

Biology B

Advanced

PAPER 2: Advanced Physiology, Evolution and Ecology

Friday 13 June 2025 – Morning

Time: 1 hour 45 minutes

Diagram Booklet

THIS DOCUMENT **MUST** BE RETURNED TO
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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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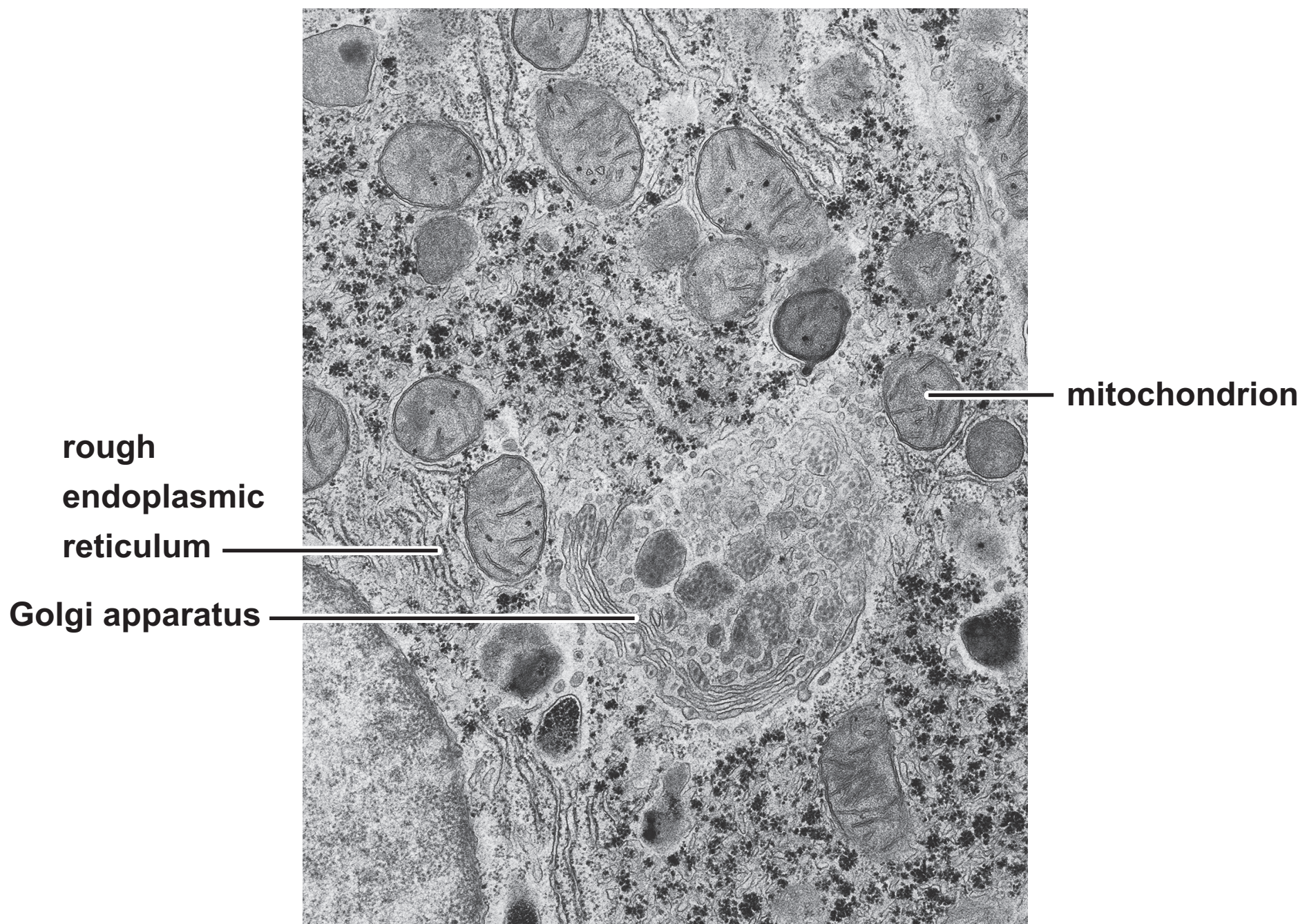
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Spare Copies

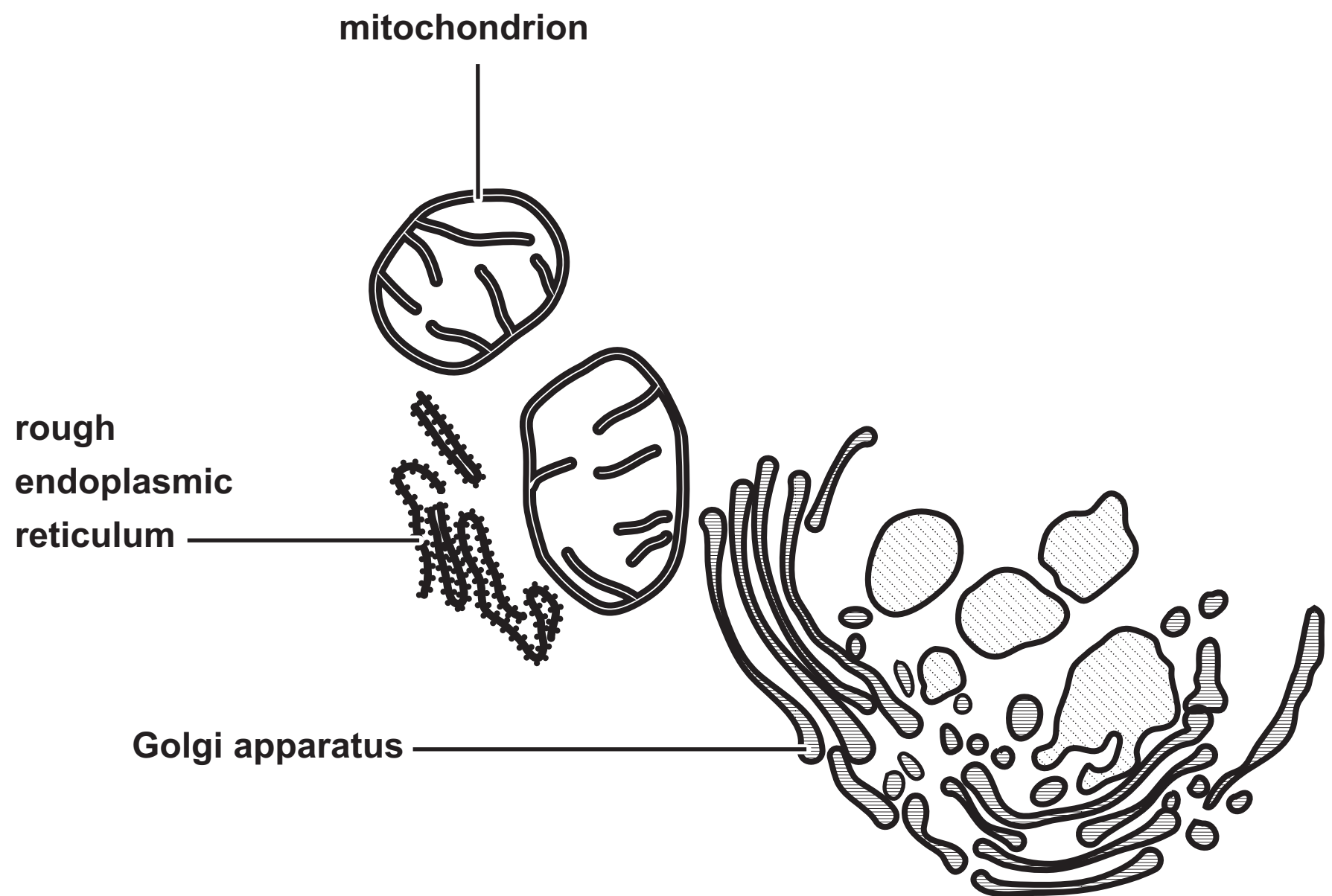
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Question 1(a) – Original photograph



