

Paper Reference(s) 9BI0/02
Pearson Edexcel Level 3 GCE

Biology B
Advanced
PAPER 2: Advanced Physiology, Evolution
and Ecology

Friday 16 June 2023 – Morning

Diagram Booklet

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 in case you need them.

**THIS DIAGRAM BOOKLET MUST BE
RETURNED WITH THE QUESTION PAPER
AT THE END OF THE EXAMINATION.**

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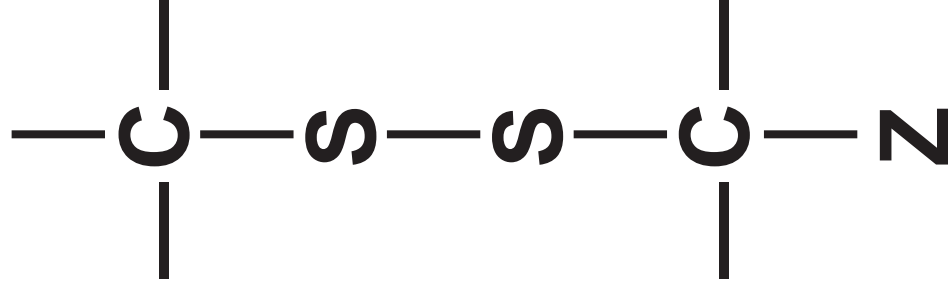
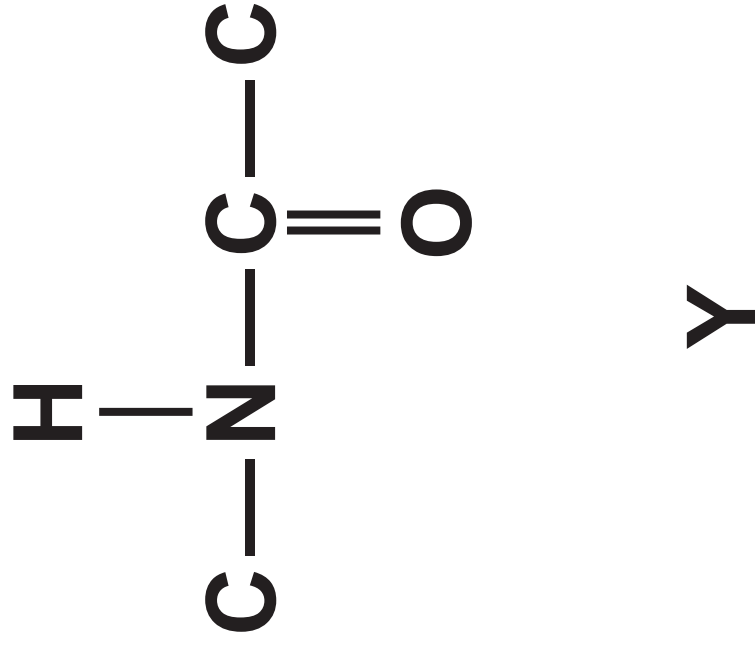
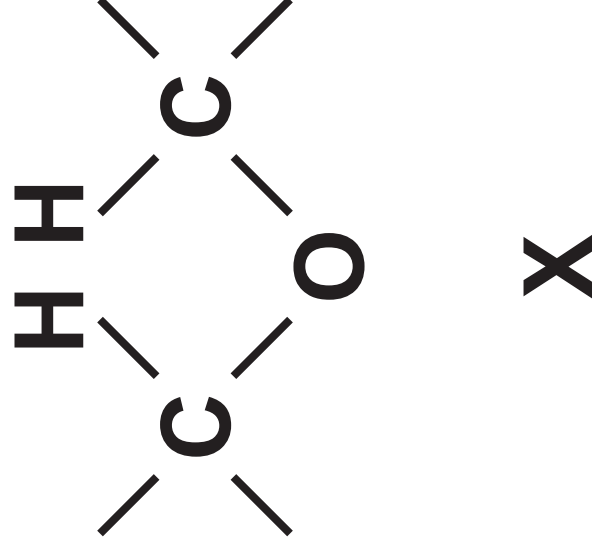
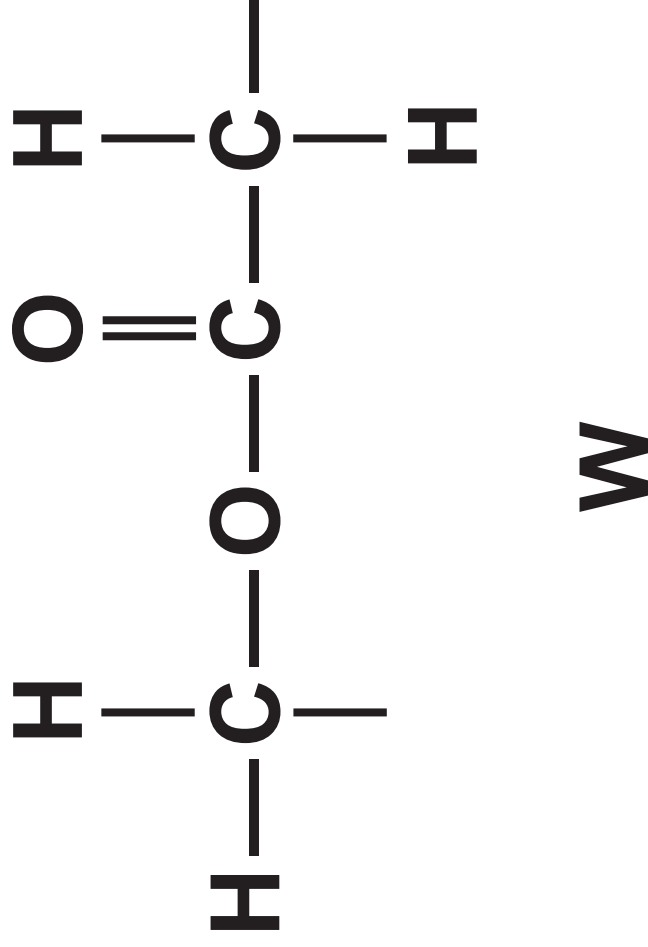
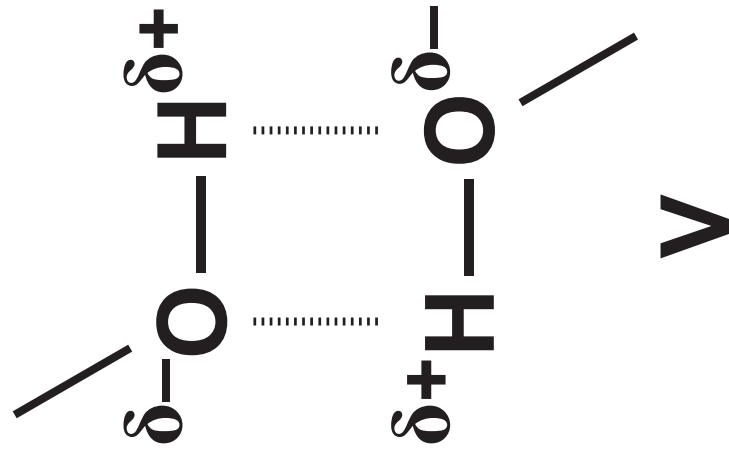
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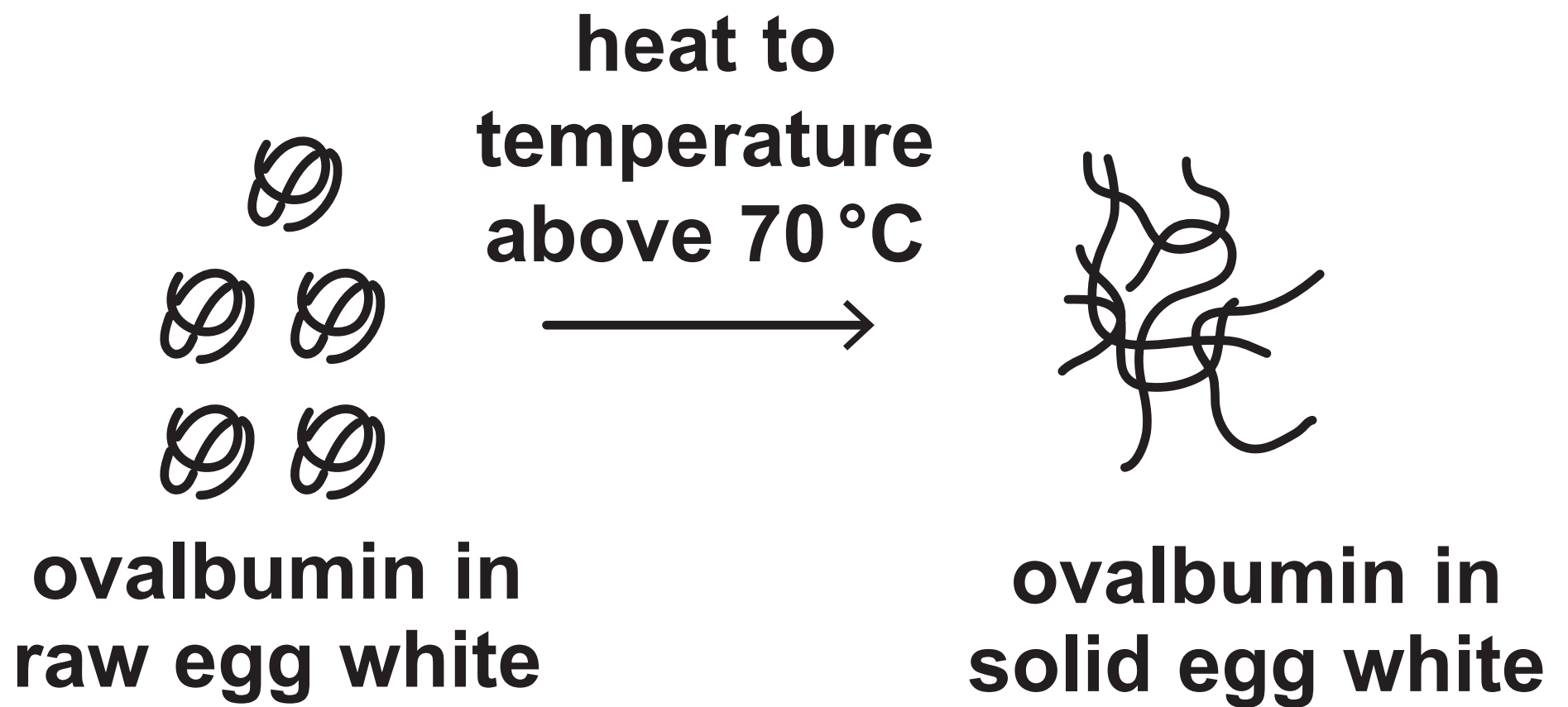
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Question 1(a)



