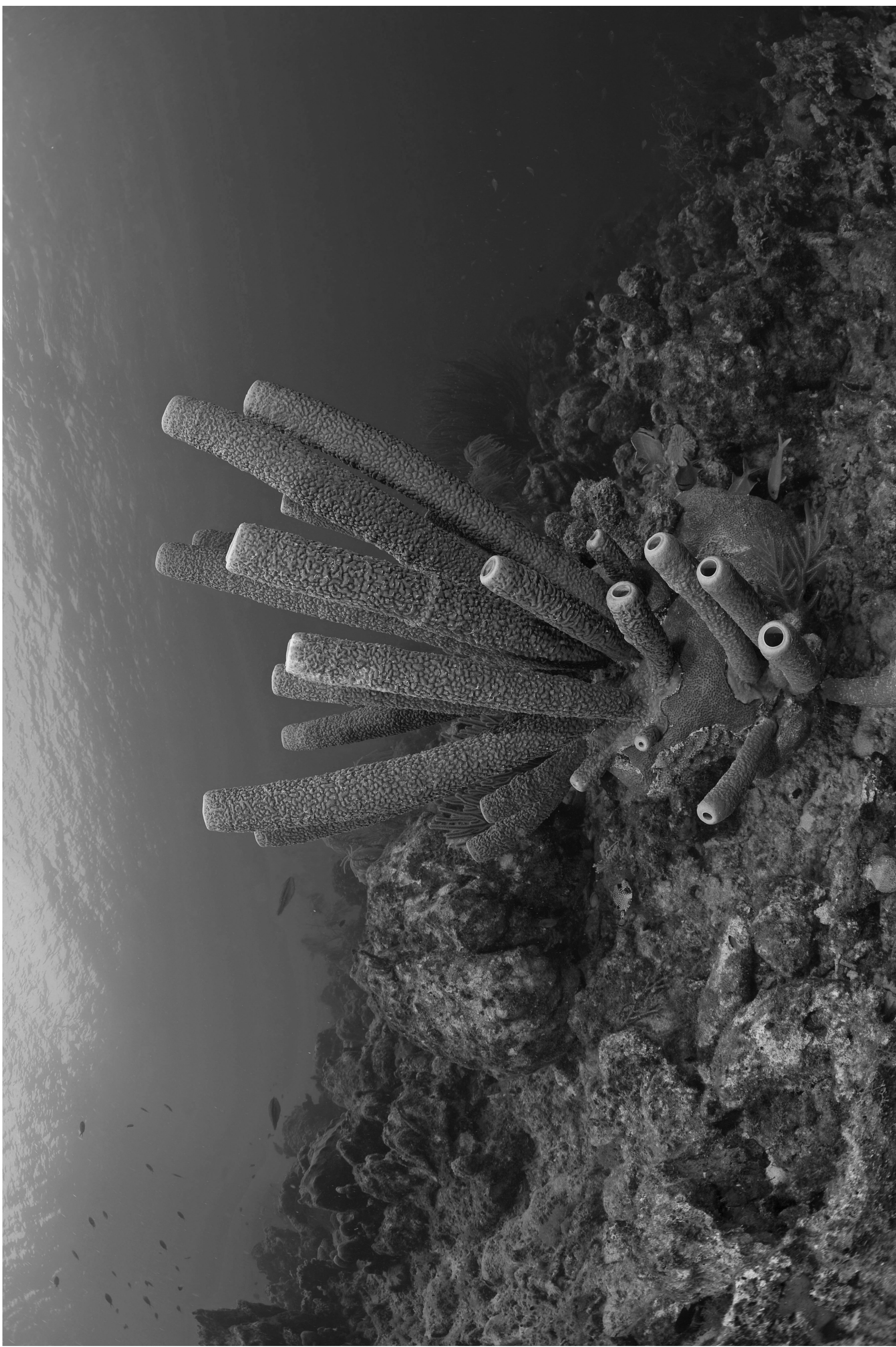
Question 7(a)