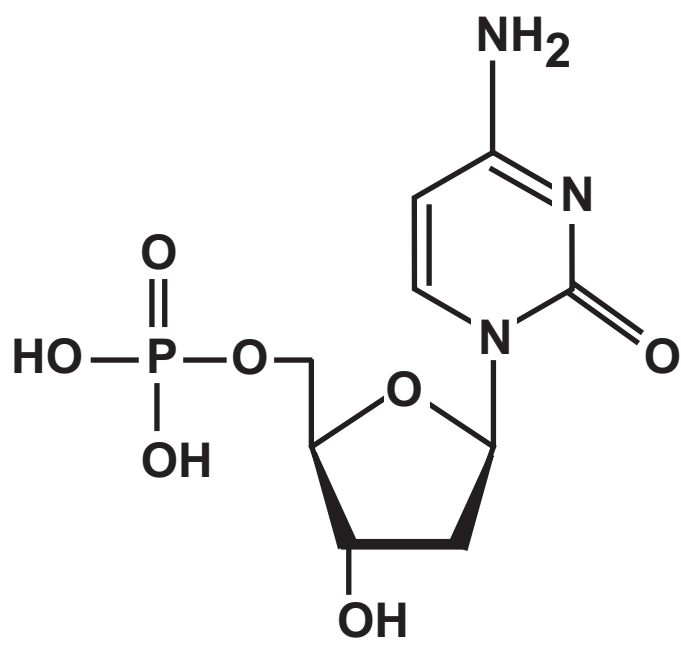
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Question 1(a) – Outline image

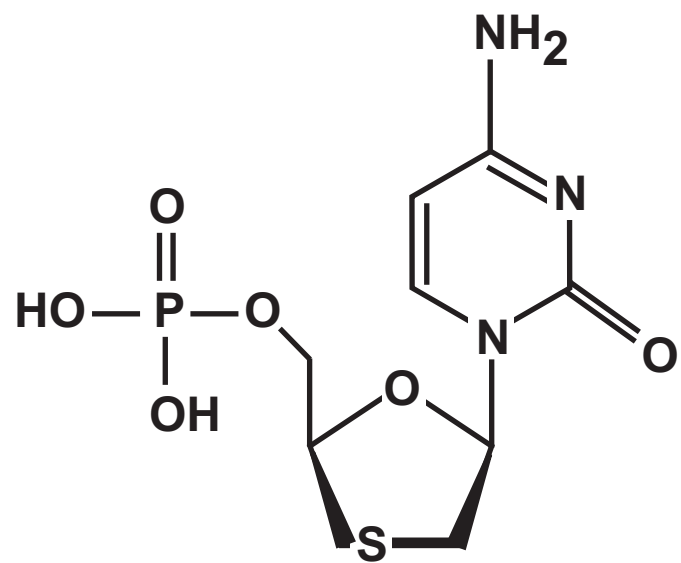


Question 1(b)(ii)

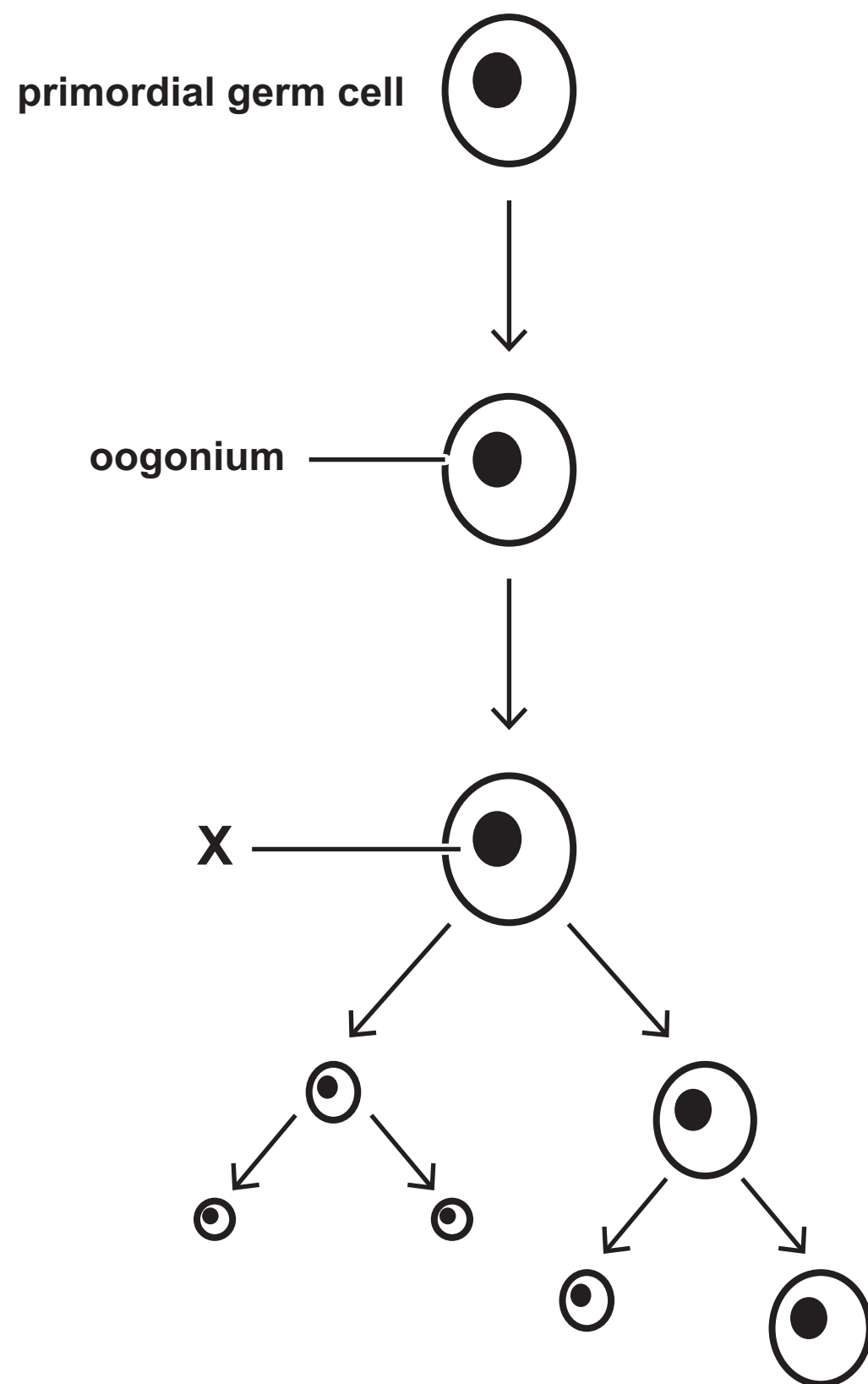
NORMAL NUCLEOTIDE



ALTERED NUCLEOTIDE

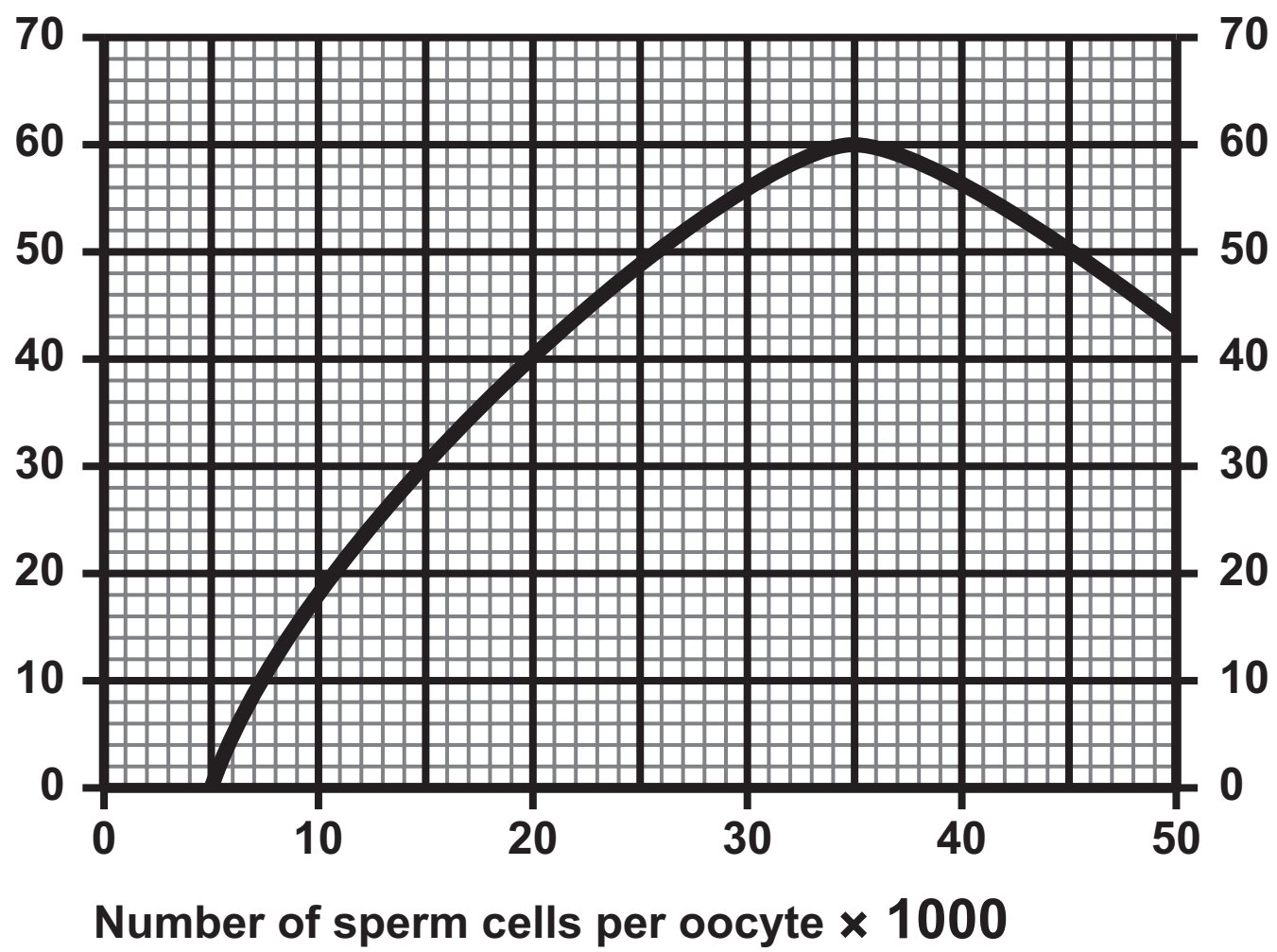


Question 2(a)

