PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 2: CELLS AND CONTROL (PACK 4)

SCORE	PERCENTAGE
/58	%

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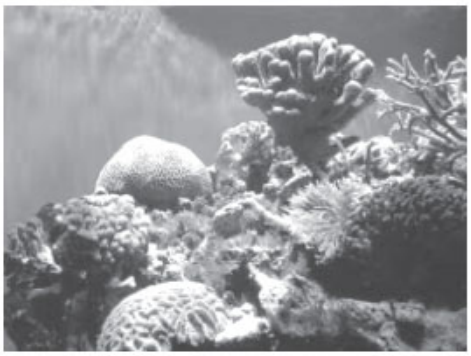
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Q1.

Corals are animals that live on the sea bed.

The photograph shows some species of coral.



After fertilisation, mitosis takes place to form an embryo.

The embryo develops into new coral.

(i) Describe mitosis.

(3)

.....

.....

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(ii) Describe how the embryo develops into new coral.

(3)

.....

.....

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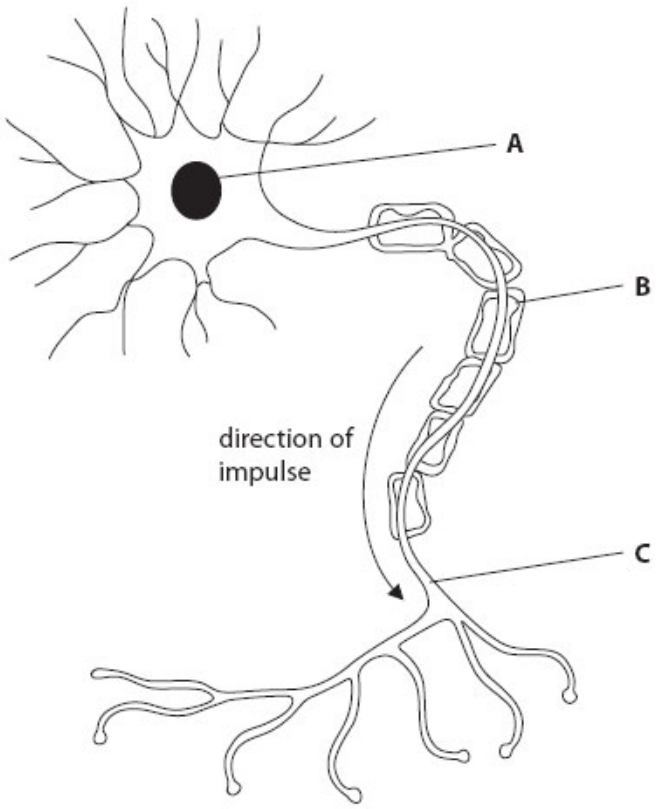
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Q2.

The diagram shows a motor neurone.



(i) Name the structures labelled **A**, **B**and **C**.

(3)

A .....

B .....

C .....

(ii) When the brain receives impulses from receptor cells it coordinates a response.

Complete the sentence by putting a cross (☒) in the box next to your answer.

Responses are carried out by

(1)

☒ **A** alleles

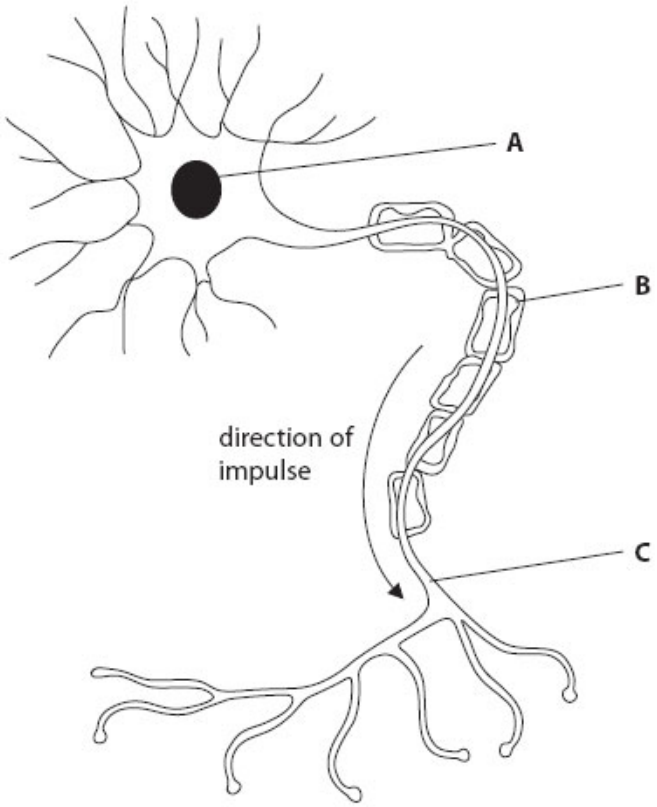
☒ **B** dendrons

☒ **C** effectors

☒ **D** senses

Q3.

The diagram shows a motor neurone.



(i) Name the structures labelled **A**, **B**and **C**.

(3)

A .....

B .....

C .....

(ii) When the brain receives impulses from receptor cells it coordinates a response.

Complete the sentence by putting a cross (☒) in the box next to your answer.

Responses are carried out by

(1)

- ☒ **A** alleles
- ☒ **B** dendrons
- ☒ **C** effectors
- ☒ **D** senses

Q4.

Measles is a disease caused by a virus.

A measles infection can cause inflammation of the brain.

Figure 11 shows a brain.