Original photograph

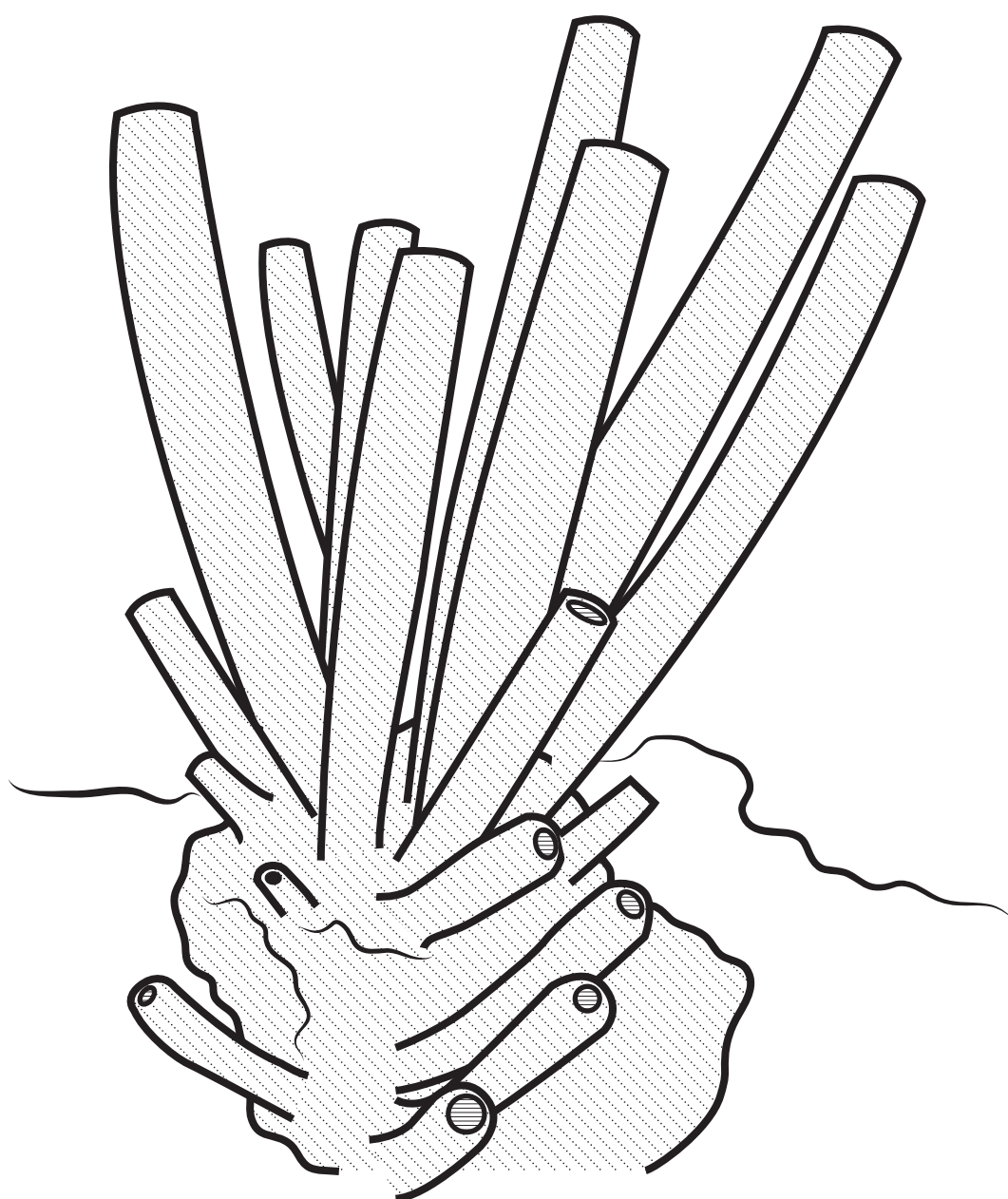


Outline version

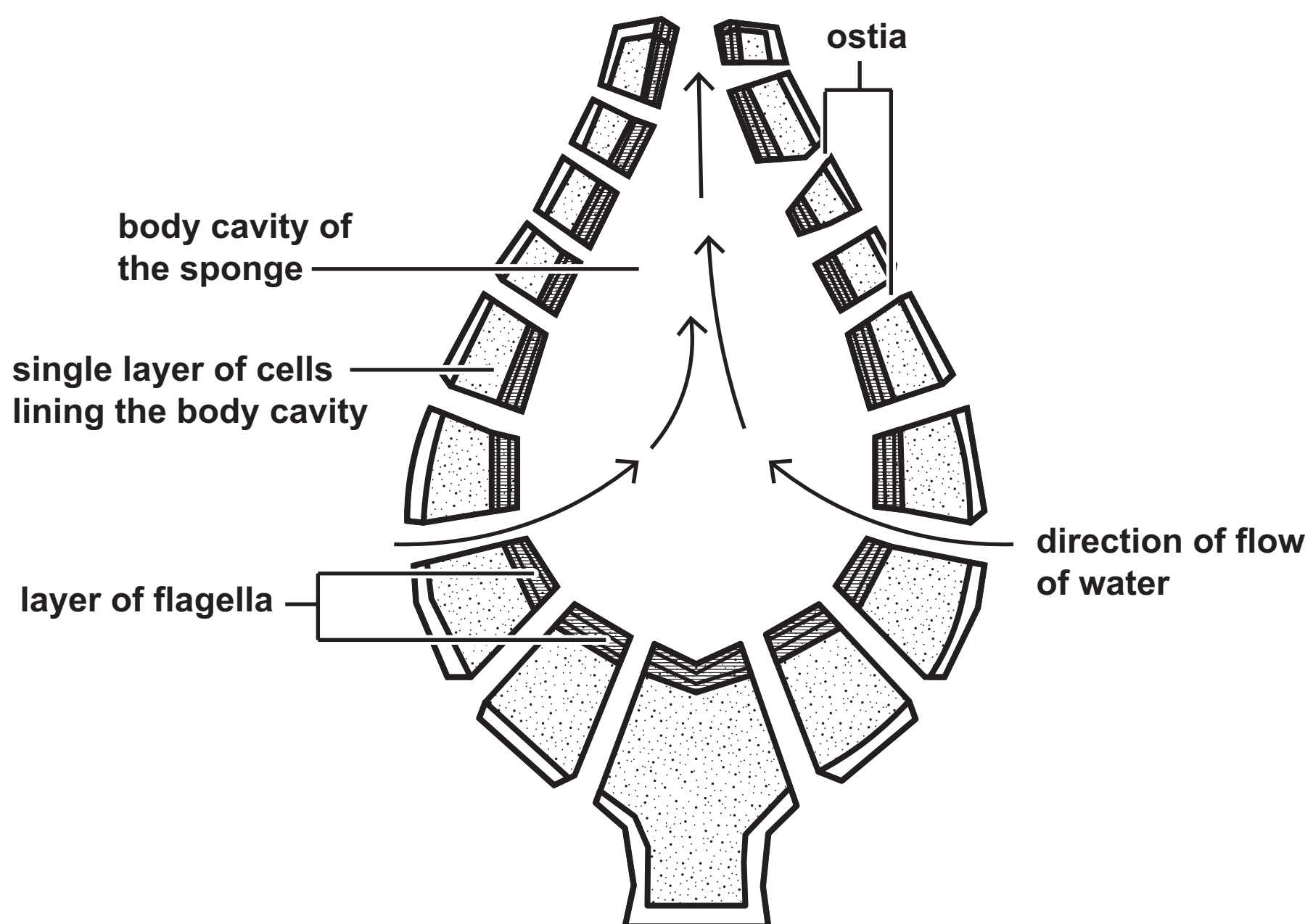




Question 7(b) – Outline version continued.



Question 7(b) – Diagram



Question 7(c)