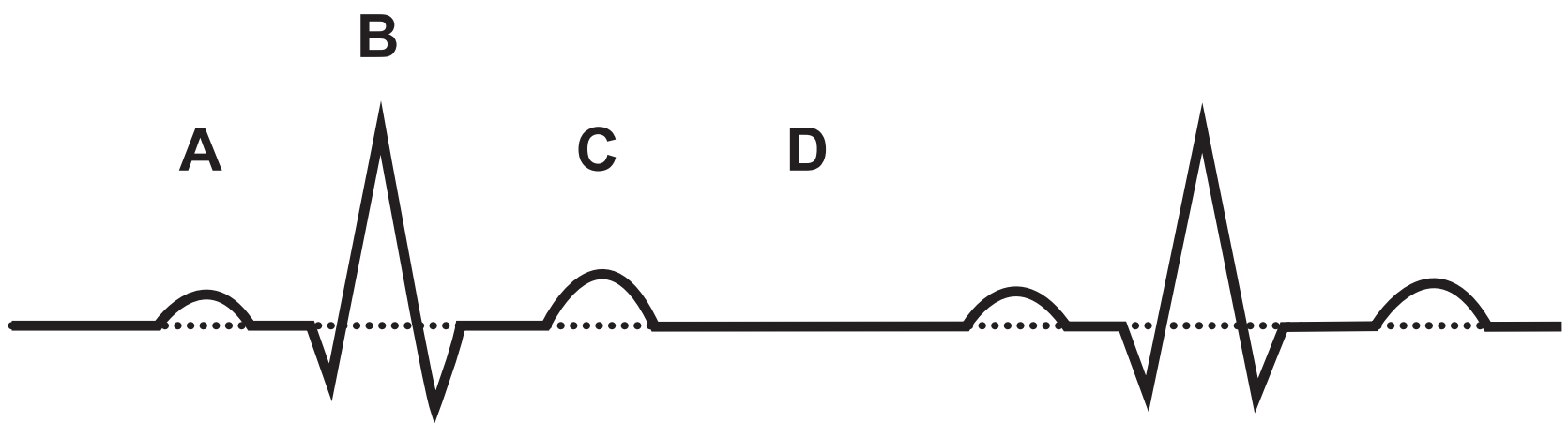


Question 2(b)

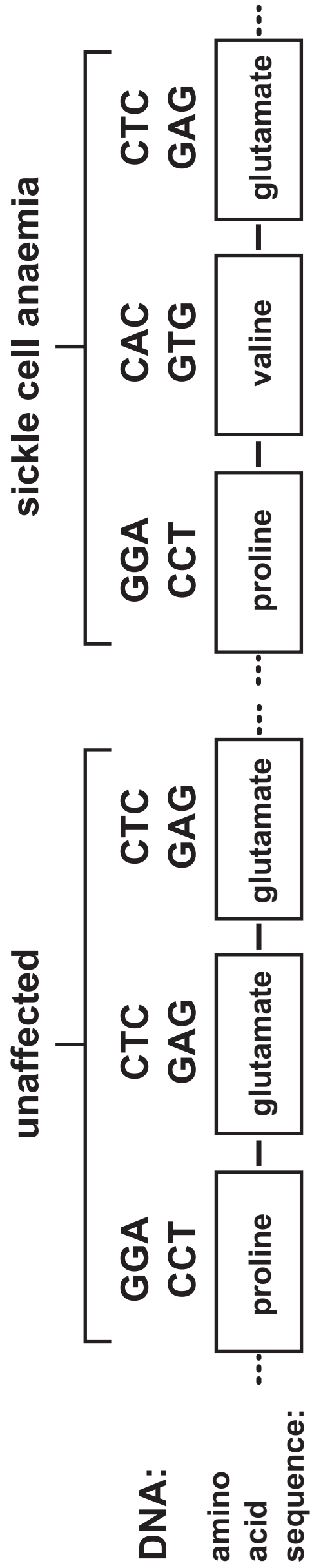
Percentage of embryos
that develop (%)



Question 3(a)

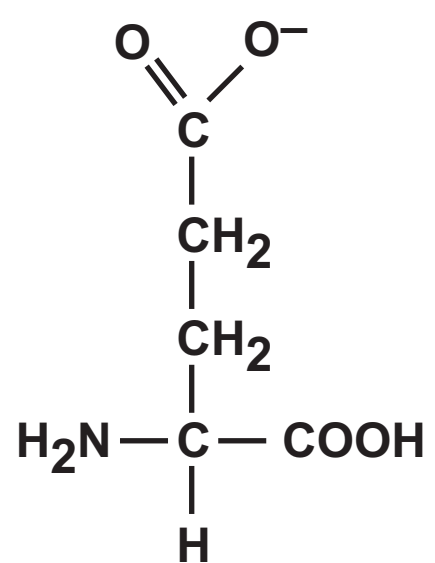


Fright number	Heart rate / beats per minute			
	without anti-anxiety drug		with anti-anxiety drug	
	resting	after fright	resting	after fright
1	64	135	46	70
2	56	125	54	65
3	55	125	48	70
4	75	110	56	105
5	72	105	48	65

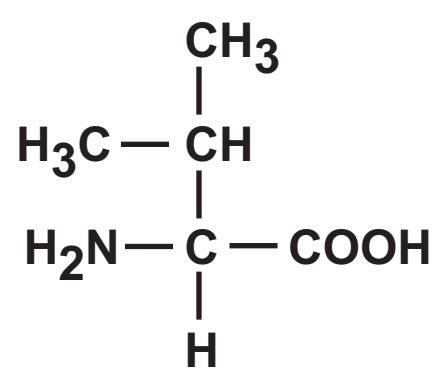


Question 4(a)(iii)