Question 1(b)

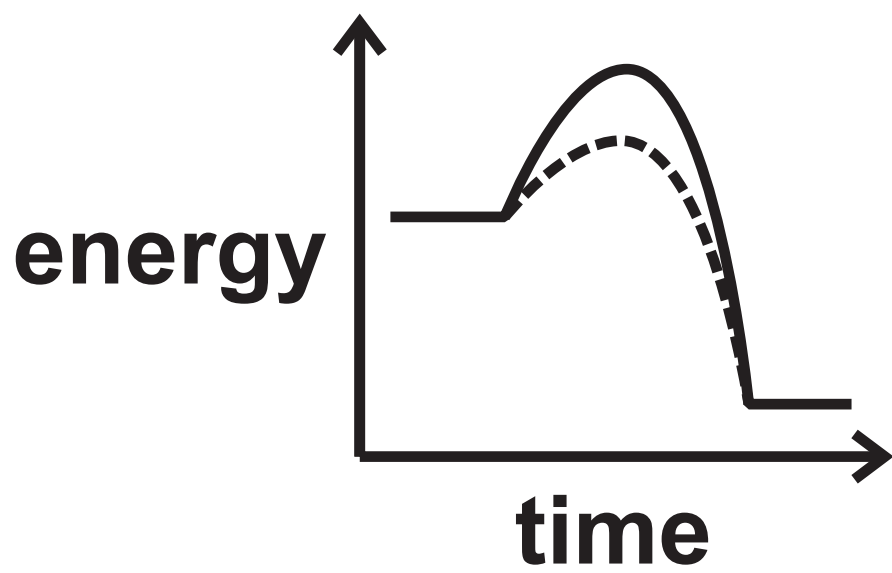


Question 2(a)

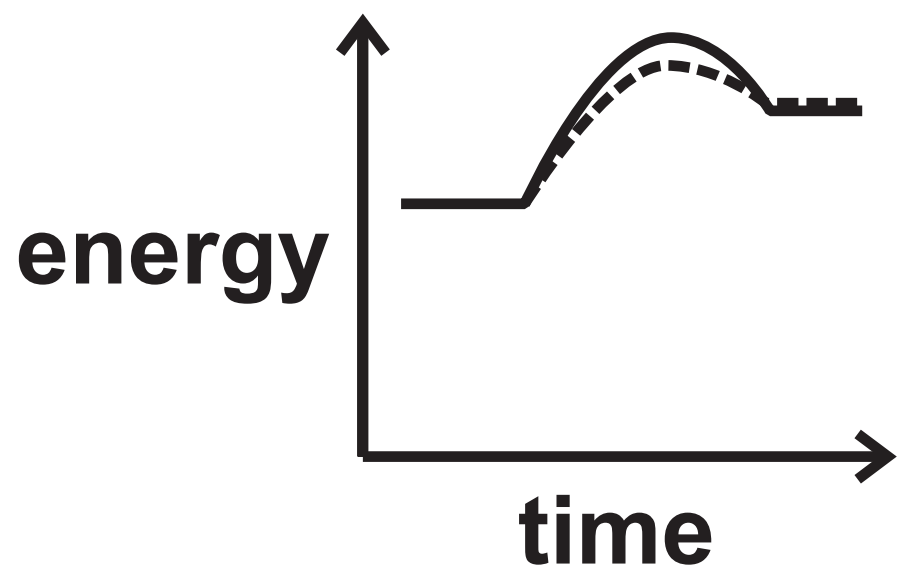
Key:

— without enzyme

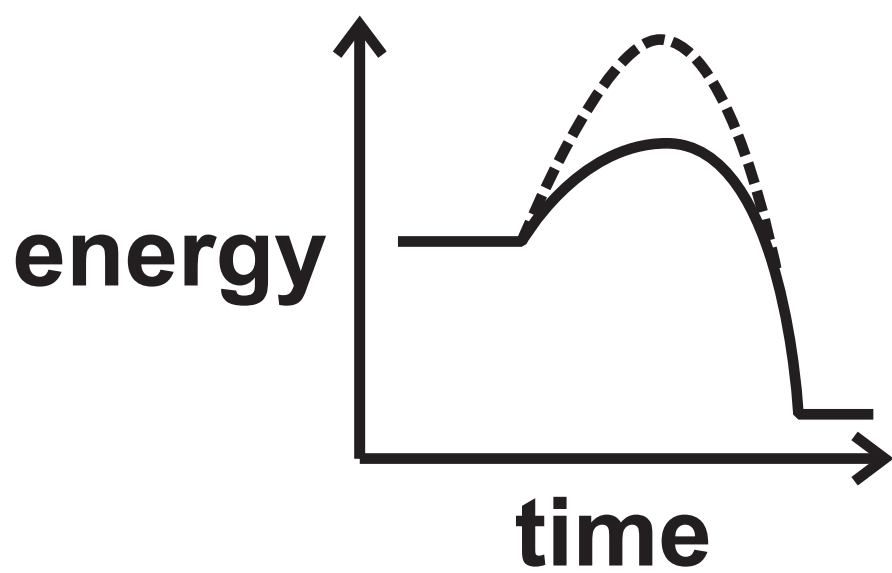
..... with enzyme



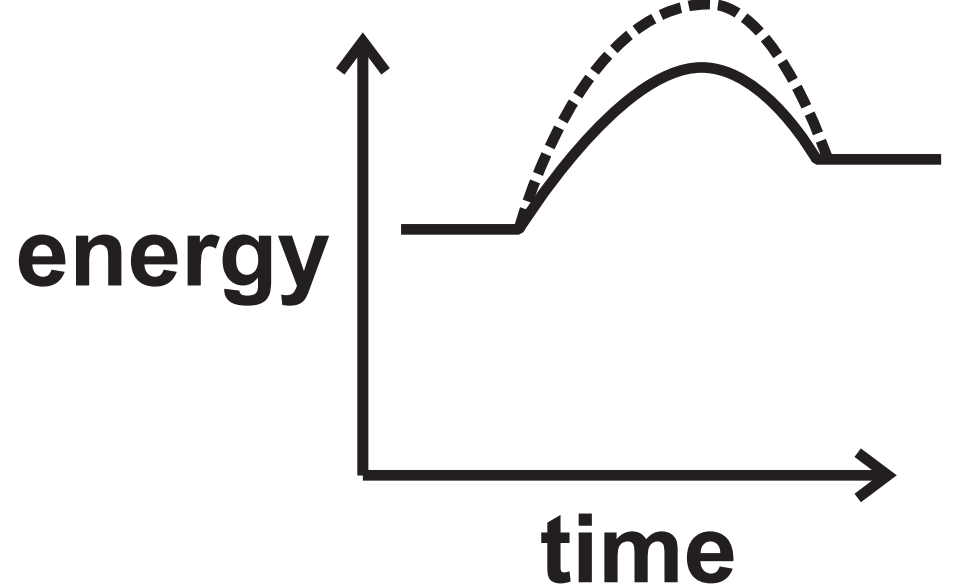
W



X



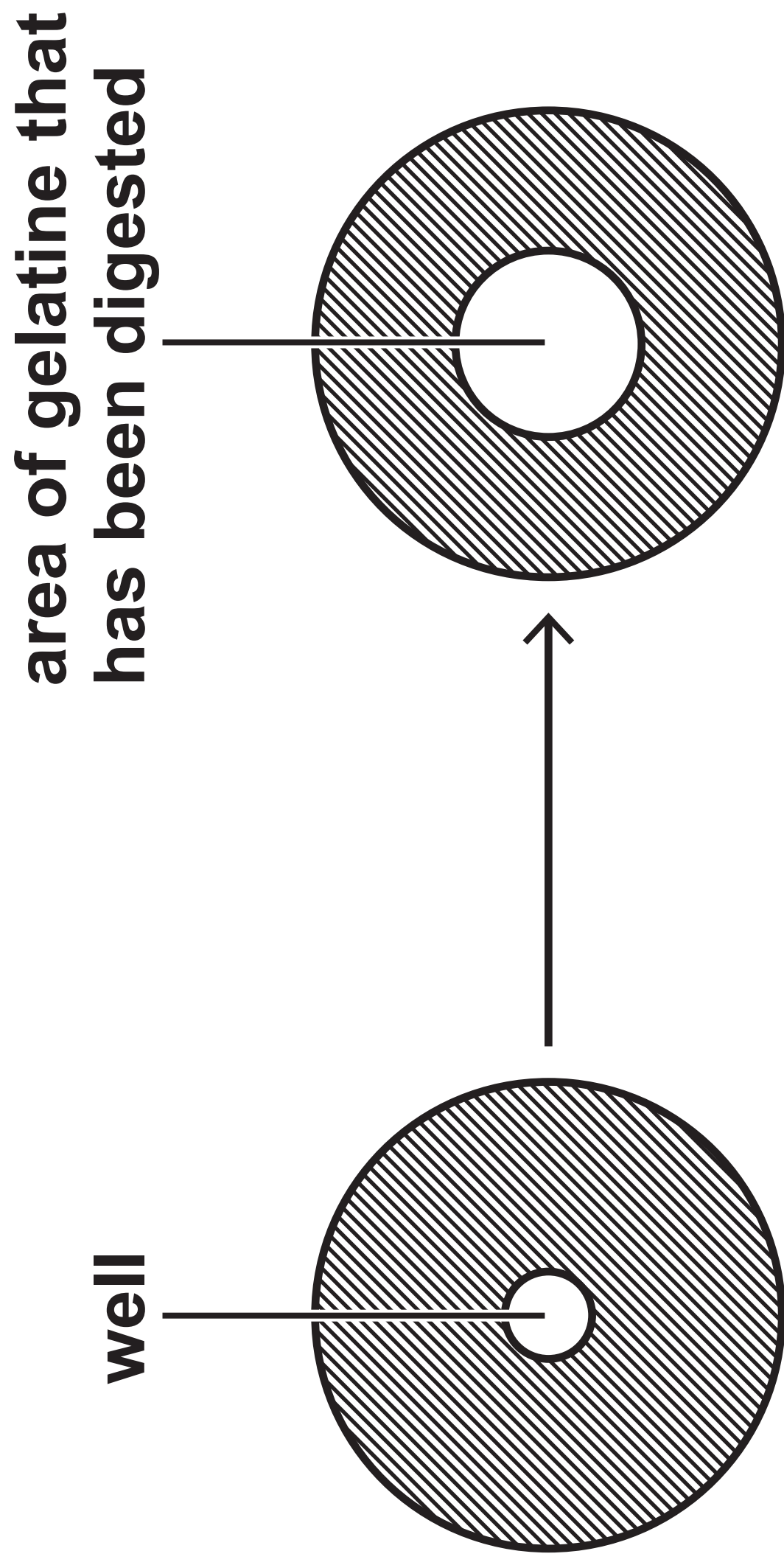
Y



Z

Question 2(b)