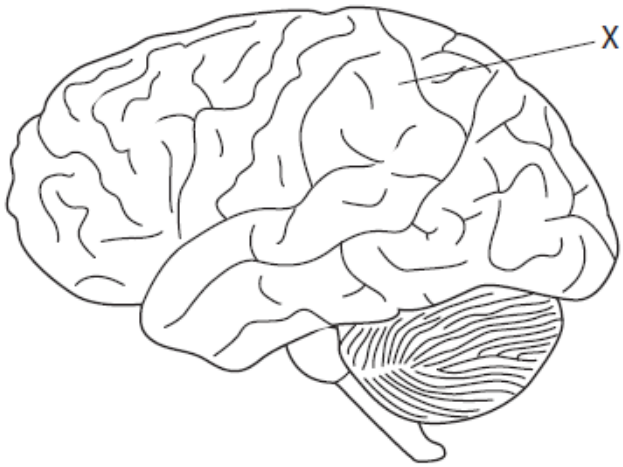


Figure 11

(i) Name the part of the brain labelled X.

(1)

.....

(ii) The death rate from measles is 0.15%.

In 2015, 134 250 people died from measles.

Calculate the number of people infected with measles in 2015.

Give your answer in standard form.

(3)

..... people

(Total for question = 4 marks)

Q5.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Figure 10 shows a neurone.

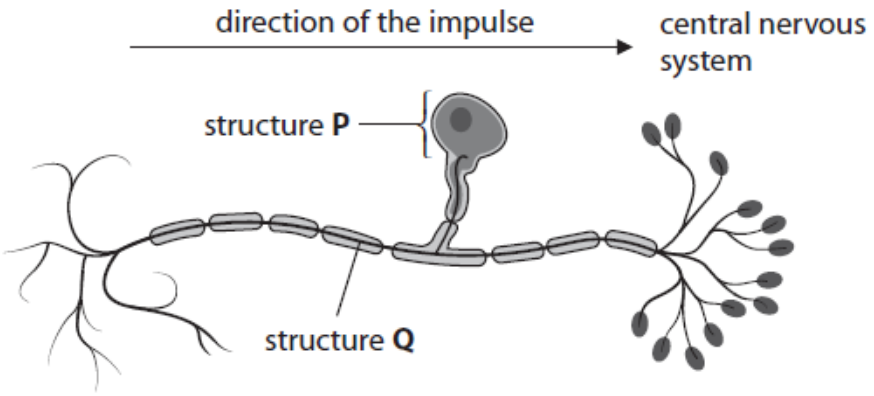


Figure 10

(i) Name the type of neurone shown in Figure 10.

(1)

.....

(ii) Which row identifies structure **P** and structure **Q**?

(1)

		structure P	structure Q
☒	**A**	myelin sheath	axon
☒	**B**	cell body	dendron
☒	**C**	myelin sheath	dendron
☒	**D**	cell body	axon

(Total for question = 2 marks)

Q6.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Figure 7 shows a neurone.

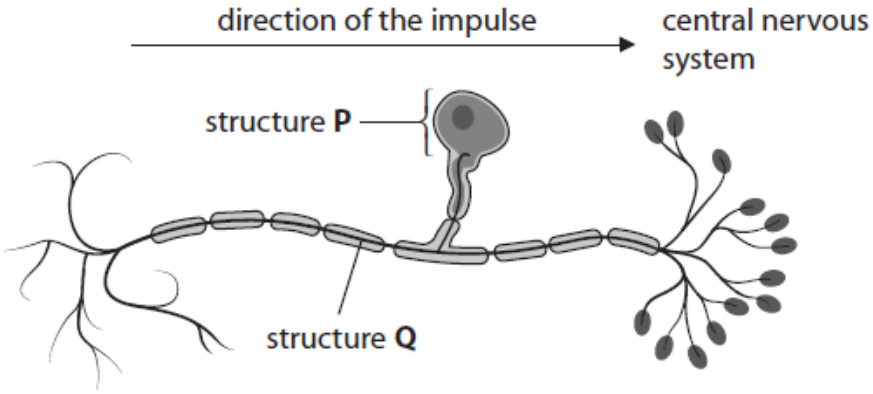


Figure 7

(i) Name the type of neurone shown in Figure 7.

(1)

.....

(ii) Which row identifies structure **P** and structure **Q**?

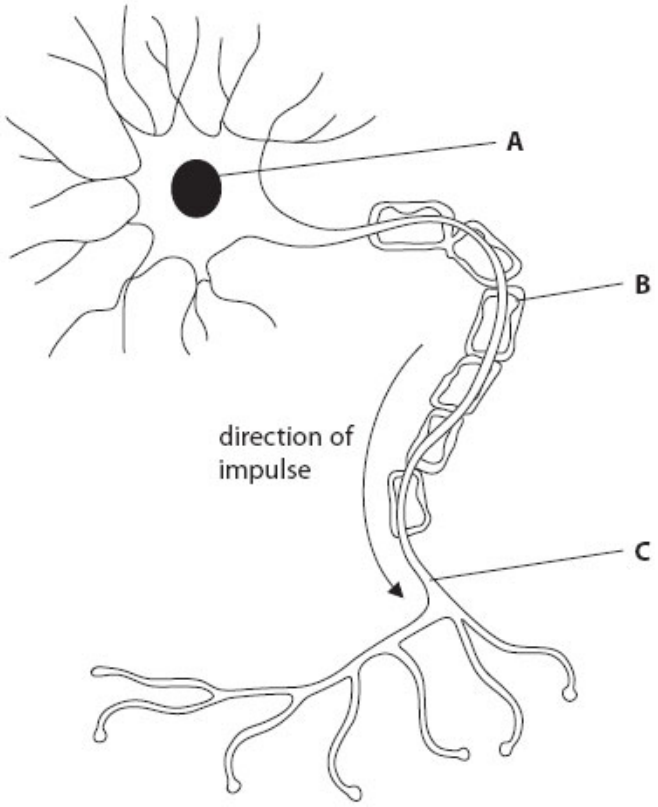
(1)

		structure P	structure Q
☒	**A**	myelin sheath	axon
☒	**B**	cell body	dendron
☒	**C**	myelin sheath	dendron
☒	**D**	cell body	axon

(Total for question = 2 marks)

Q7.