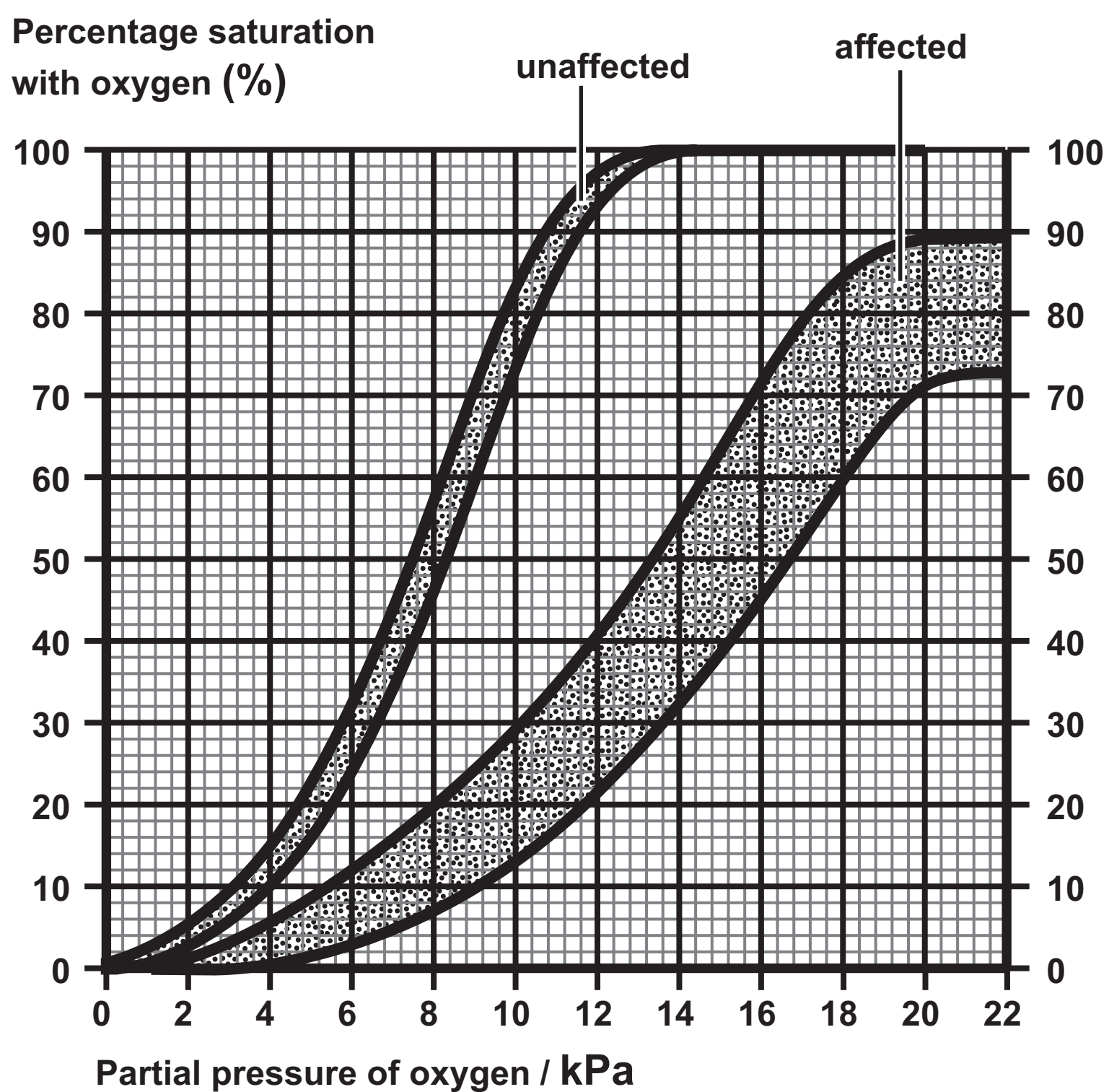
GLUTAMATE



VALINE

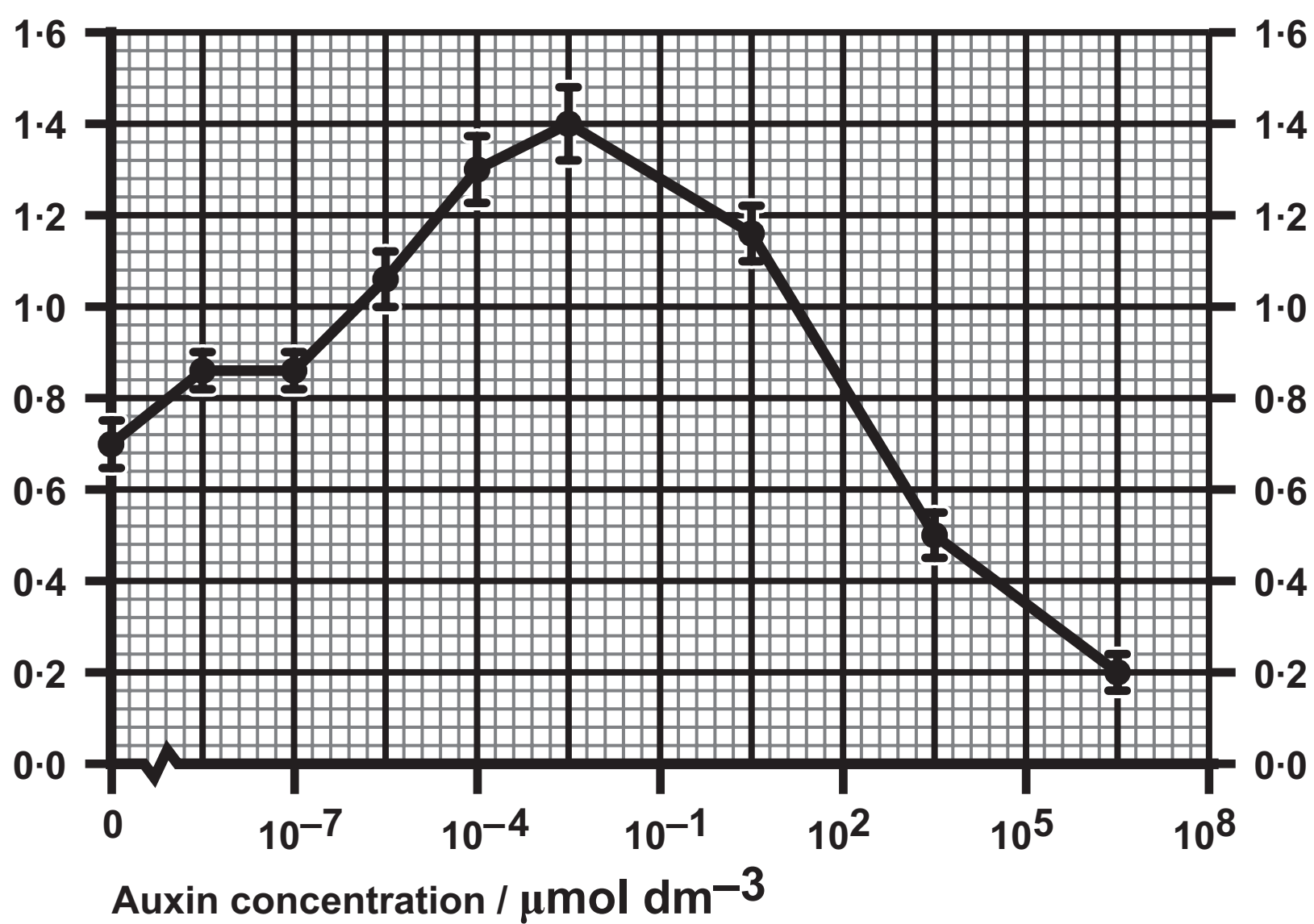


Question 4(b)



Question 5(b)