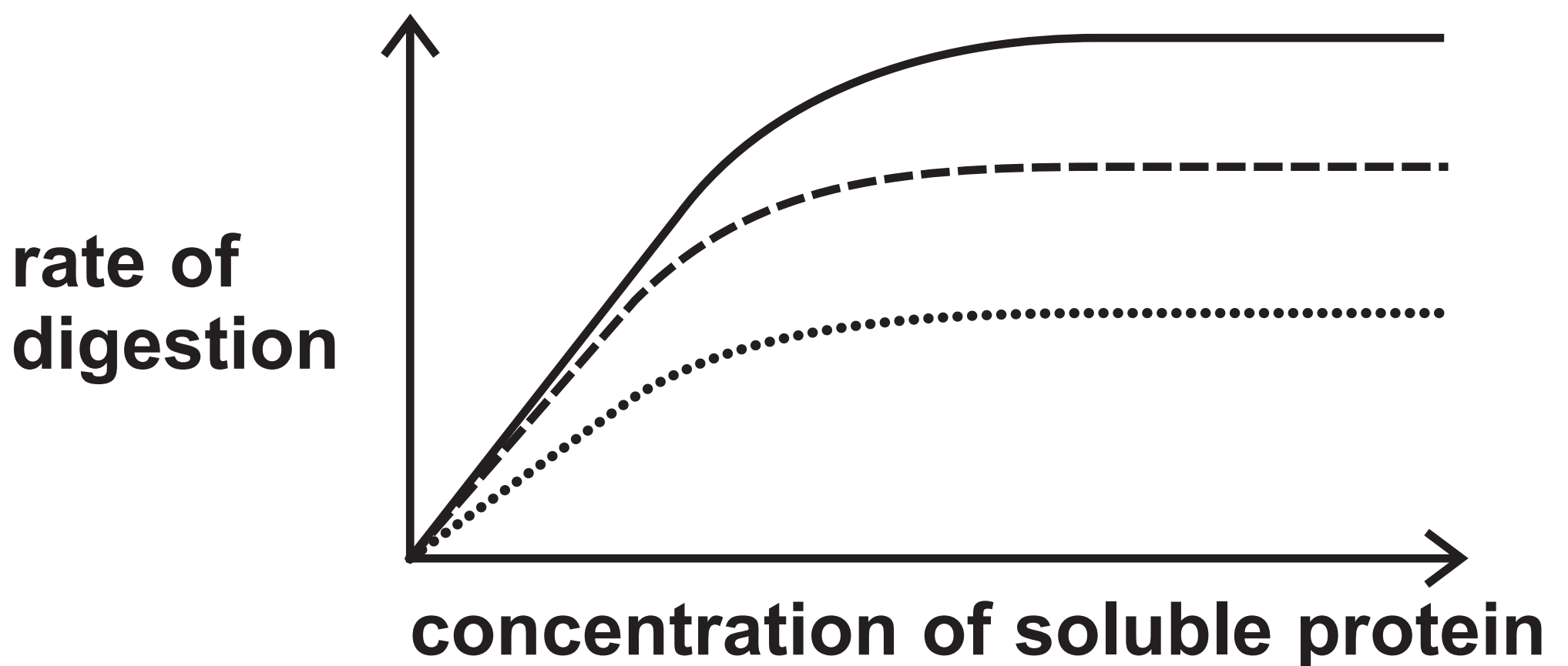
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Question 2(c)

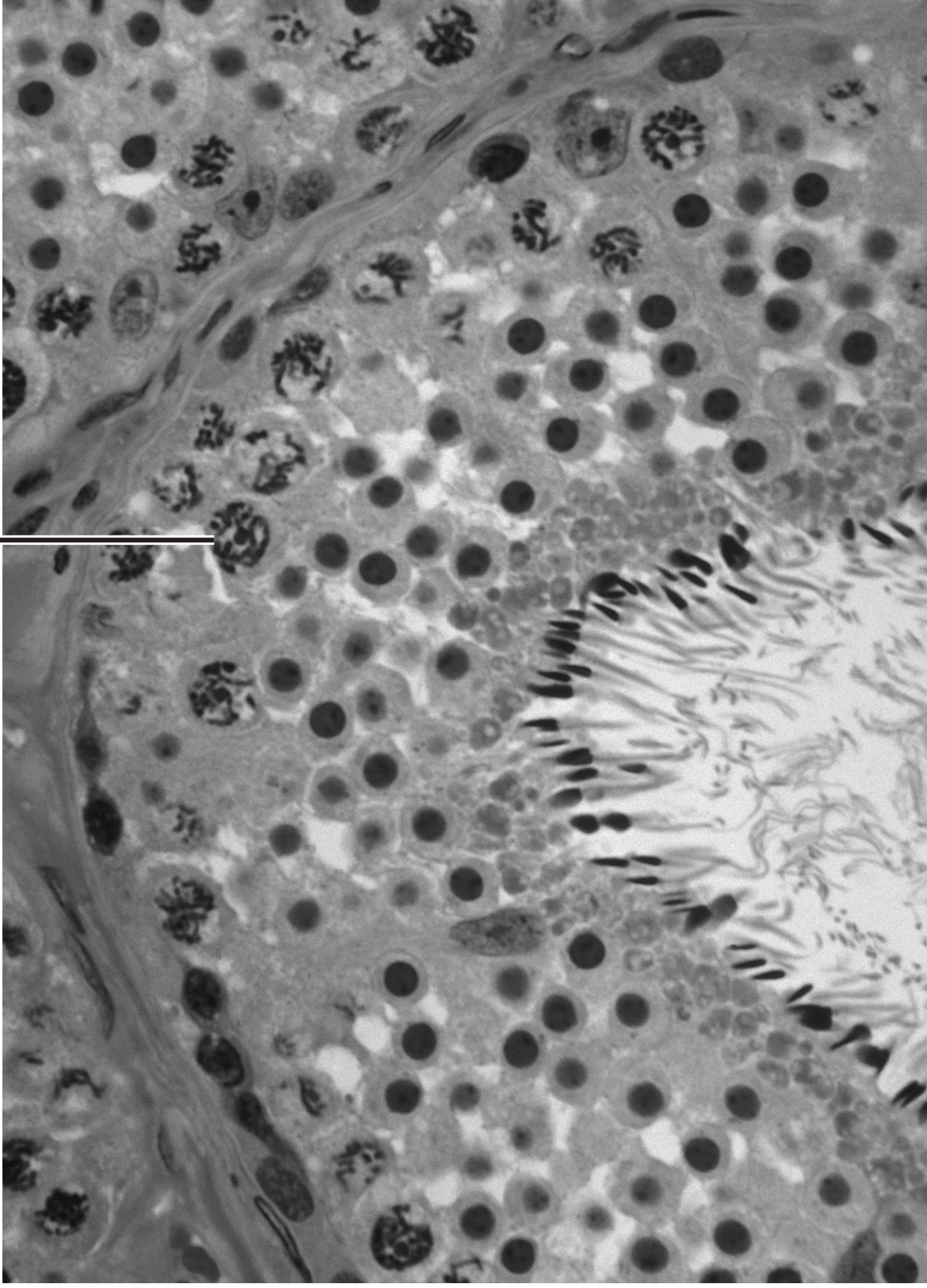
Key

- no copper sulfate
- medium concentration of copper sulfate
- high concentration of copper sulfate