The diagram shows a motor neurone.



(a) (i) Name the structures labelled **A**, **B**and **C**.

(3)

A .....

B .....

C .....

(ii) When the brain receives impulses from receptor cells it coordinates a response.

Complete the sentence by putting a cross (☒) in the box next to your answer.

Responses are carried out by

(1)

- ☒ **A** alleles
- ☒ **B** dendrons
- ☒ **C** effectors
- ☒ **D** senses

(b) A response can be affected by drugs.

The effect of drinking alcohol on reaction time was investigated using five adult volunteers A, B, C, D and E.

After drinking a number of units of alcohol, the reaction time for each volunteer was measured

three times.

The results are shown in the table.

		Reaction time / ms			
Volunteer	**Number of units of alcohol drunk**	**1st attempt**	**2nd attempt**	**3rd attempt**	**Mean**
A	0.5	34	38	27	33
B	1.5	36	47	40	41
C	3.0	59	62	59	60
D	4.5	67	60	62	
E	6.0	80	68	83	77

(i) Calculate the mean reaction time for volunteer D.

(2)

Answer ..... ms

(ii) Explain why alcohol causes a change in reaction time.

(2)

.....

.....

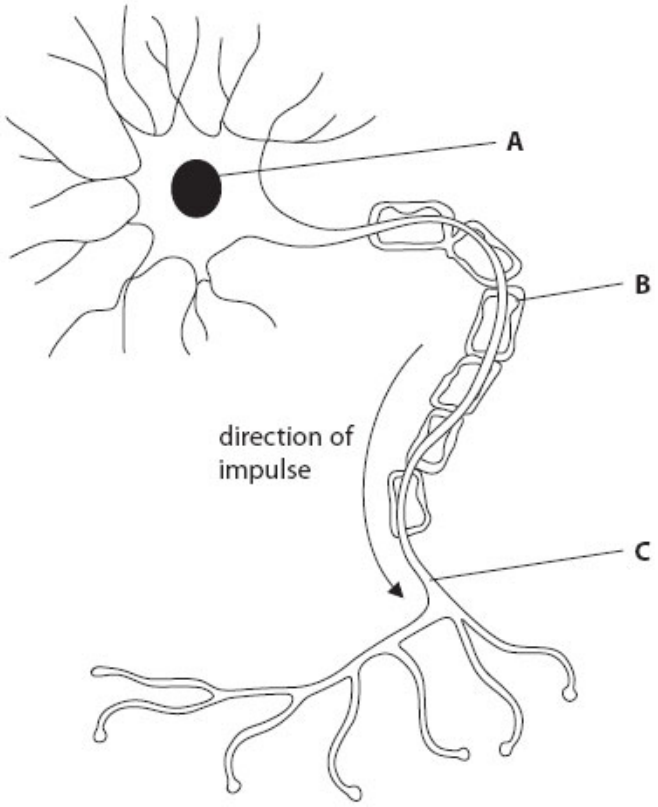
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(Total for Question is 8 marks)

Q8.

The diagram shows a motor neurone.



(a) (i) Name the structures labelled **A**, **B**and **C**.

(3)

A .....

B .....

C .....

(ii) When the brain receives impulses from receptor cells it coordinates a response.

Complete the sentence by putting a cross (☒) in the box next to your answer.

Responses are carried out by

(1)

- ☒ **A** alleles
- ☒ **B** dendrons
- ☒ **C** effectors
- ☒ **D** senses

(b) A response can be affected by drugs.

The effect of drinking alcohol on reaction time was investigated using five adult volunteers A, B, C, D and E.

After drinking a number of units of alcohol, the reaction time for each volunteer was measured

three times.

The results are shown in the table.

		Reaction time / ms				
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C	3.0	59	62	59	60	
D	4.5	67	60	62		
E	6.0	80	68	83	77	

(i) Calculate the mean reaction time for volunteer D.

(2)

Answer ..... ms

(ii) Explain why alcohol causes a change in reaction time.

(2)

.....

.....