Mean root
length / cm

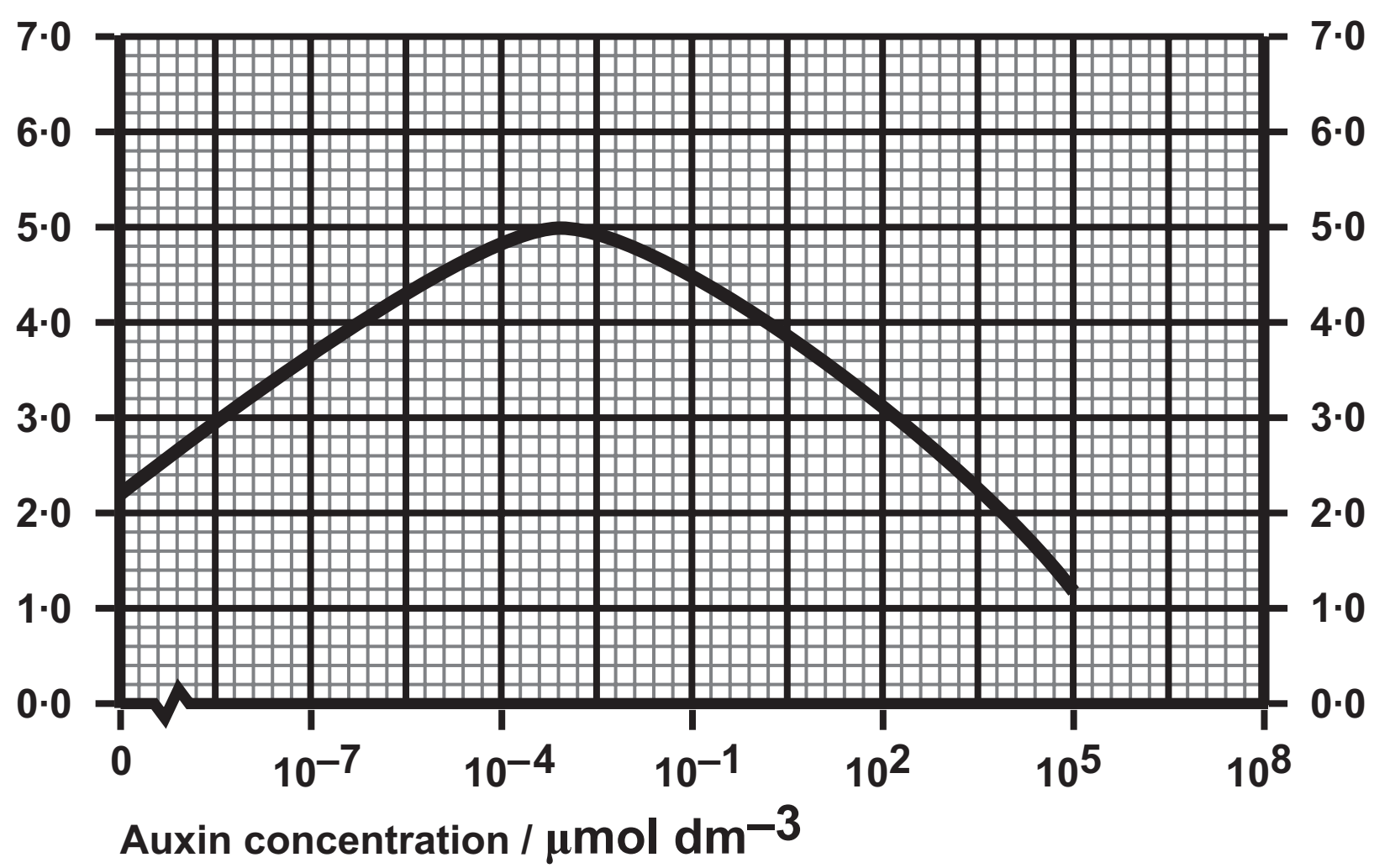


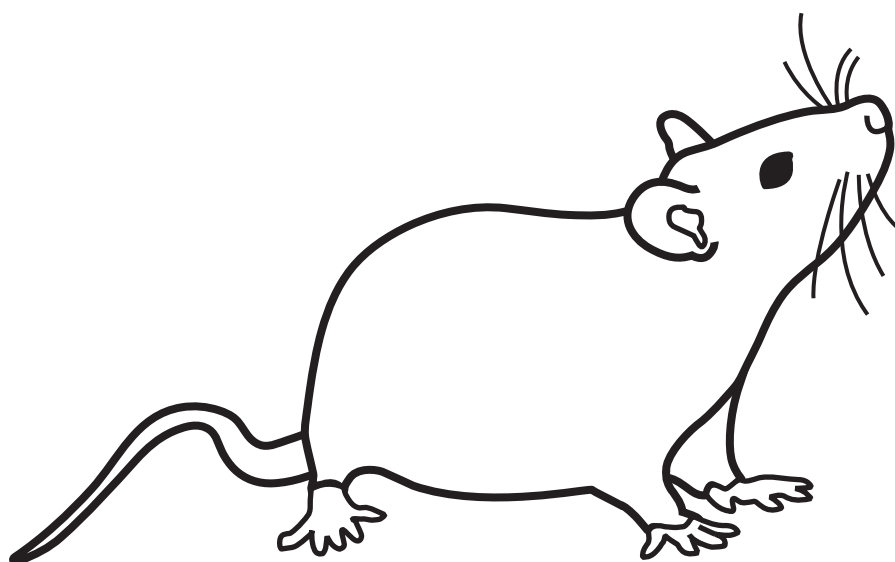
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Turn over

5(b) continued.

Mean dry
biomass / mg



Question 6(a)**ORIGINAL PHOTOGRAPH****OUTLINE IMAGE**

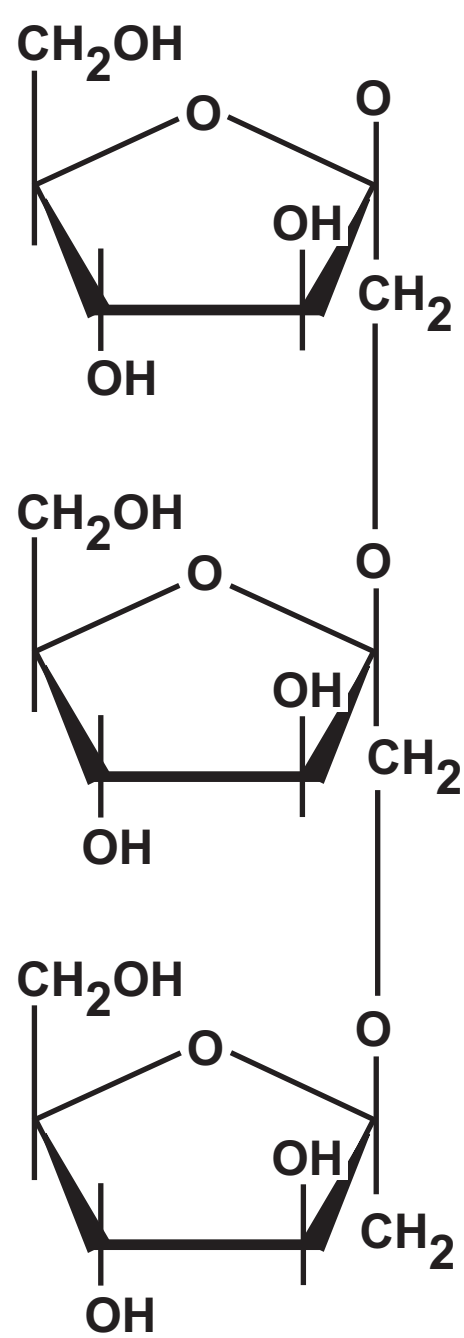
Question 6(a)(i)

	Family	Order	Class
A	Mammalia	Muridae	Rodentia
B	Mammalia	Rodentia	Muridae
C	Muridae	Rodentia	Mammalia
D	Muridae	Mammalia	Rodentia

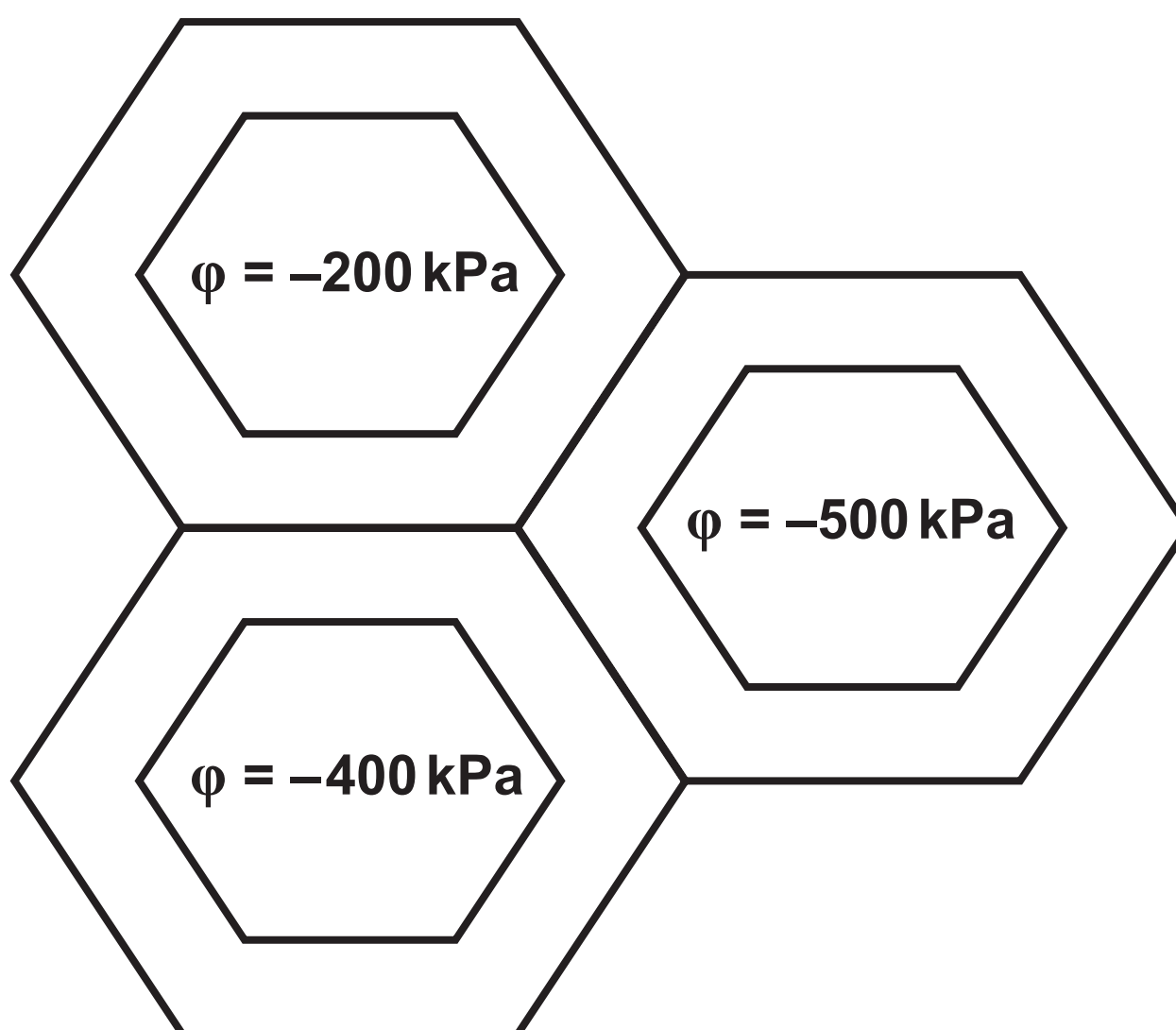
Question 6(b)