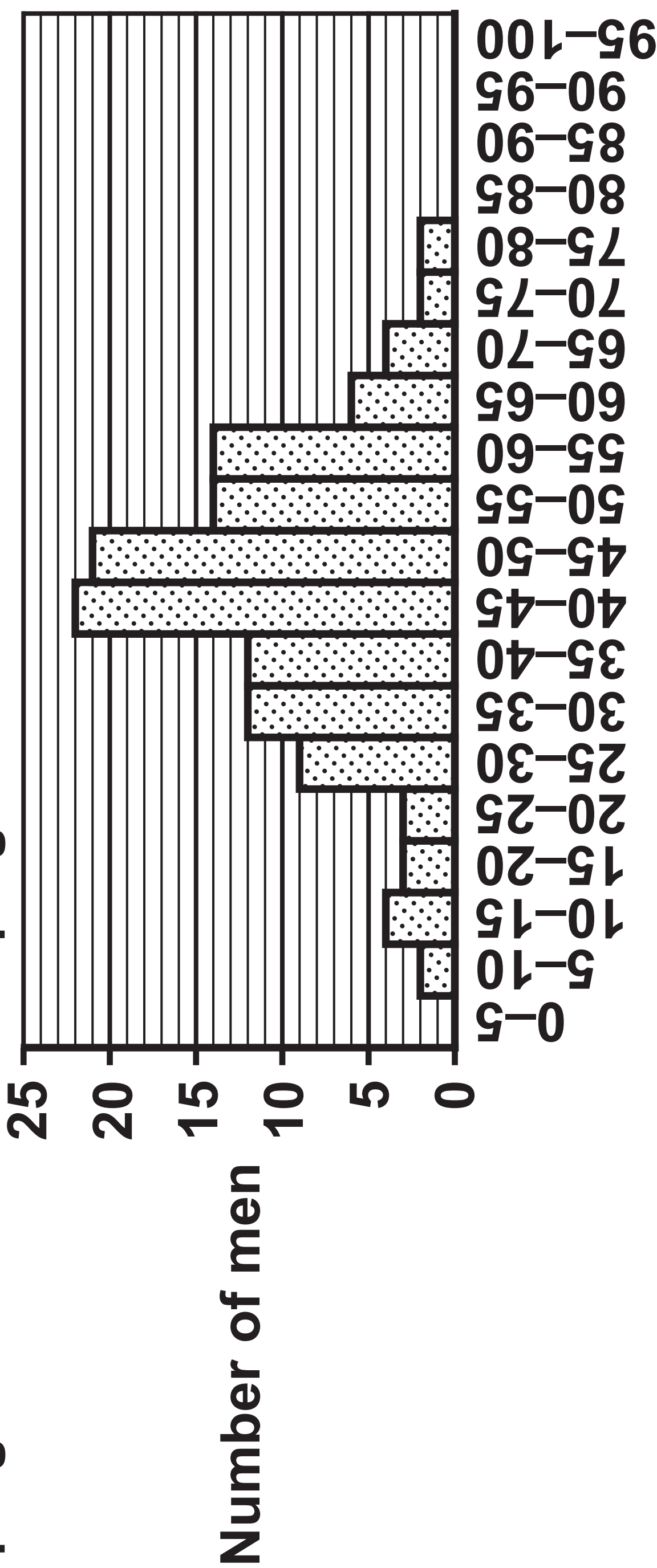
Question 3(a)

X



Question 3(b)

Men with partners with history of pregnancies not developing to full term

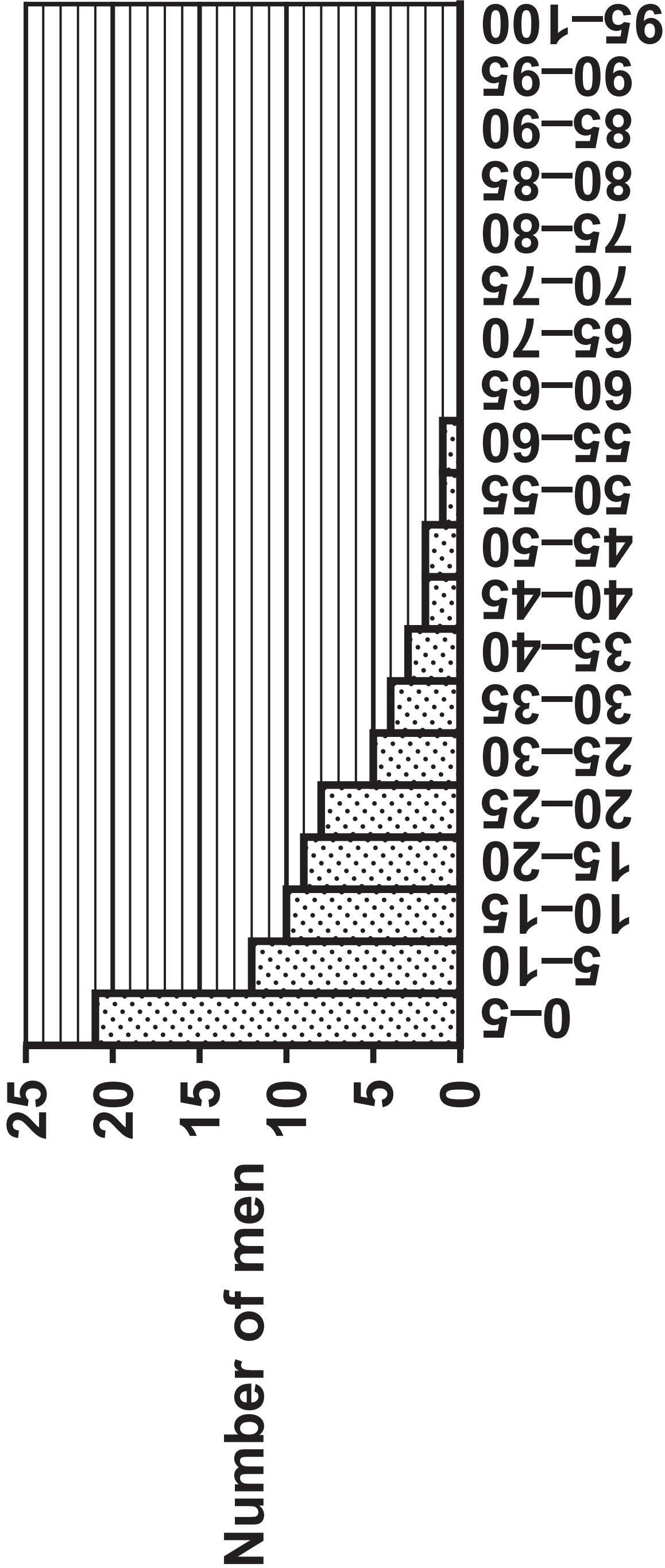


Percentage (%) of sperm cells with DNA damage

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Question 3(b) continued.

Men with partners where pregnancies developed to full term



Percentage (%) of sperm cells with DNA damage

Question 4(a)



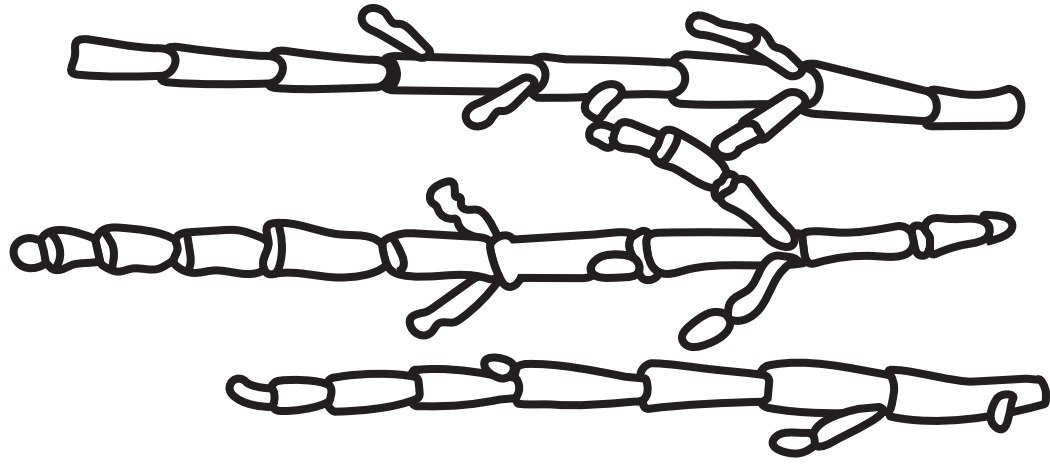
Question 4(a)(i)

	Temperature	Wind speed	Air humidity
A	high	high	high
B	high	high	low
C	high	low	high
D	low	high	low

Question 4(a)(ii)

15

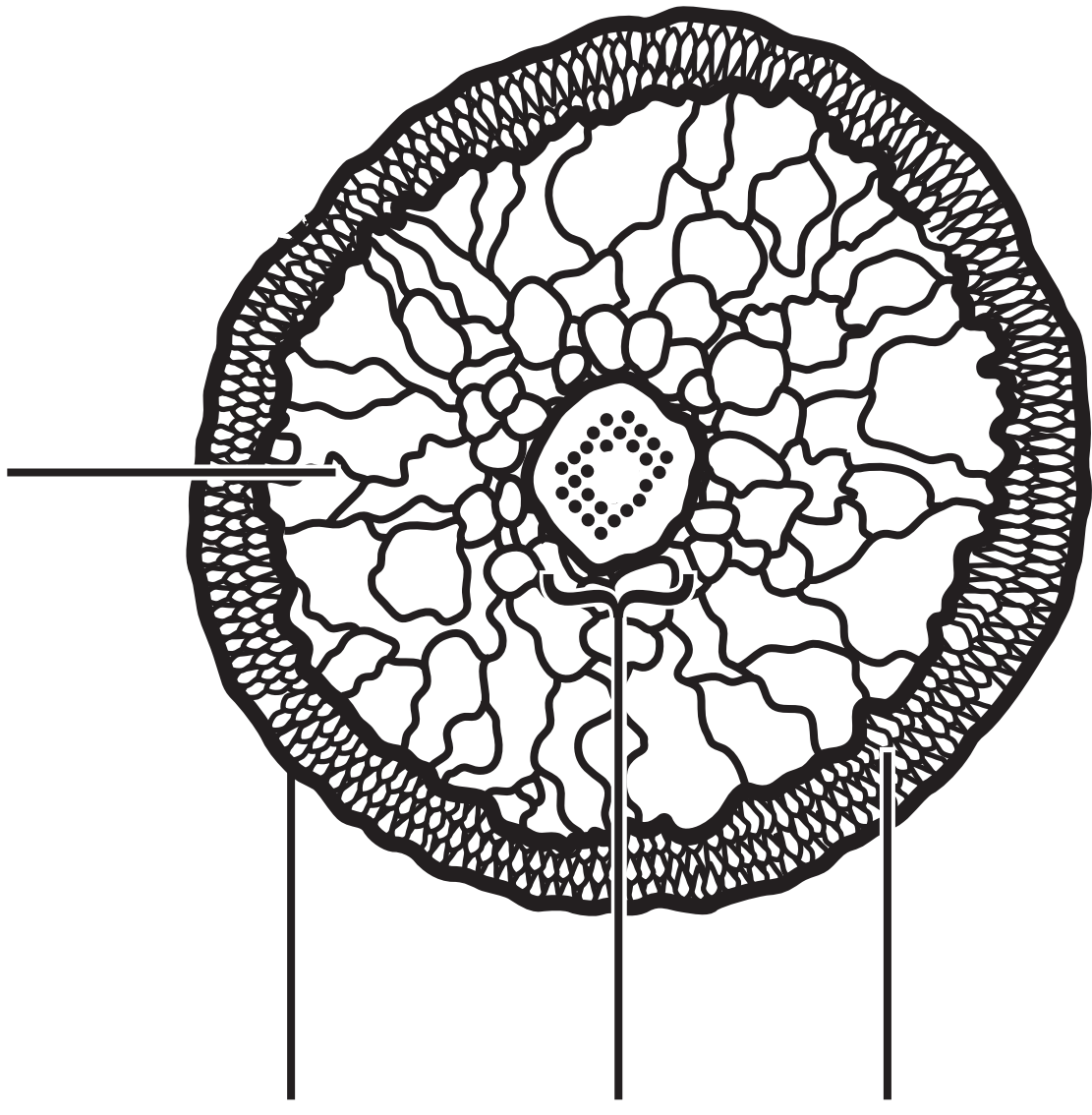
cortex containing large cells with high salt concentration and air spaces