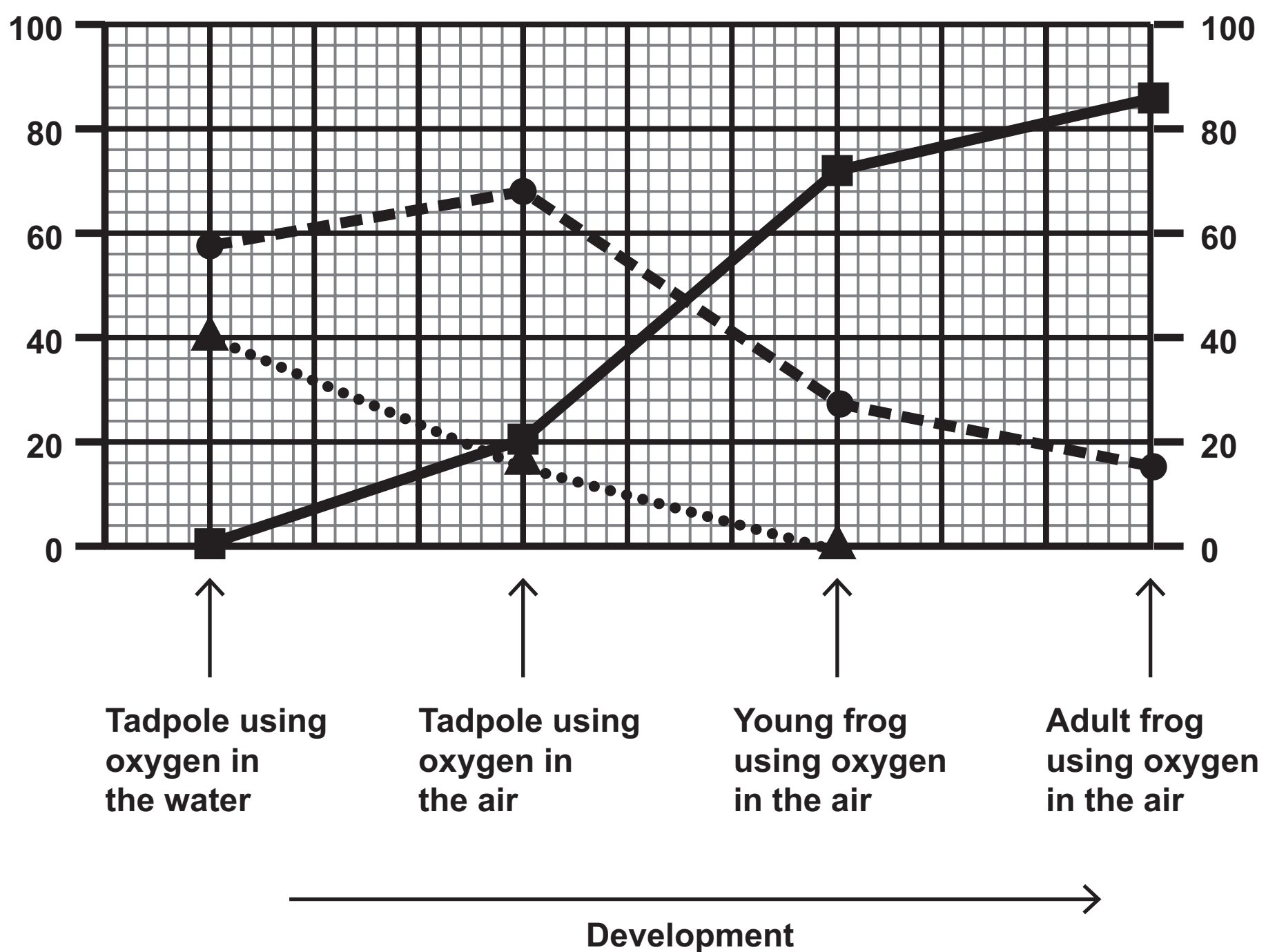
Graph 1

Key:

—■— Lungs

- - ● - - Skin

.....▲..... Gills

Percentage of
oxygen uptake (%)