Type of rat	Genotypes of rats	Number of rats		
		before warfarin was used	two years after warfarin use started	five years after warfarin use started
Resistant to warfarin	$W^R W^R$ and $W^N W^R$	35	195	180
Not resistant to warfarin	$W^N W^N$	265	105	120

Question 7(a)

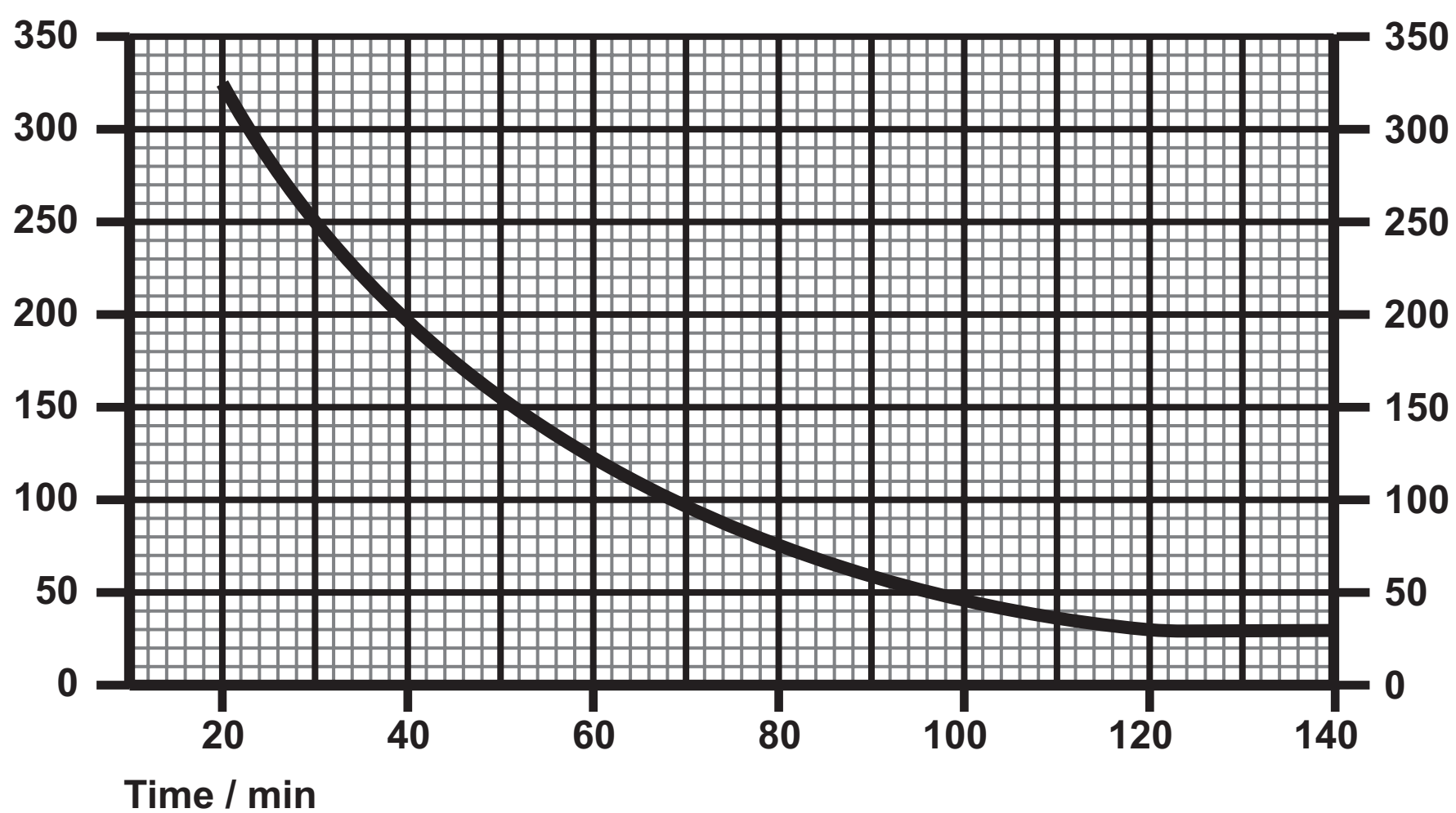


Question 7(b)(i)

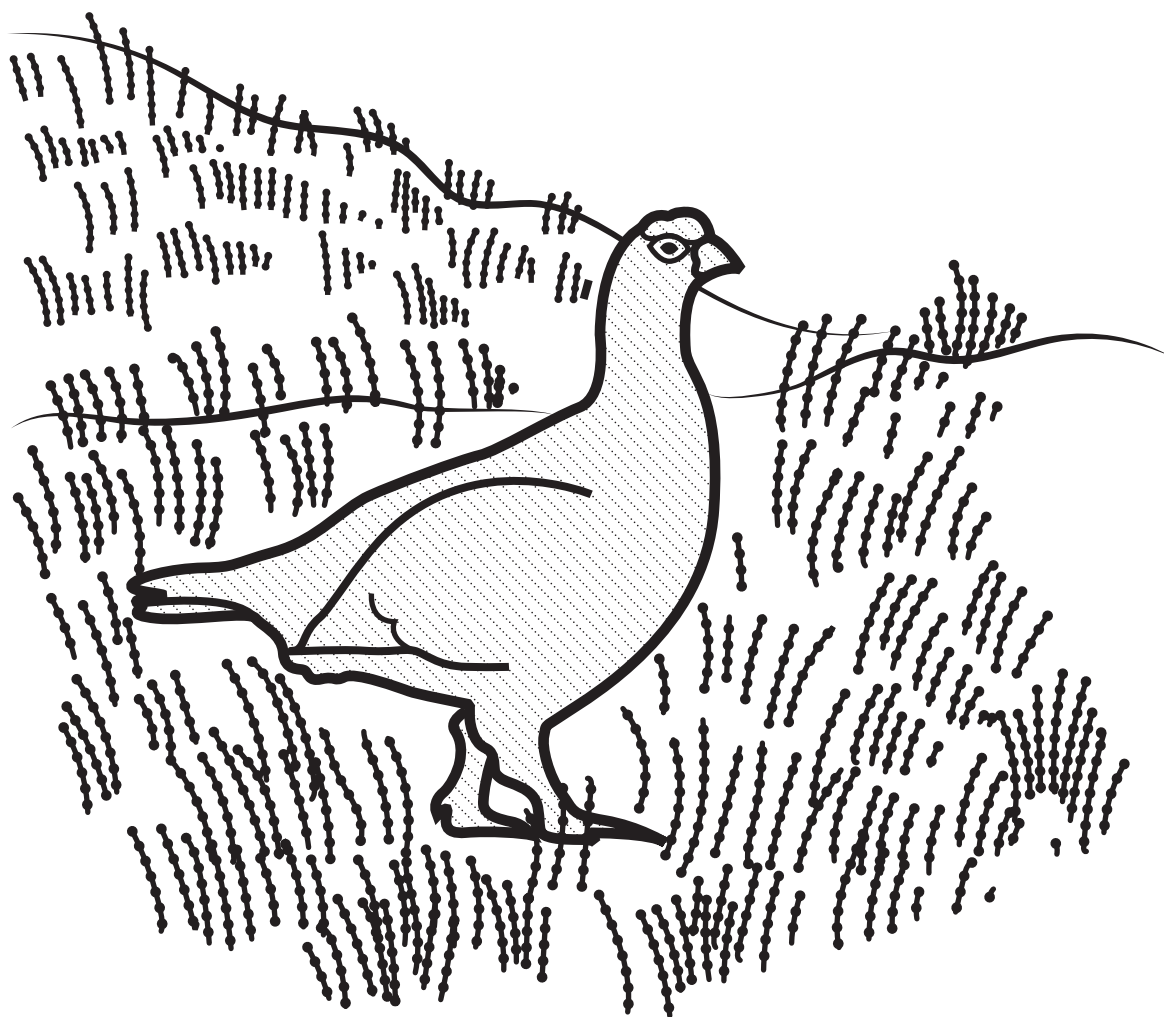


Question 7(c)(i)