**thick epidermis
and waxy cuticle**

vascular tissue

**palisade cells containing
chloroplasts**



Factor		Distance from sea / m				
		0	5	10	15	20
ACFOR scales	Samphire	Abundant	Common	Rare	Absent	Absent
	Sea lavender	Absent	Rare	Common	Common	Rare
	Scurvy grass	Absent	Absent	Rare	Occasional	Abundant
Index of diversity for all plant species		0-20	0-54	0-85	2-54	2-85
Percentage of silt made up of organic material (%)		15	10	25	35	55

Question 5(b)

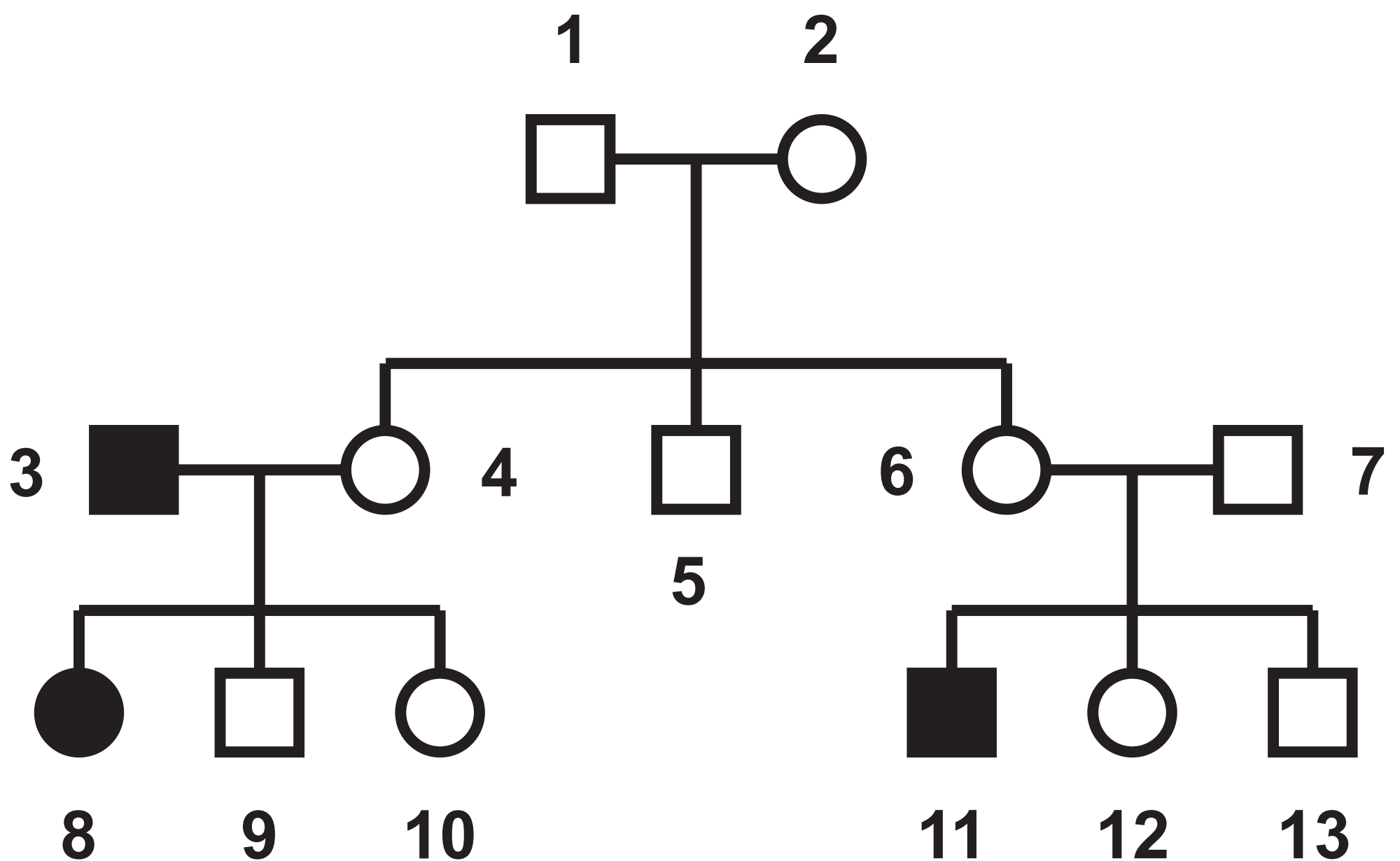