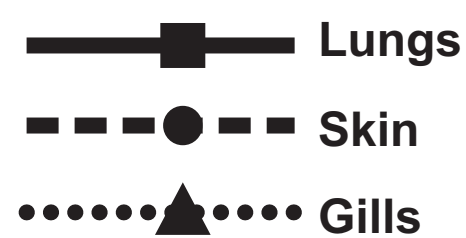
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Turn over

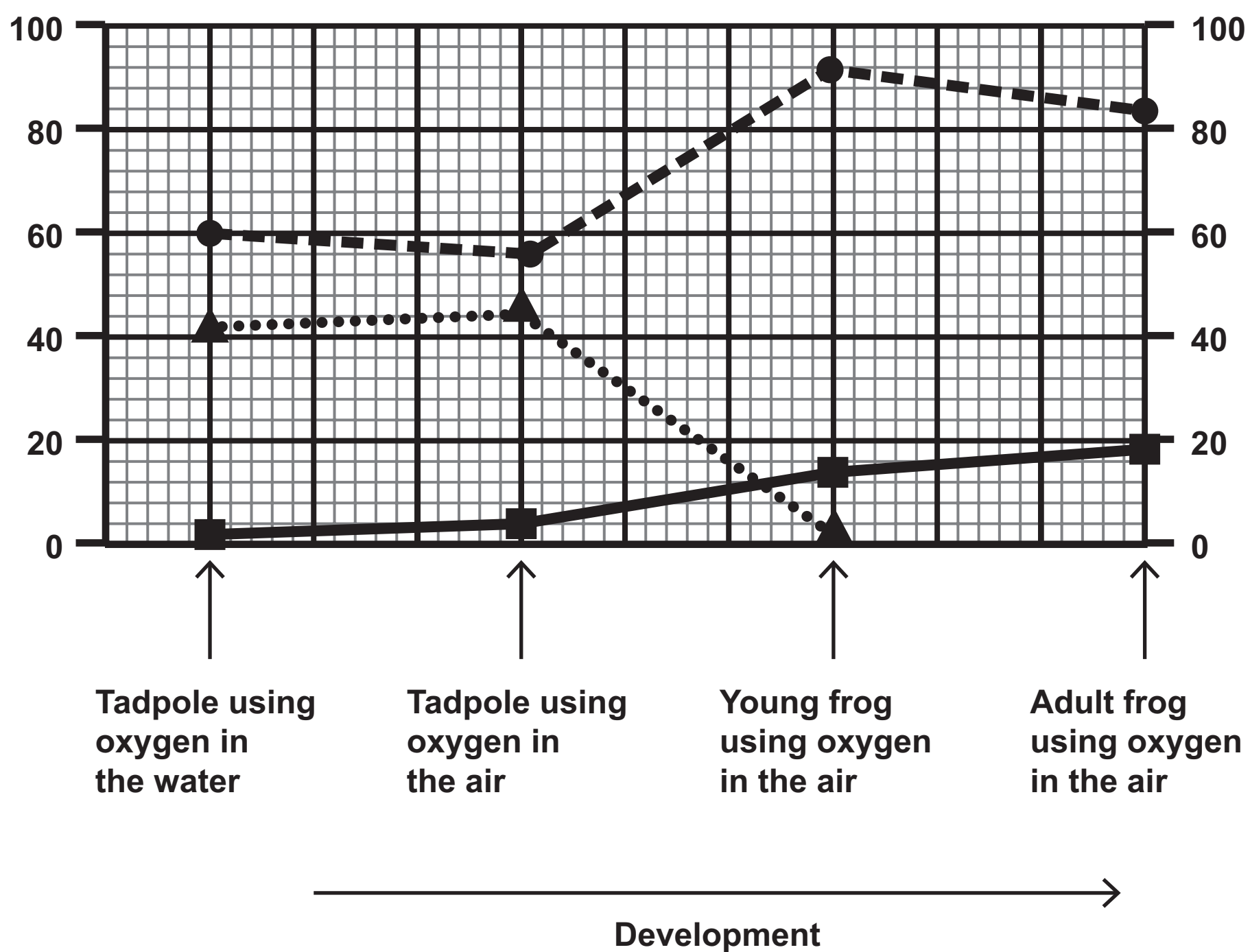
Question 7(c) continued.