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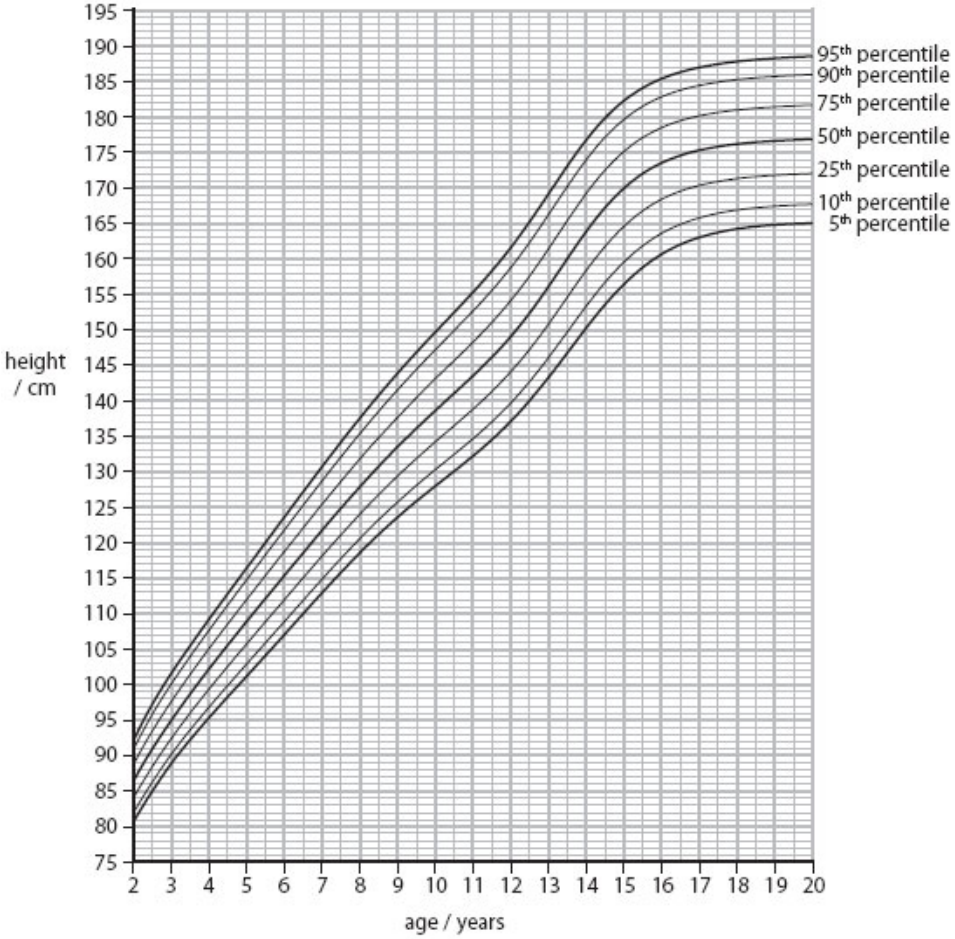
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(Total for Question is 8 marks)

Q9.

Height can be used to monitor growth.

The graph shows a percentile chart for height for males aged between 2 and 20 years.



(i) Describe how the height of males changes from the age of 2 to 20 years.

(2)

.....

.....

.....

.....

(ii) Calculate the difference in height of an 11 year old male in the 95th percentile and an 11 year old male in the 5th percentile.

(2)

answer = ... cm

(iii) Explain what is meant by the 95th percentile on this graph.

(2)

.....

.....

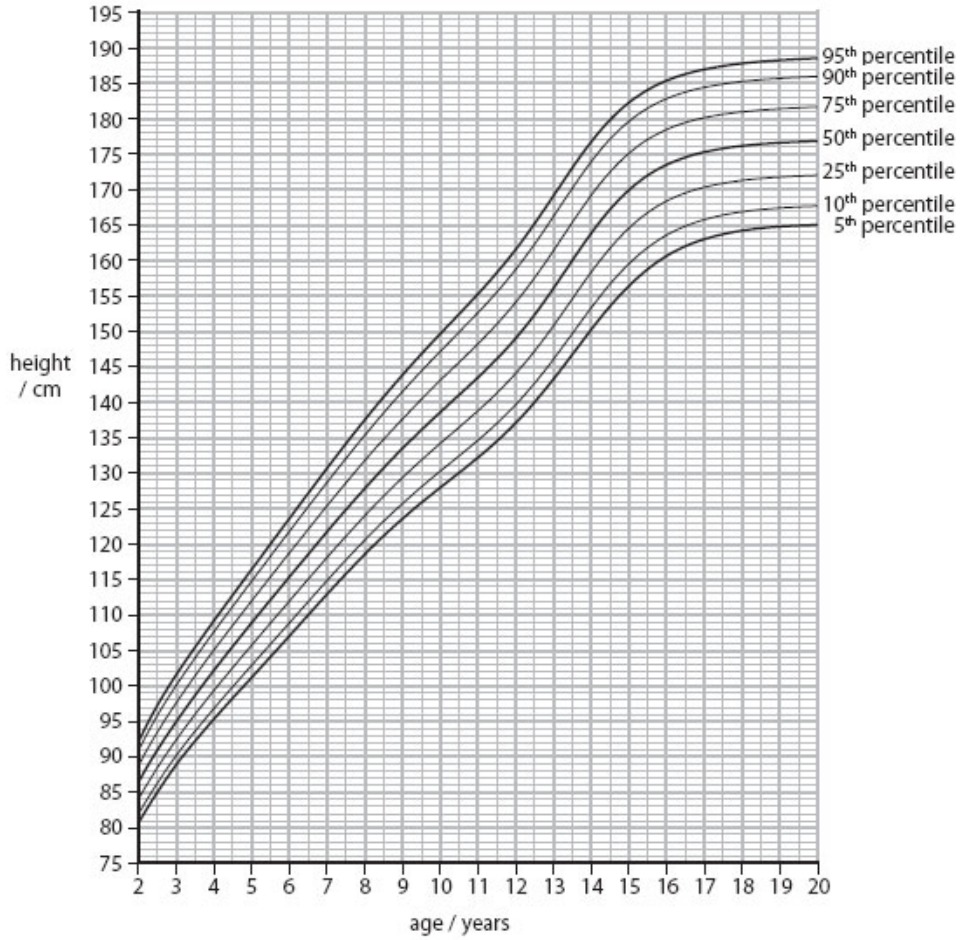
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Q10.

Height can be used to monitor growth.