Concentration of inulin in
blood plasma / mg dm^{-3}



Question 8

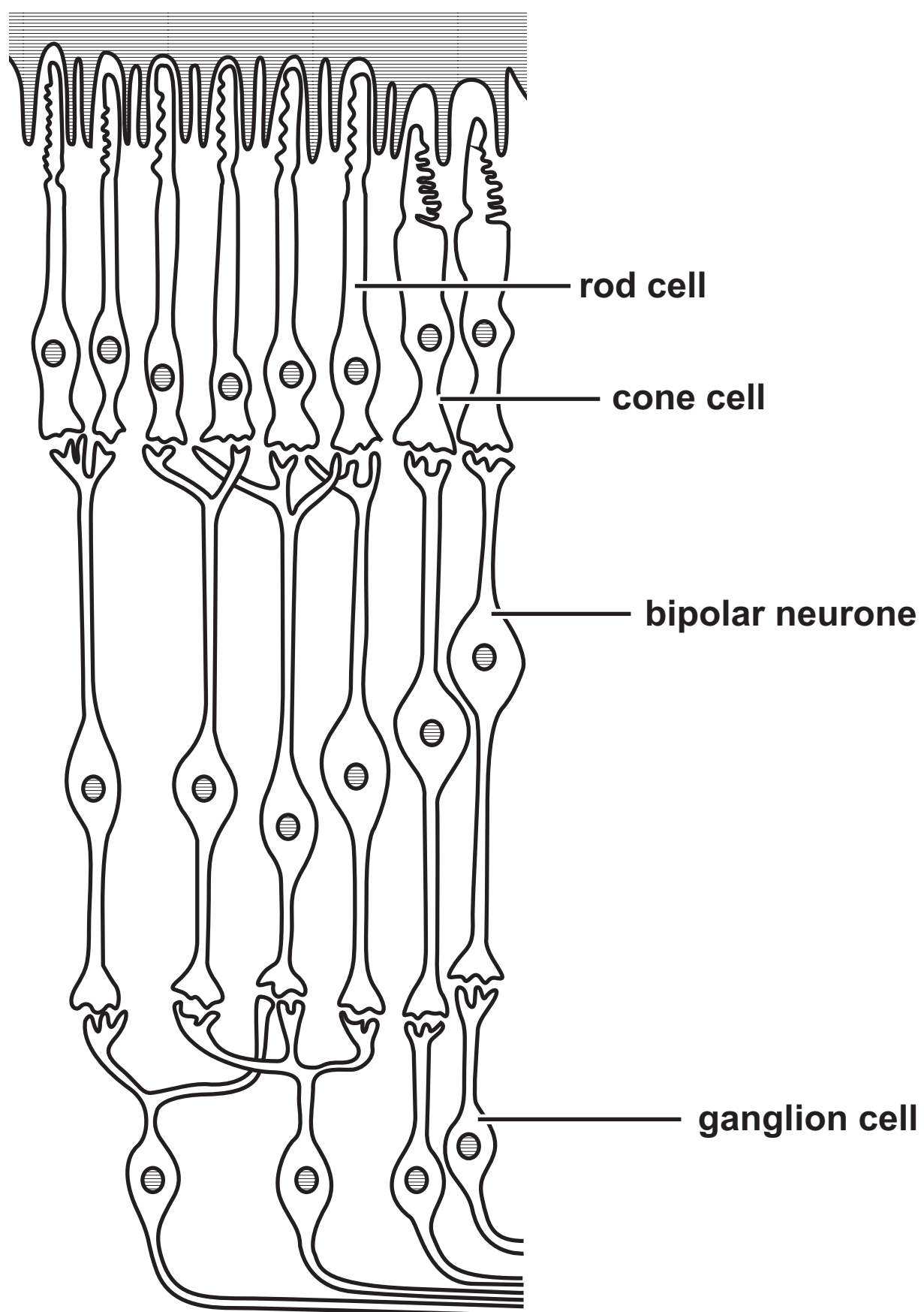


Age of heather plant/years	Rank of age of heather plant	Ratio of leaf area : woody stem area	Rank of leaf area : woody stem area	d	d ²
16	4	0.7	4.5	-0.5	0.25
15	5	0.4	8	-3	9
12	6	0.6	6	0	0
4	9	2.0	1	8	64
7	8	1.1		5.5	30.25
22	1	0.2	10	-9	81
20	2	0.3	9	-7	49
3	10	1.1			
17	3	0.5	7	-4	16
11	7	0.7	4.5	2.5	6.25

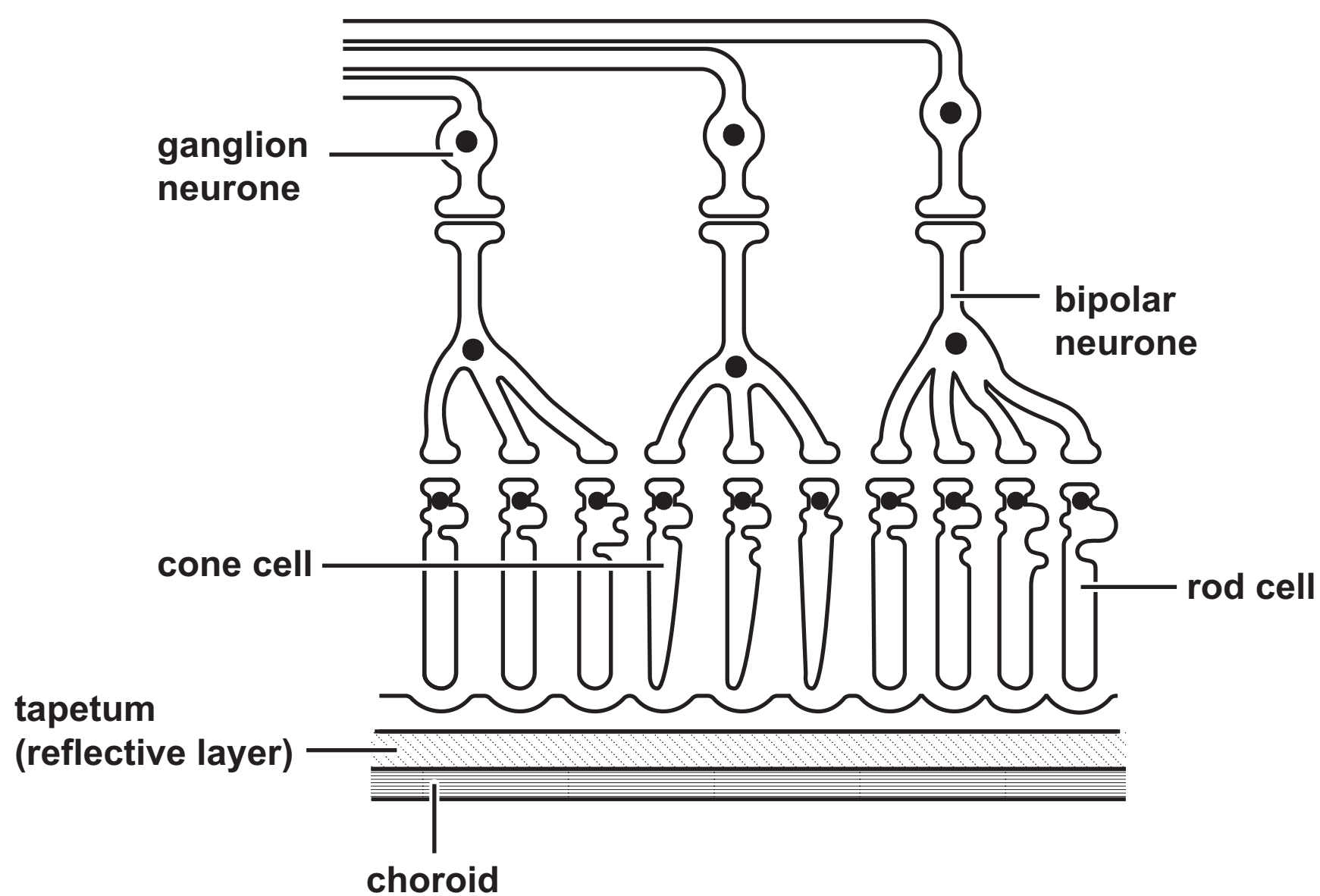
Question 8(b)(iii)

n	Level of significance	
	P = 0.05	P = 0.01
5	1.000	—
6	0.886	1.000
7	0.786	0.929
8	0.738	0.881
9	0.700	0.833
10	0.648	0.794
11	0.618	0.755

Question 9(a)(i)



Question 9(b) – Diagram



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Question 9(b)