Graph 2

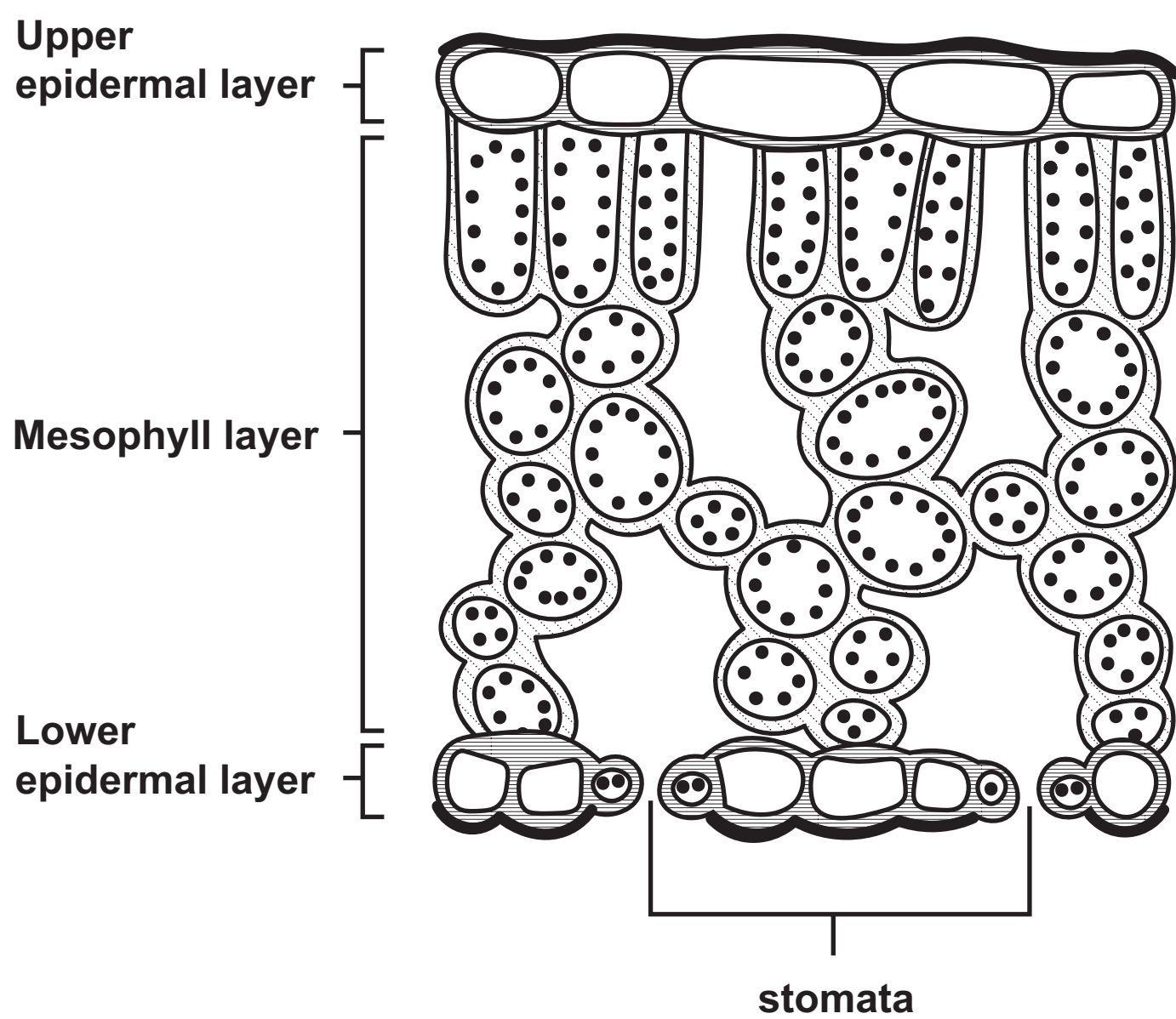
Key:



Percentage of carbon dioxide released (%)



Question 8(b)