Key

□ male without colour blindness

■ male with colour blindness

○ female without colour blindness

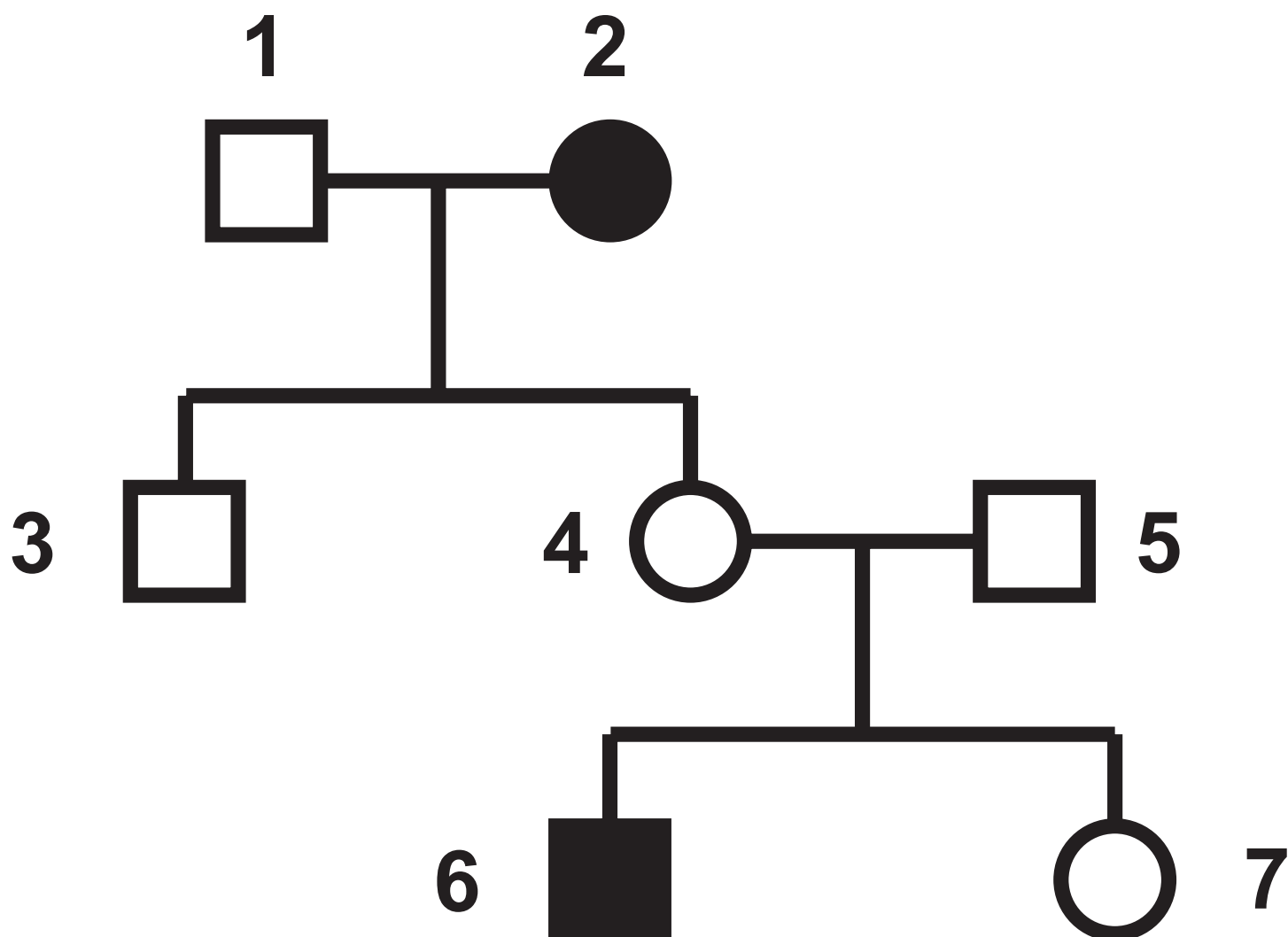
● female with colour blindness



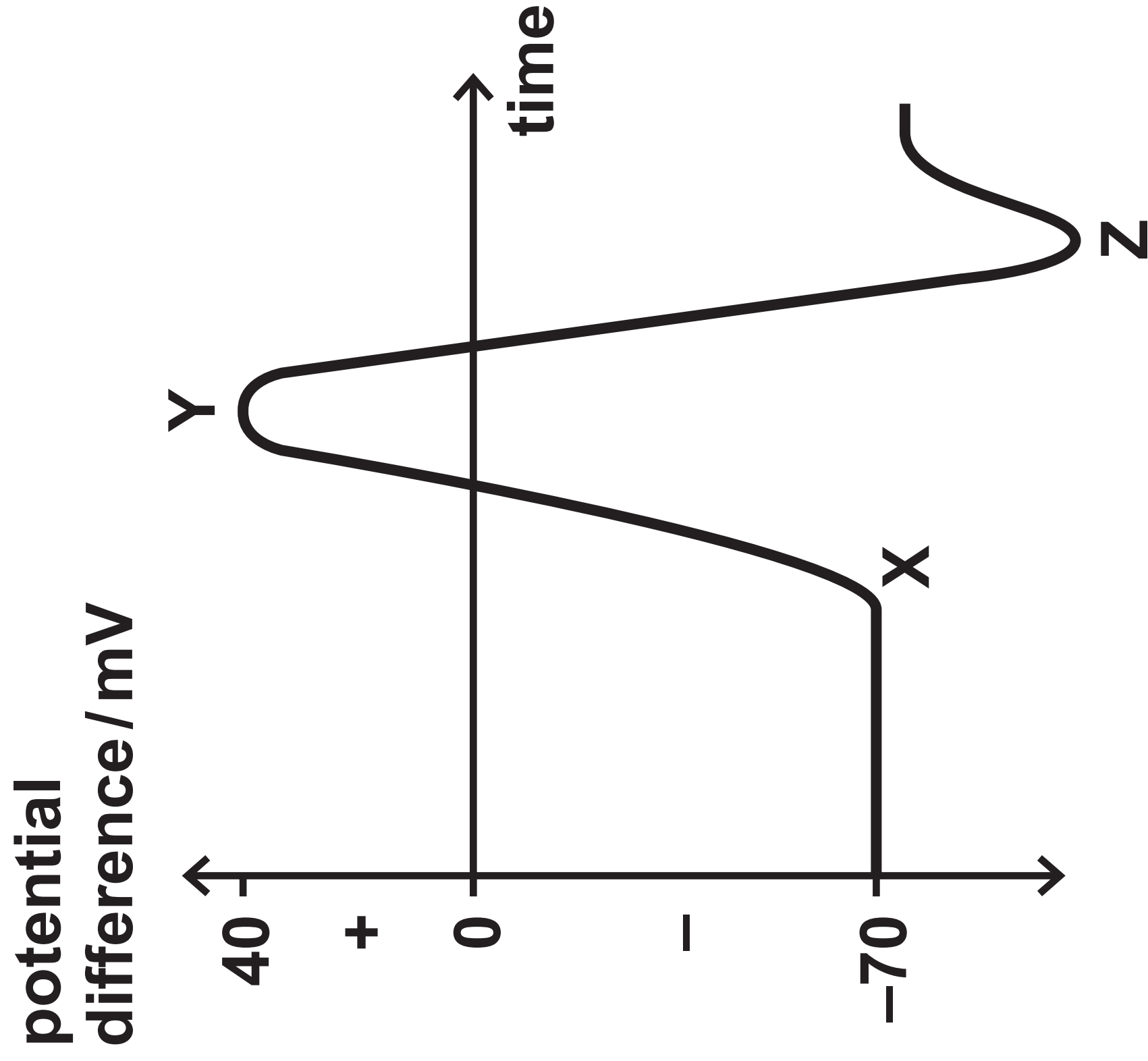
Question 5(c)(i)

Key

- male without achromatopsia
- male with achromatopsia
- female without achromatopsia
- female with achromatopsia



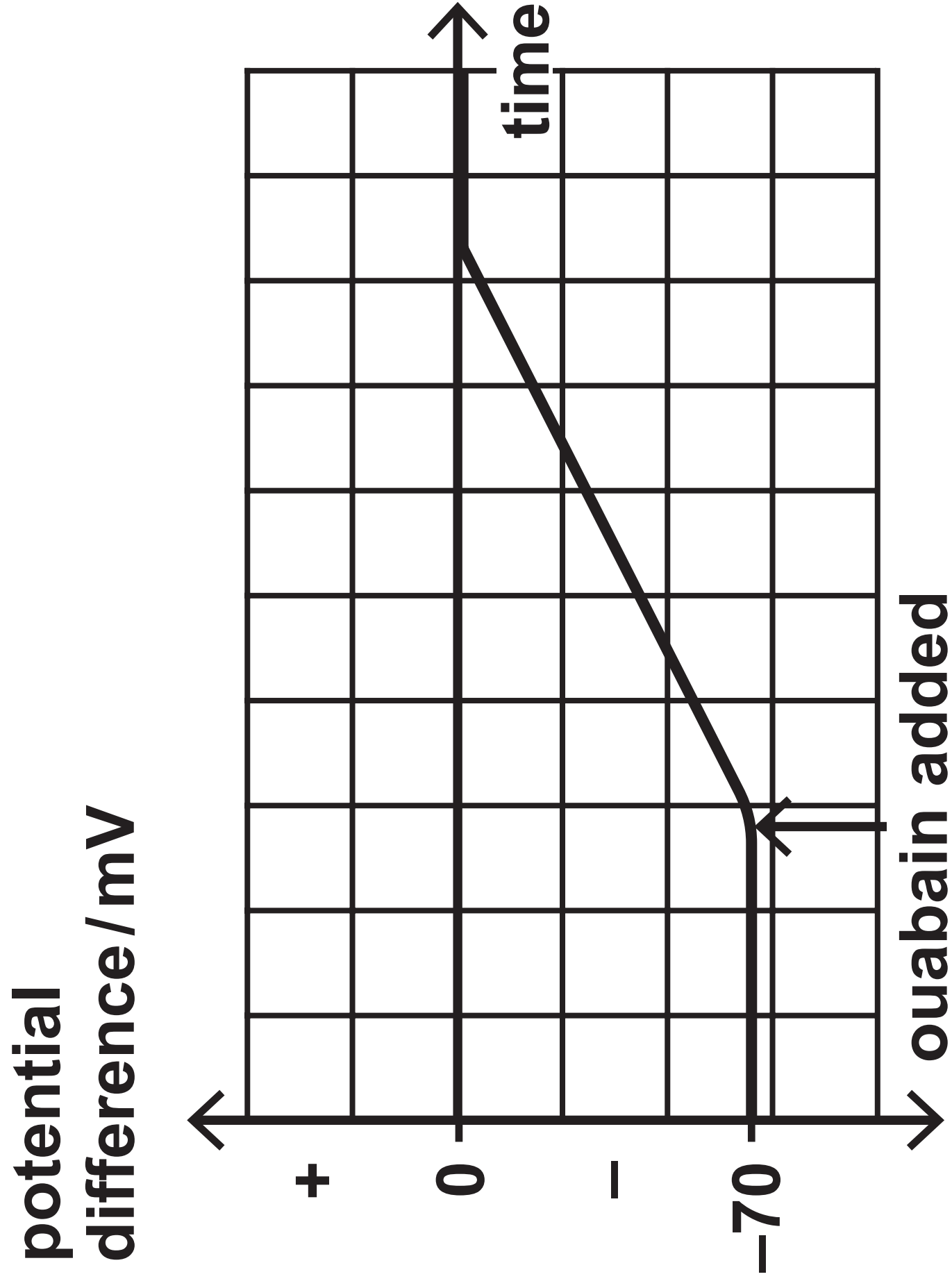
Question 6(a)



Question 6(b)



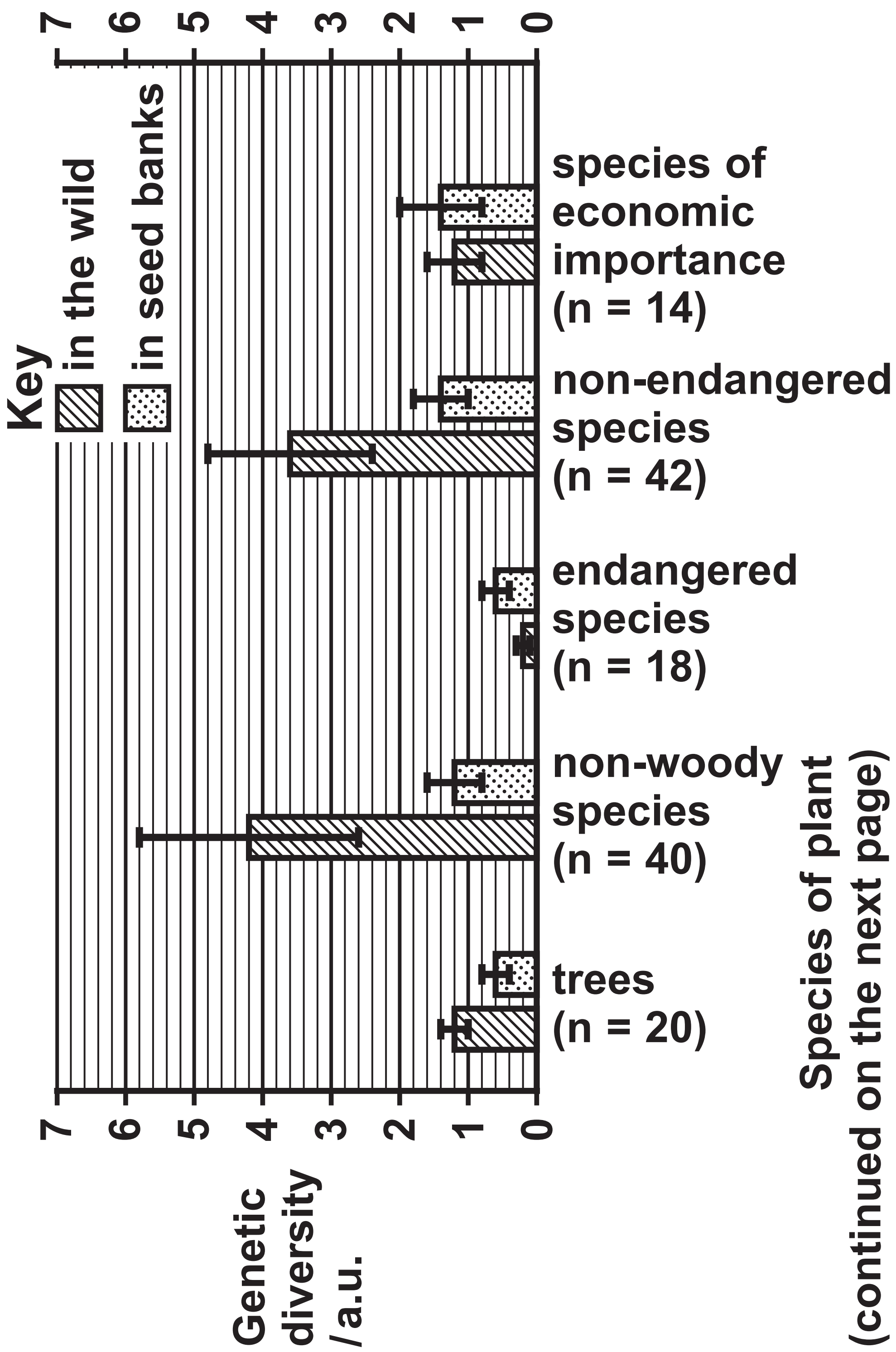
Question 6(b)(ii)