The graph shows a percentile chart for height for males aged between 2 and 20 years.



(i) Describe how the height of males changes from the age of 2 to 20 years.

(2)

.....

.....

.....

.....

(ii) Calculate the difference in height of an 11 year old male in the 95th percentile and an 11 year old male in the 5th percentile.

(2)

answer = ... cm

(iii) Explain what is meant by the 95th percentile on this graph.

(2)

.....

.....

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.....

Q11.

Humans have reflexes.

Describe the route of an impulse through a reflex arc.

(4)

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Q12.

Humans have reflexes.

Describe the route of an impulse through a reflex arc.

(4)

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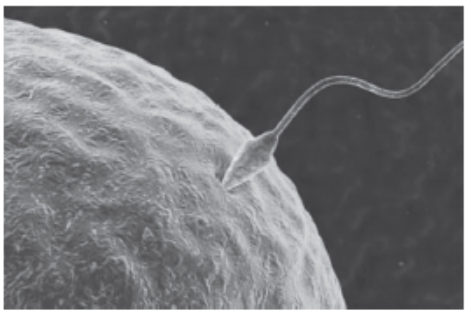
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Q13.

The photograph shows a sperm cell and an egg cell just before fertilisation.



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Which row describes the sperm cell and the egg cell before fertilisation?

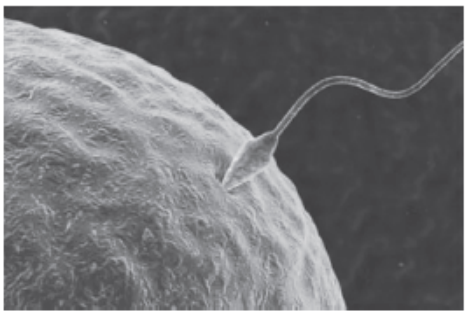
Place a cross (☒) in the box next to your answer.

(1)

	sperm cell	egg cell
☐ A	diploid	diploid
☐ B	diploid	haploid
☐ C	haploid	diploid
☐ D	haploid	haploid

Q14.

The photograph shows a sperm cell and an egg cell just before fertilisation.



© Education Portal

Which row describes the sperm cell and the egg cell before fertilisation?

Place a cross (☒) in the box next to your answer.

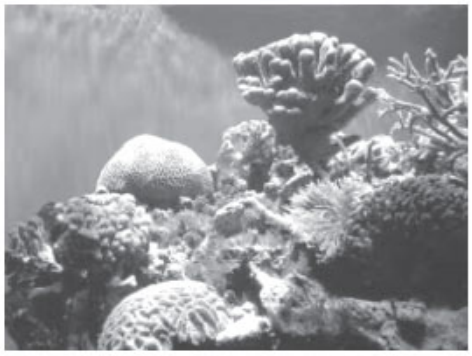
(1)

	sperm cell	egg cell
☐ A	diploid	diploid
☐ B	diploid	haploid
☐ C	haploid	diploid
☐ D	haploid	haploid

Q15.

Corals are animals that live on the sea bed.

The photograph shows some species of coral.



(a) Corals can reproduce sexually, releasing sperm cells into the water.

The mass of DNA in one sperm cell from a species of coral is 0.5 picogram.

(i) Suggest the mass of DNA that would be present in an unfertilised egg cell of the same species.

(1)

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The term used to describe the number of chromosomes in an egg or sperm cell is

(1)

☒ **A** diploid

☒ **B** gamete

☒ **C** haploid

☒ **D** zygote

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The base pairs in DNA are

(1)

☒

A thymine with adenine, cytosine with guanine

☒ **B** thymine with guanine, adenine with cytosine

☒ **C** uracil with adenine, guanine with cytosine

☒ **D** uracil with thymine, guanine with cytosine

(iv) Name the bond that joins the base pairs together.

(1)

.....

(b) After fertilisation, mitosis takes place to form an embryo.

The embryo develops into new coral.

(i) Describe mitosis.

(3)

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(ii) Describe how the embryo develops into new coral.

(3)

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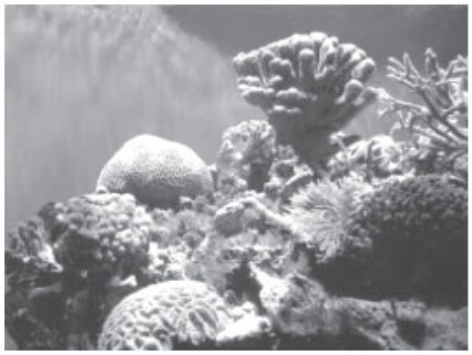
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(Total for Question = 10 marks)

Q16.

Corals are animals that live on the sea bed.

The photograph shows some species of coral.



(a) Corals can reproduce sexually, releasing sperm cells into the water.

The mass of DNA in one sperm cell from a species of coral is 0.5 picogram.

(i) Suggest the mass of DNA that would be present in an unfertilised egg cell of the same species.

(1)

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The term used to describe the number of chromosomes in an egg or sperm cell is

(1)

☒ **A** diploid

☒ **B** gamete

☒ **C** haploid

☒ **D** zygote

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The base pairs in DNA are

(1)

☒ **A** thymine with adenine, cytosine with guanine

☒ **B** thymine with guanine, adenine with cytosine

☒ **C** uracil with adenine, guanine with cytosine

☒ **D** uracil with thymine, guanine with cytosine

(iv) Name the bond that joins the base pairs together.

(1)

.....

(b) After fertilisation, mitosis takes place to form an embryo.

The embryo develops into new coral.

(i) Describe mitosis.