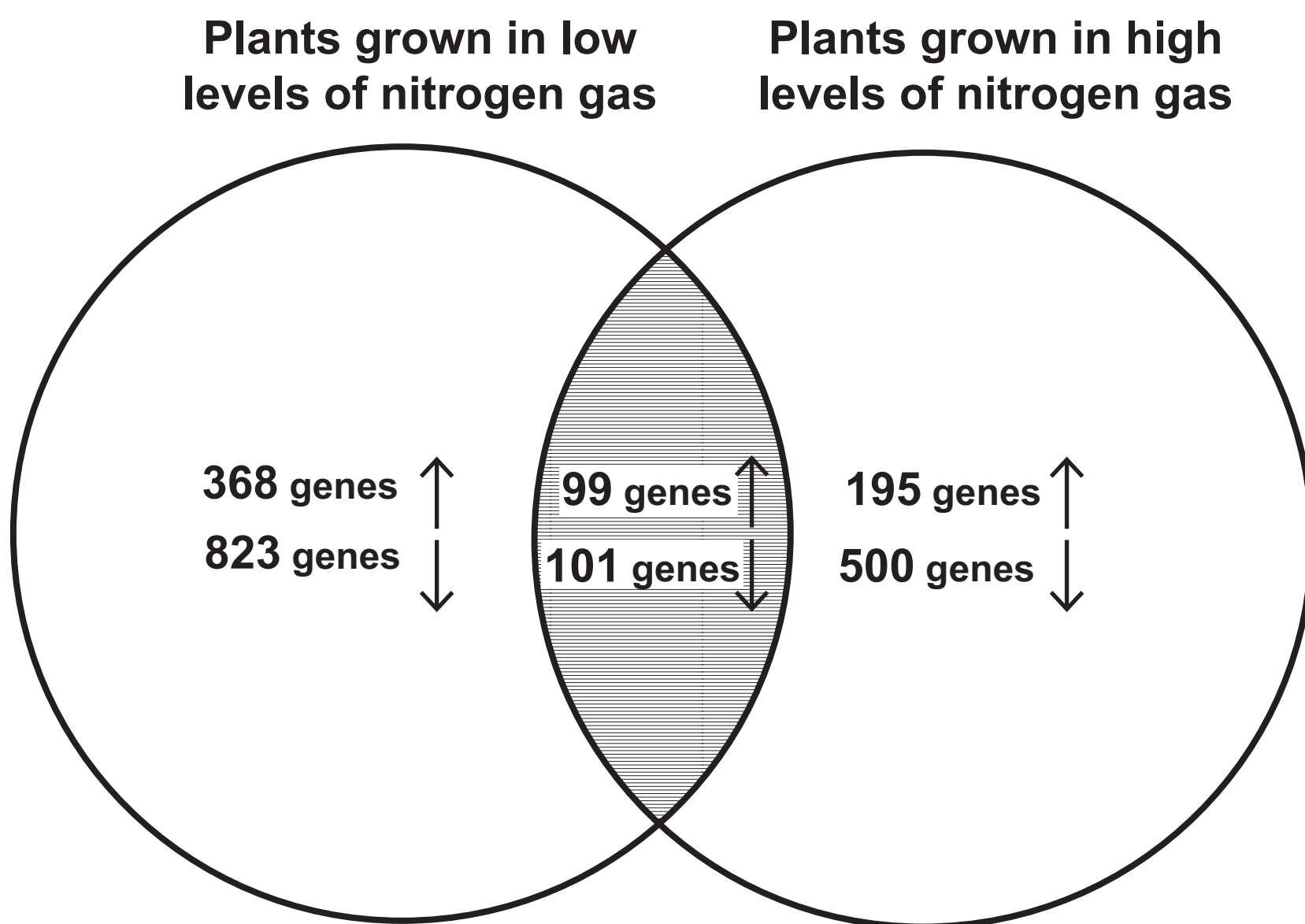
Question 8(b)(ii)

Characteristic	Effect compared with plants grown in moderate levels of nitrogen gas	
	Plants grown in low levels of nitrogen gas	Plants grown in high levels of nitrogen gas
Thickness of layers	smaller	larger
Size of chloroplasts	smaller	larger
Surface area of chloroplasts exposed to intercellular air space	lower	higher
RUBISCO activity	lower	lower