Question 7(a)(i)

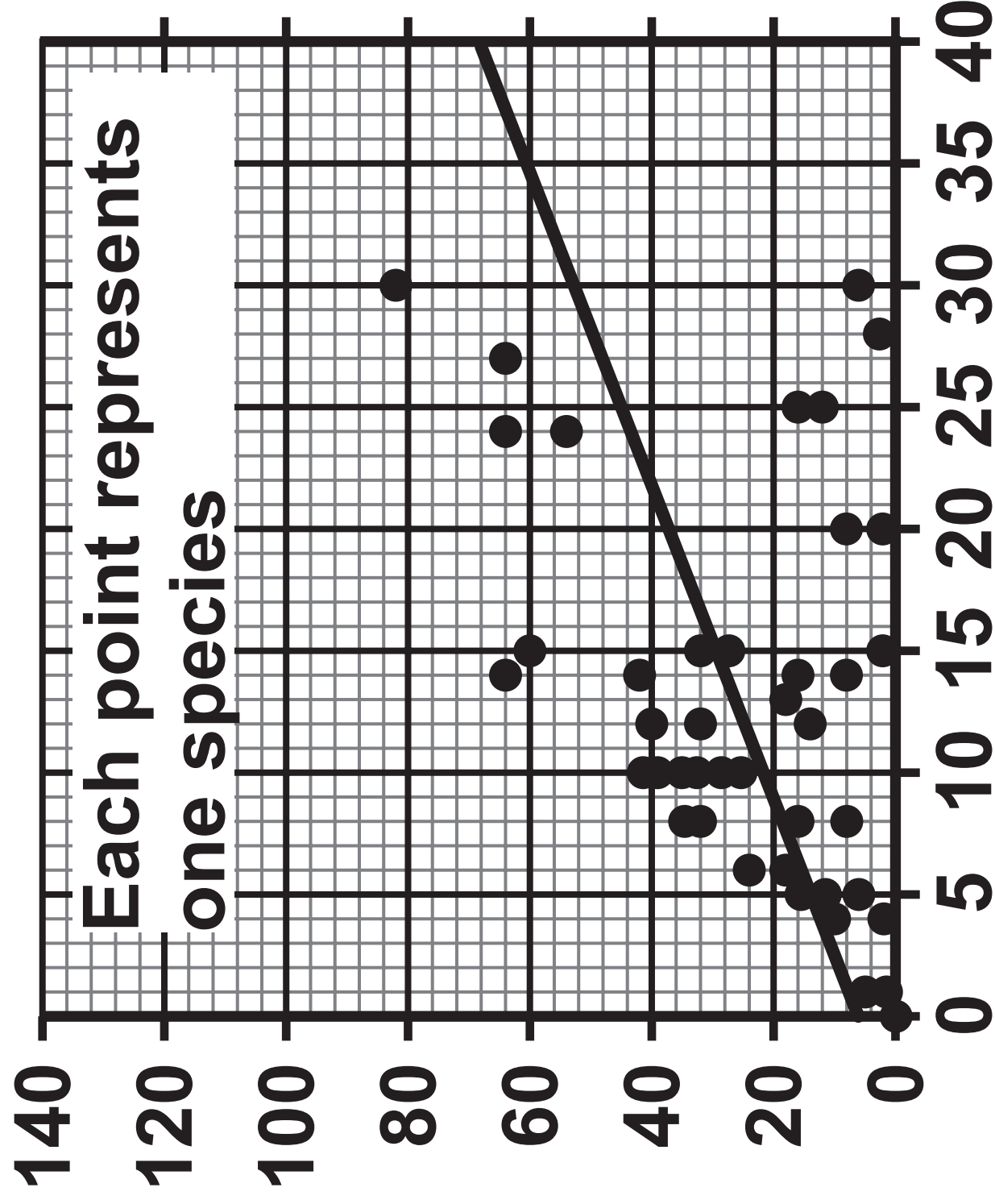
	Overlapping	Degenerate	Contains introns in genes
A	yes	yes	yes
B	yes	no	yes
C	no	yes	no
D	no	yes	yes

Question 7(b)



Question 7(b) continued.

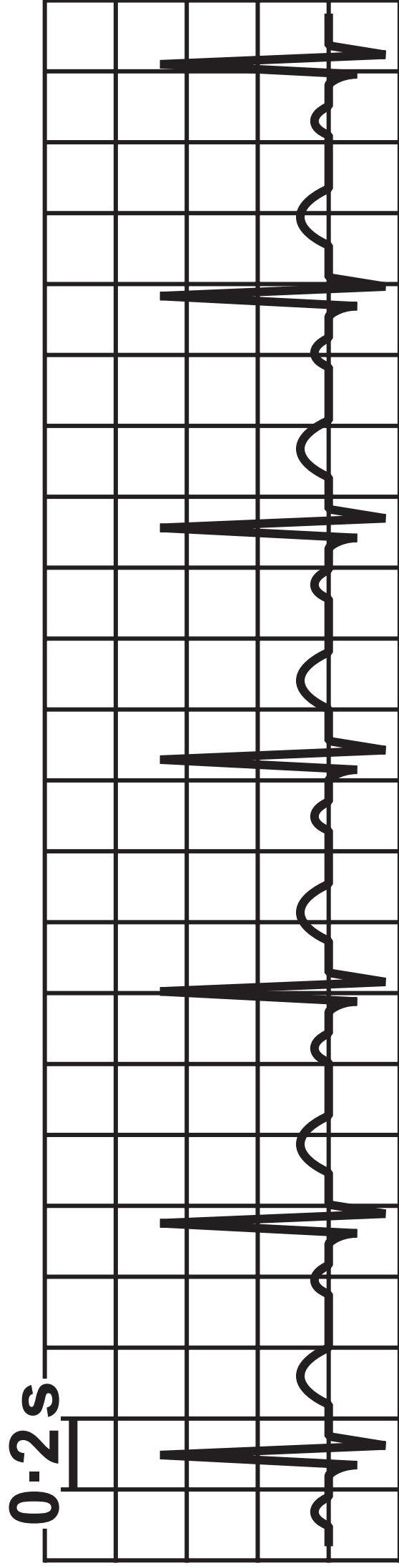
Mean number of differences in
DNA sequences from seed bank
compared with wild plant



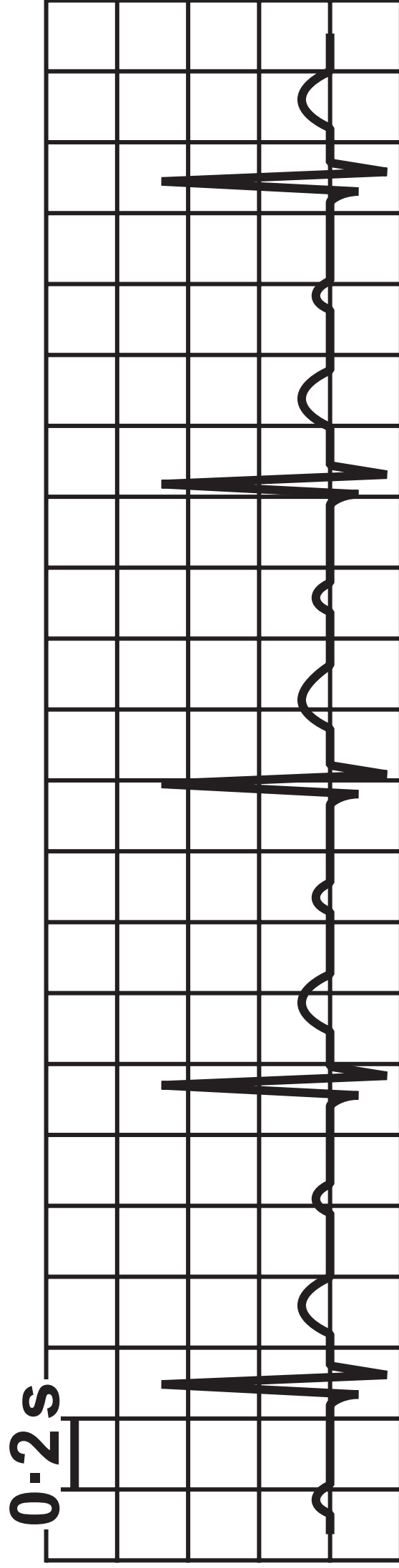
Age of seeds in seed bank/years

Question 8(b)