(3)

.....

.....

.....

.....

.....

.....

(ii) Describe how the embryo develops into new coral.

(3)

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(Total for Question = 10 marks)

Q17.

Short-sightedness, also known as myopia, is a common eye defect.

Figure 4 shows a section through the human eye with light rays from a distant object.

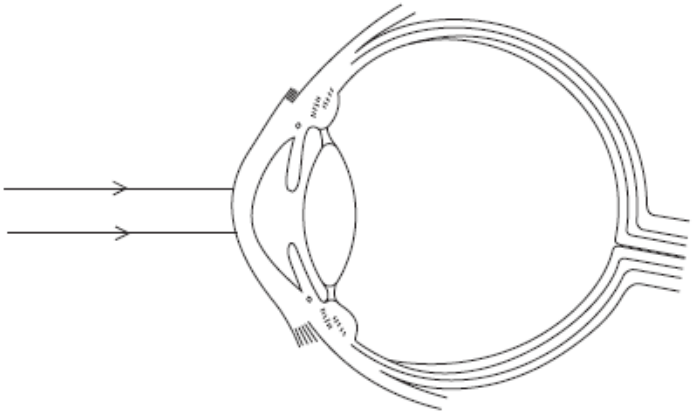


Figure 4

(i) Complete the diagram to show the light rays for this individual who is short-sighted.

(2)

(ii) Explain how laser technology can be used to correct short-sightedness.

(2)

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.....

(iii) Which structure controls the amount of light entering the eye?

(1)

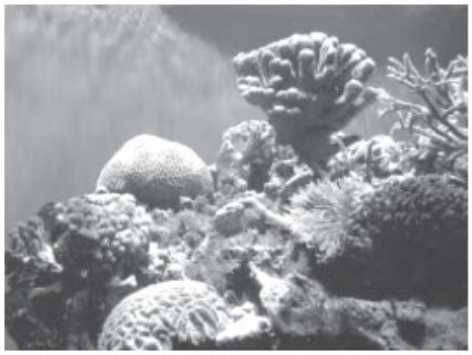
- ☒ **A** cornea
- ☒ **B** iris
- ☒ **C** retina
- ☒ **D** lens

(Total for question = 5 marks)

Q18.

Corals are animals that live on the sea bed.

The photograph shows some species of coral.



Corals can reproduce sexually, releasing sperm cells into the water.

The mass of DNA in one sperm cell from a species of coral is 0.5 picogram.

(i) Suggest the mass of DNA that would be present in an unfertilised egg cell of the same species.

(1)

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The term used to describe the number of chromosomes in an egg or sperm cell is

(1)

☒ **A** diploid

☒ **B** gamete

☒ **C** haploid

☒ **D** zygote

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The base pairs in DNA are

(1)

☒ **A** thymine with adenine, cytosine with guanine

☒ **B** thymine with guanine, adenine with cytosine

☒ **C** uracil with adenine, guanine with cytosine

☒ **D** uracil with thymine, guanine with cytosine

(iv) Name the bond that joins the base pairs together.

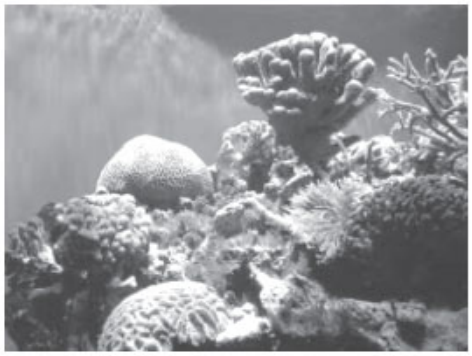
(1)

.....

Q19.

Corals are animals that live on the sea bed.

The photograph shows some species of coral.



Corals can reproduce sexually, releasing sperm cells into the water.

The mass of DNA in one sperm cell from a species of coral is 0.5 picogram.

(i) Suggest the mass of DNA that would be present in an unfertilised egg cell of the same species.

(1)

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The term used to describe the number of chromosomes in an egg or sperm cell is

(1)

☒ **A** diploid

☒

B gamete

☒ **C** haploid

☒ **D** zygote

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The base pairs in DNA are

(1)

☒ **A** thymine with adenine, cytosine with guanine

☒ **B** thymine with guanine, adenine with cytosine

☒ **C** uracil with adenine, guanine with cytosine

☒ **D** uracil with thymine, guanine with cytosine

(iv) Name the bond that joins the base pairs together.

(1)

.....

Q20.

Eye tests can detect some brain tumours.

(i) State **one** other way that brain tumours can be detected.

(1)

.....

(ii) Describe why a brain tumour is difficult to treat.

(2)

.....

.....

.....

.....

(Total for question = 3 marks)

Q21.

The mitotic index is often used in the diagnosis of cancer.

State the effect of cancer on cell division.

(1)

.....

.....

(Total for question = 1 mark)

Q22.

The mitotic index is often used in the diagnosis of cancer.

State the effect of cancer on cell division.