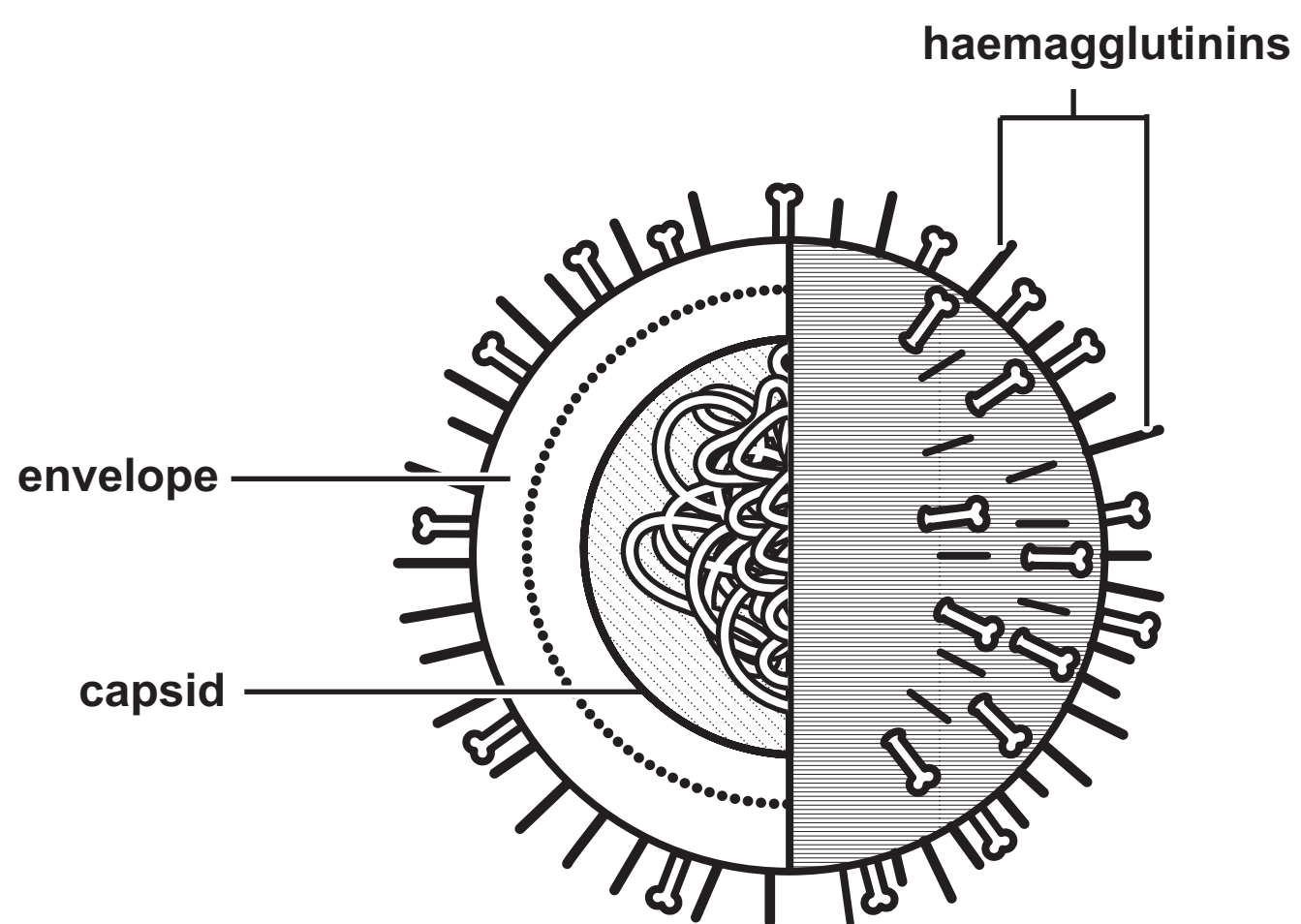
Question 8(c)

Key:

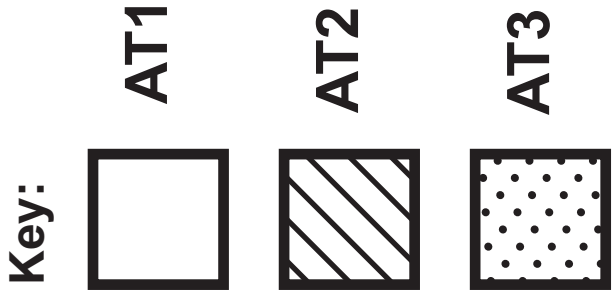
↑ increased expression
↓ decreased expression