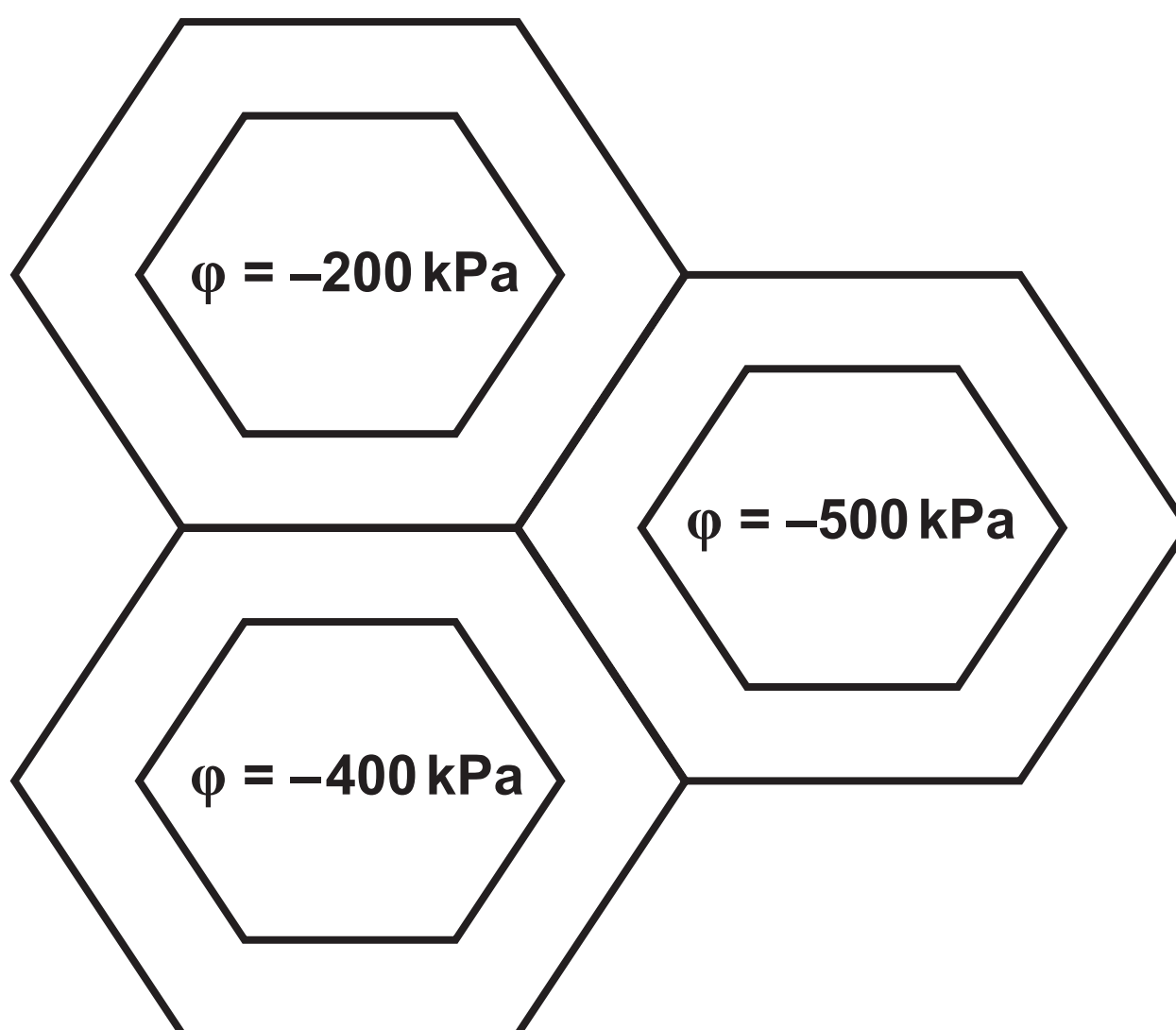
TABLE 1

Distribution of rods and cones	Density of cells in retina / cells per mm ²	
	human	cat
Highest cone density	199 000	27 000
Highest rod density	160 000	460 000
Cone density around edge of retina	5 000	<3 000
Rod density around edge of retina	40 000	250 000

TABLE 2

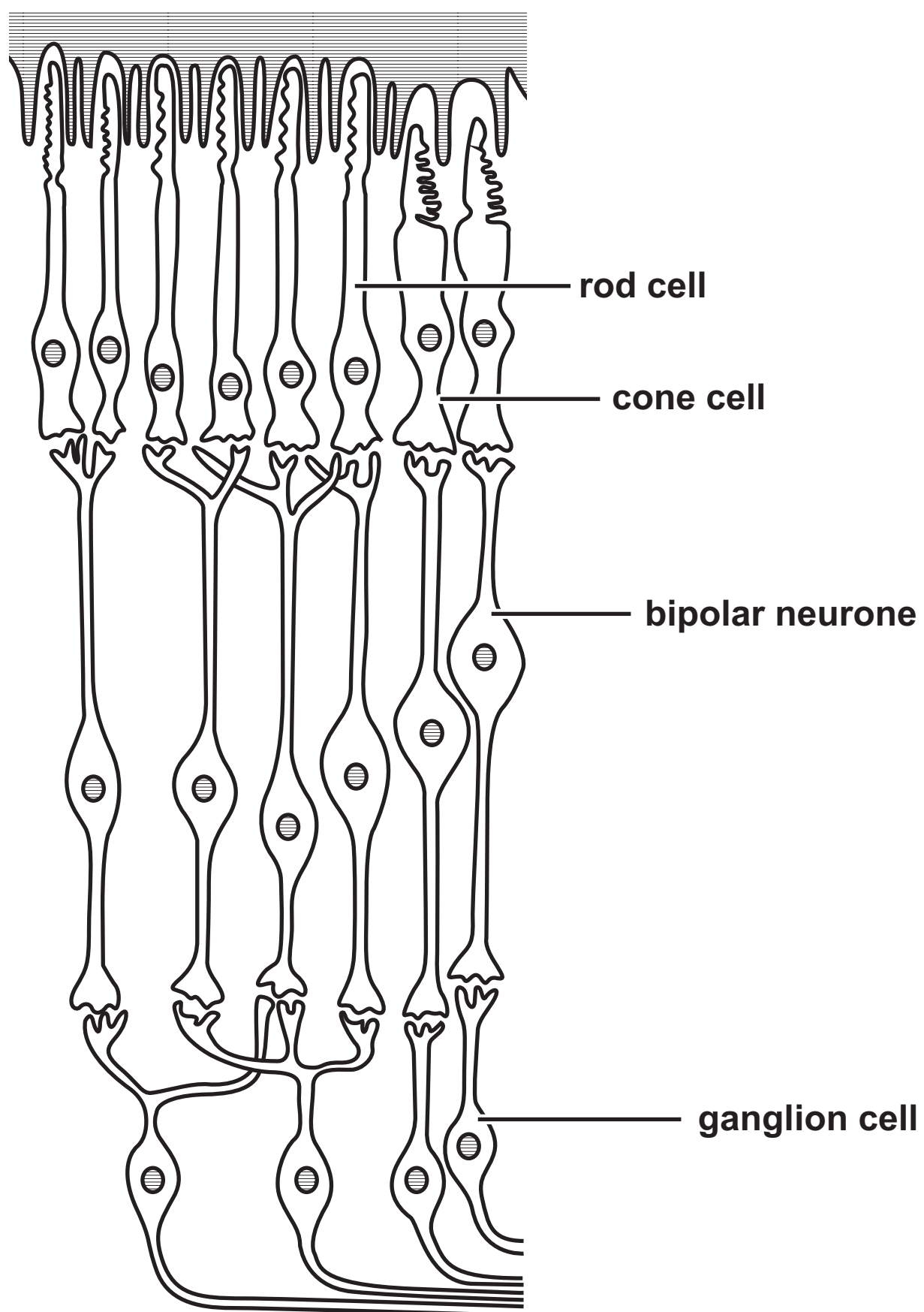
Species	When active	Total number of cells × 10 ⁶	
		rod cells	cone cells
Rat	night	30	3
Night monkey	night	150	3
Marmoset monkey	day	6	11
Saimiri monkey	day	30	10

Question 7(b)(i) – spare copy



Age of heather plant/years	Rank of age of heather plant	Ratio of leaf area : woody stem area	Rank of leaf area : woody stem area	d	d ²
16	4	0.7	4.5	-0.5	0.25
15	5	0.4	8	-3	9
12	6	0.6	6	0	0
4	9	2.0	1	8	64
7	8	1.1		5.5	30.25
22	1	0.2	10	-9	81
20	2	0.3	9	-7	49
3	10	1.1			
17	3	0.5	7	-4	16
11	7	0.7	4.5	2.5	6.25

Question 9(a)(i) – spare copy



SOURCE INFORMATION

Question 1(a)

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Question 6(a)

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Question 8

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