(1)

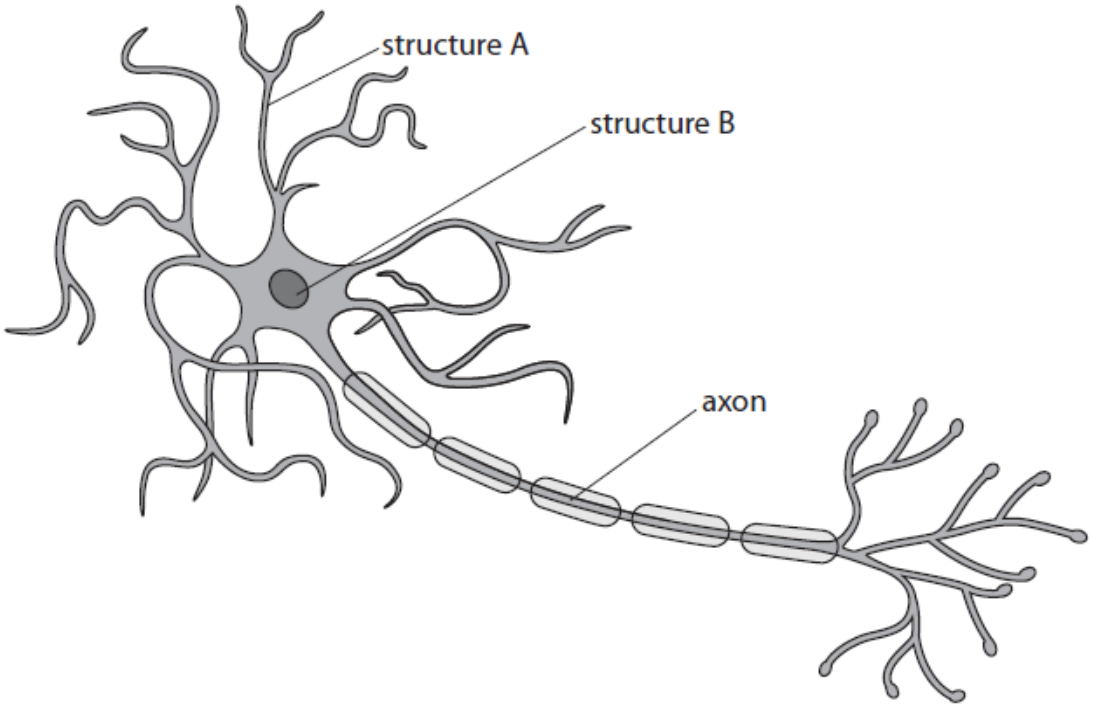
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(Total for question = 1 mark)

Q23.

Neurones form part of the nervous system.



(i) Name structures A and B.

(2)

structure A

.....

structure B

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The axon carries information along the neurone as

(1)

☒ **A** chemical messages

☒ **B** electrical impulses

☒ **C** neurotransmitters

☒ **D** hormonal responses

(iii) Describe the role of the myelin sheath surrounding the axon.

(2)

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.....

.....

.....

(iv) There is a gap between neurones.

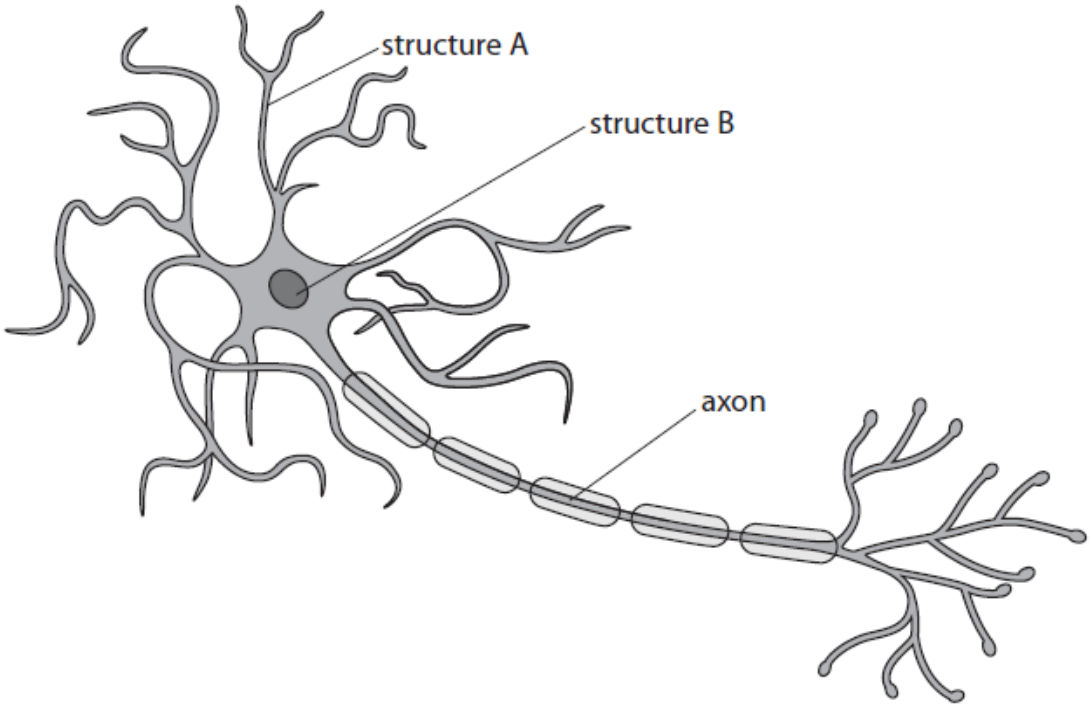
State the name for this gap between neurones.

(1)

.....

Q24.

Neurones form part of the nervous system.



(i) Name structures A and B.

(2)

structure A

.....

structure B

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The axon carries information along the neurone as

(1)

☒ **A** chemical messages

☒ **B** electrical impulses

☒ **C** neurotransmitters

☒ **D** hormonal responses

(iii) Describe the role of the myelin sheath surrounding the axon.

(2)

.....

.....

.....

.....

.....

.....

(iv) There is a gap between neurones.

State the name for this gap between neurones.

(1)

.....