25



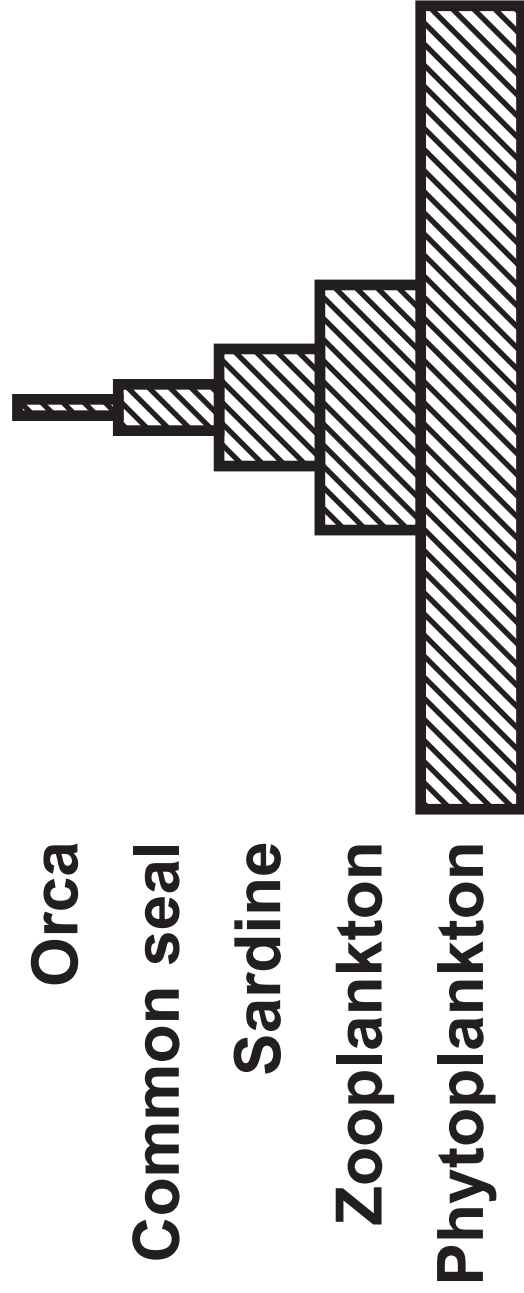
Person with regular heart rhythm



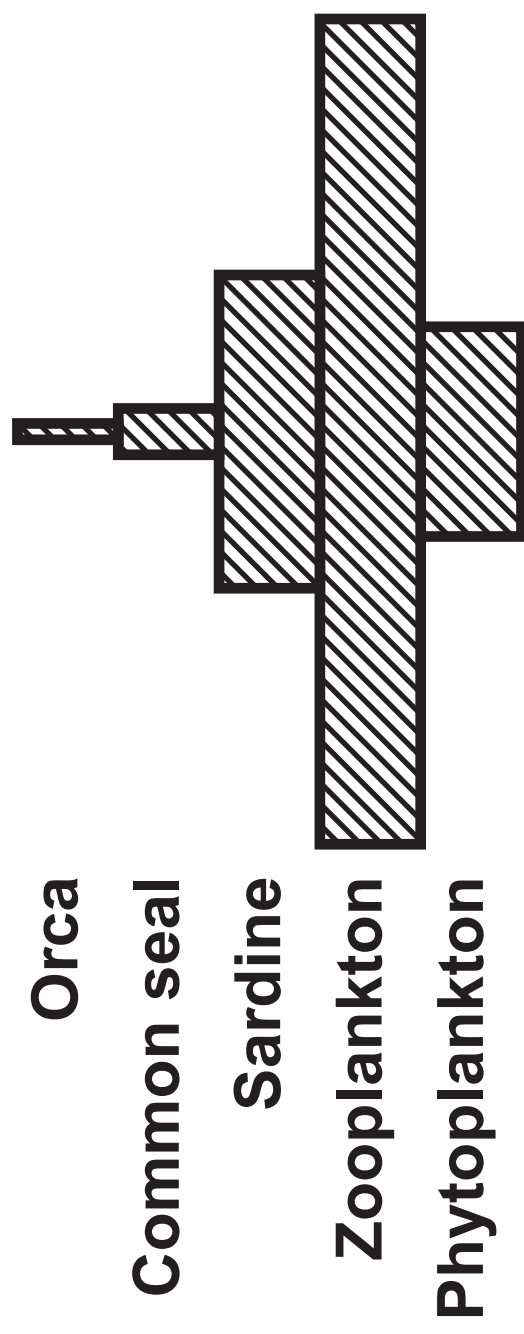
Person with abnormal heart rhythm

Question 9(a)

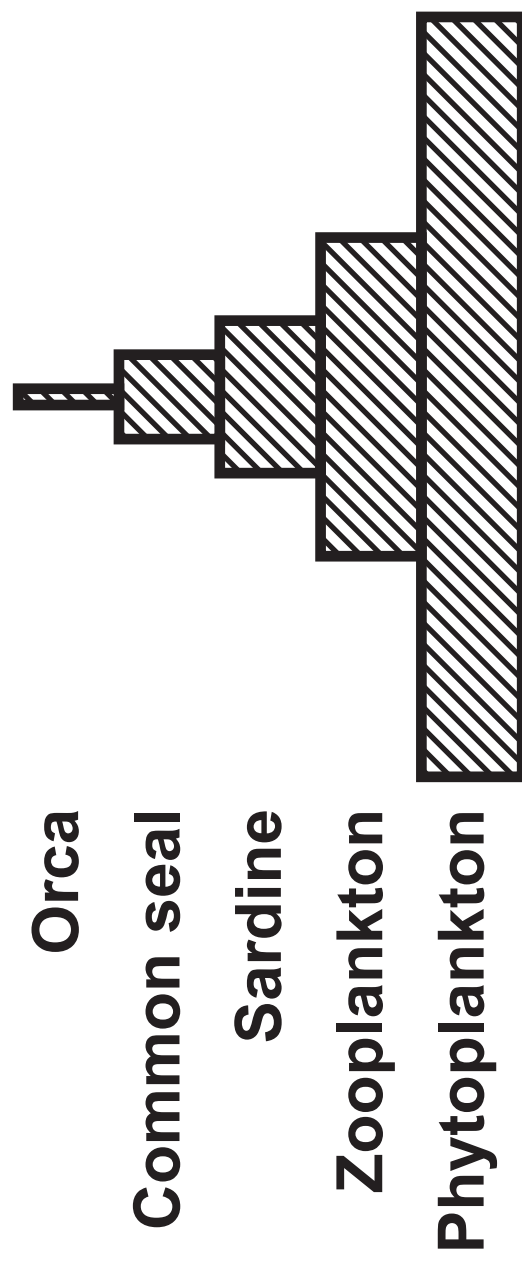
Pyramid of biomass for November



Pyramid of biomass for December



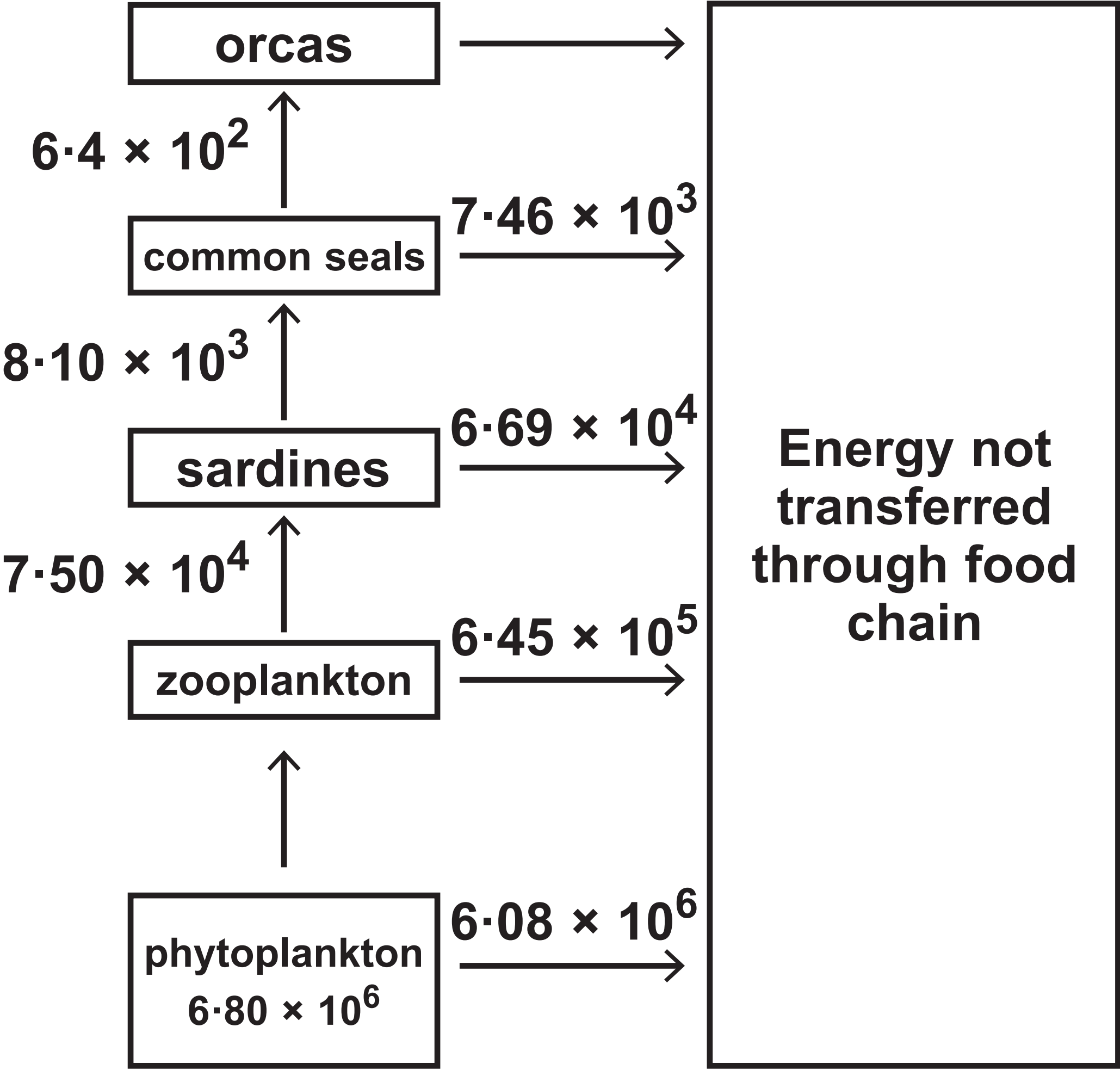
Pyramid of energy for one whole year



The units for biomass are
 kg m^{-3}

The units for energy are
 $\text{kJ m}^{-3} \text{yr}^{-1}$

Question 9(b)



Question 9(c)

Light intensity /arbitrary units	Mean increase in dry biomass of phytoplankton/g		
	10 °C	20 °C	30 °C
	4	6	2
	8	10	4
	10	20	15
	12	24	28
25	12	28	35

Question 3

(Source: © M. I. WALKER / SCIENCE PHOTO LIBRARY)

Question 4

(Source ©BOB GIBBONS / SCIENCE PHOTO LIBRARY)

Question 6

(Source: © https://commons.wikimedia.org/wiki/File:Lophiomyx_imhausi.jpg)