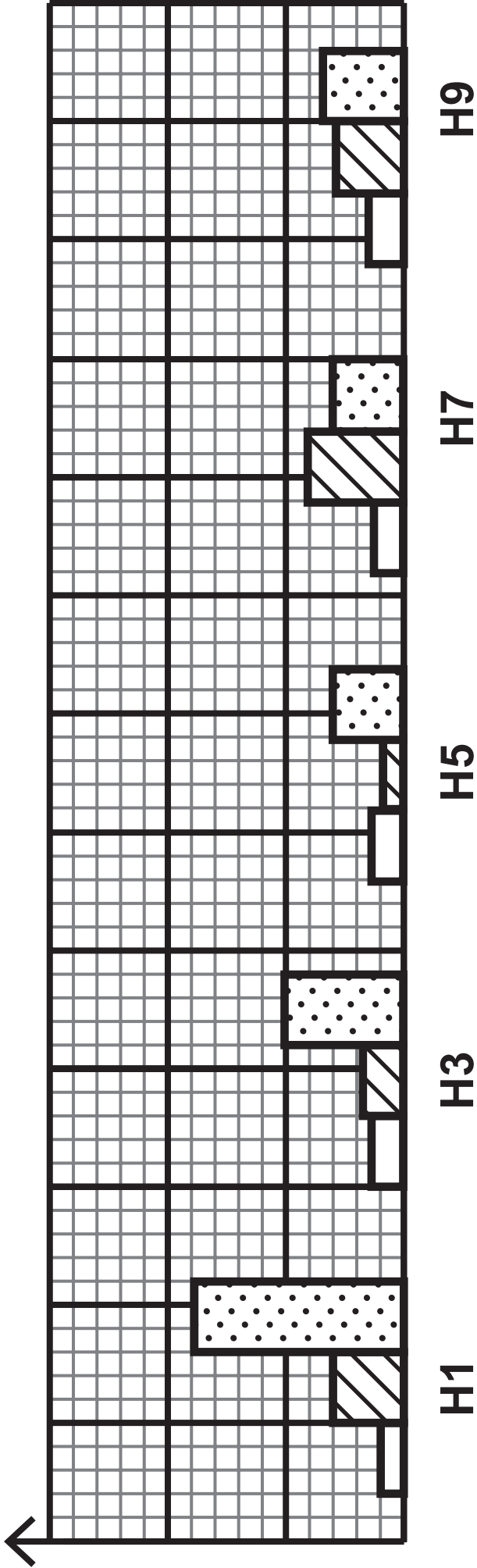
Question 9(c) – Diagram



Graph 1

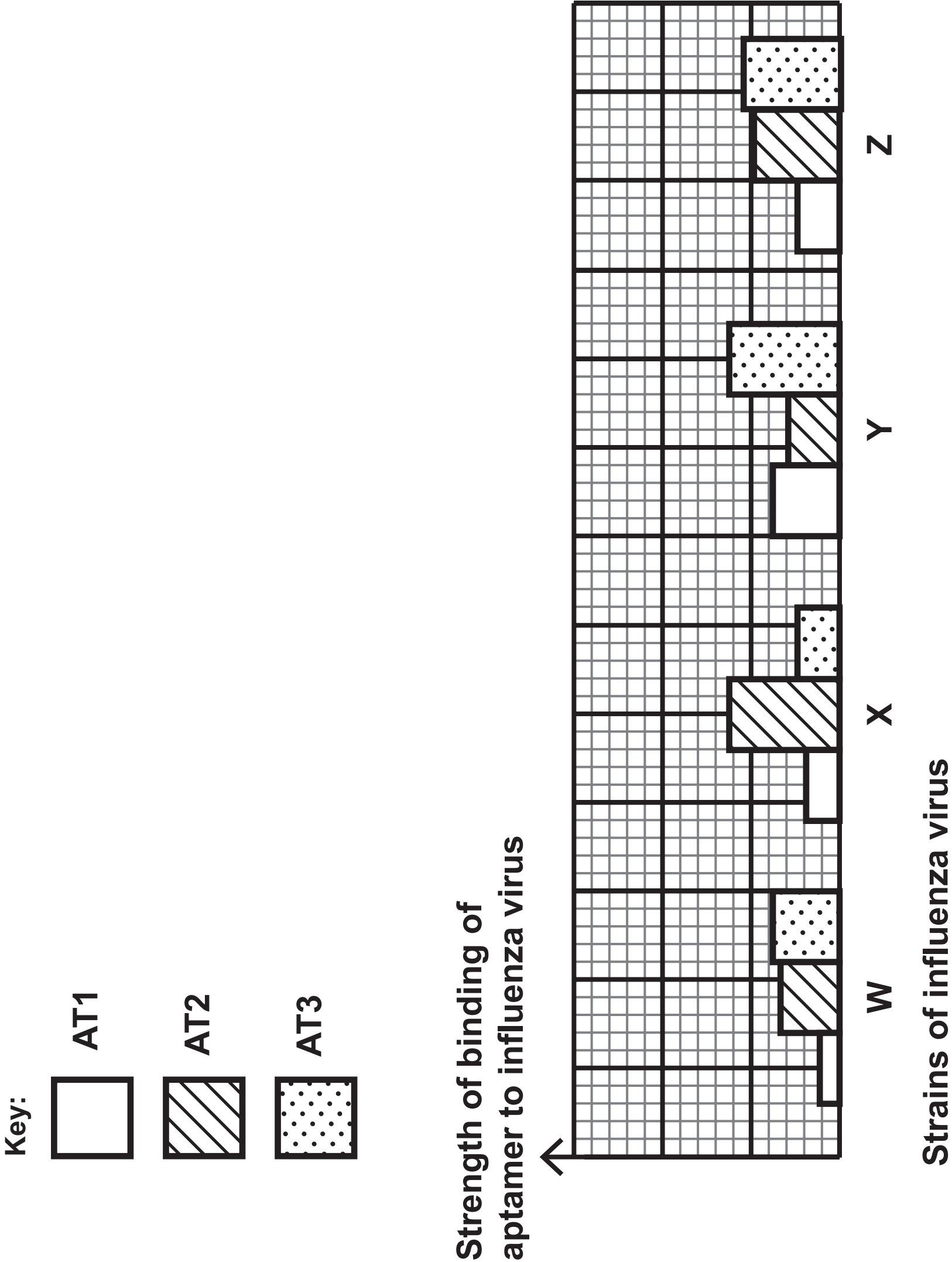


Strength of binding of
aptamer to haemagglutinin



Types of haemagglutinin

Graph 2



Sources:

Question 7(a)

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Question 7(b)

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