Q25.

Figure 7 shows a plant cell in anaphase of mitosis.



Figure 7

Describe what occurs during anaphase of mitosis.

(3)

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.....

.....

.....

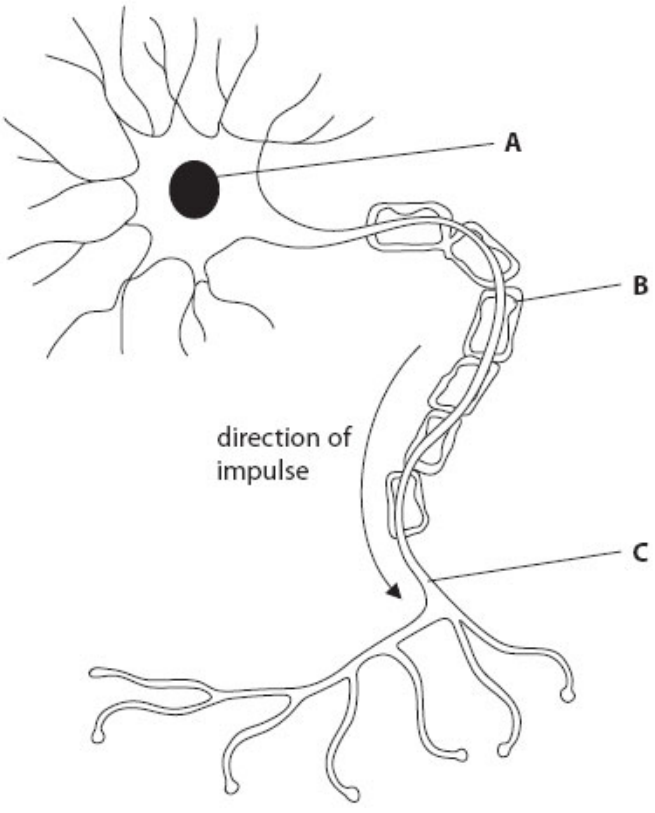
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(Total for question = 3 marks)

Q26.

The diagram shows a motor neurone.



A response can be affected by drugs.

The effect of drinking alcohol on reaction time was investigated using five adult volunteers A, B, C, D and E.

After drinking a number of units of alcohol, the reaction time for each volunteer was measured three times.

The results are shown in the table.

		Reaction time / ms			
Volunteer	**Number of units of alcohol drunk**	**1st attempt**	**2nd attempt**	**3rd attempt**	**Mean**
A	0.5	34	38	27	33
B	1.5	36	47	40	41
C	3.0	59	62	59	60
D	4.5	67	60	62	
E	6.0	80	68	83	77

(i) Calculate the mean reaction time for volunteer D.

(2)

Answer ..... ms

(ii) Explain why alcohol causes a change in reaction time.

(2)

.....

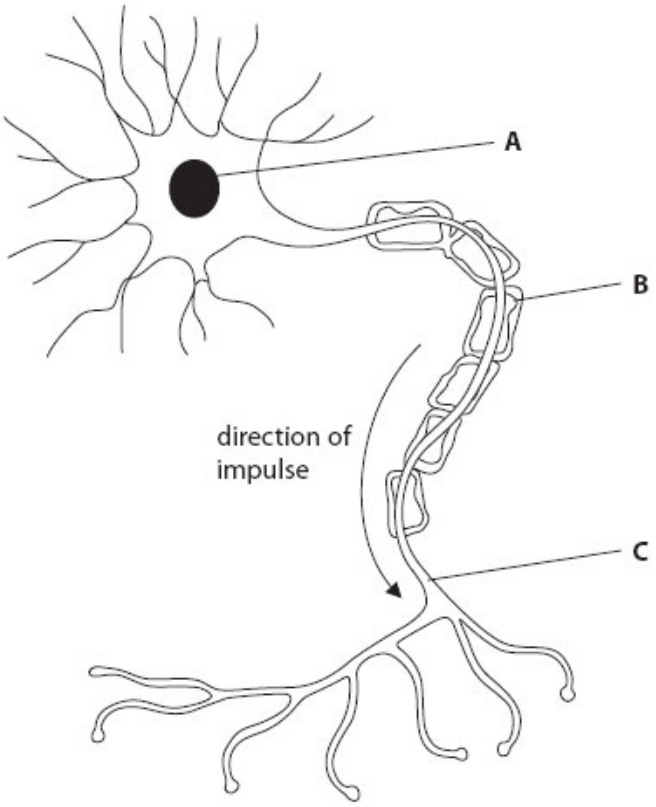
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Q27.

The diagram shows a motor neurone.



A response can be affected by drugs.

The effect of drinking alcohol on reaction time was investigated using five adult volunteers A, B, C, D and E.

After drinking a number of units of alcohol, the reaction time for each volunteer was measured three times.

The results are shown in the table.

		Reaction time / ms				
Volunteer	**Number of units of alcohol drunk**	**1st attempt**	**2nd attempt**	**3rd attempt**	**Mean**	
A	0.5	34	38	27	33	
B	1.5	36	47	40	41	
C	3.0	59	62	59	60	
D	4.5	67	60	62		
E	6.0	80	68	83	77	

(i) Calculate the mean reaction time for volunteer D.

(2)

Answer ..... ms

(ii) Explain why alcohol causes a change in reaction time.

(2)

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Q28.

The optic nerve carries information from the back of the eye to the brain.

The optic nerve is 47 mm in length.

Nerve impulses travel at 75 metres per second.

(i) Calculate the time an impulse takes to travel the length of the optic nerve.

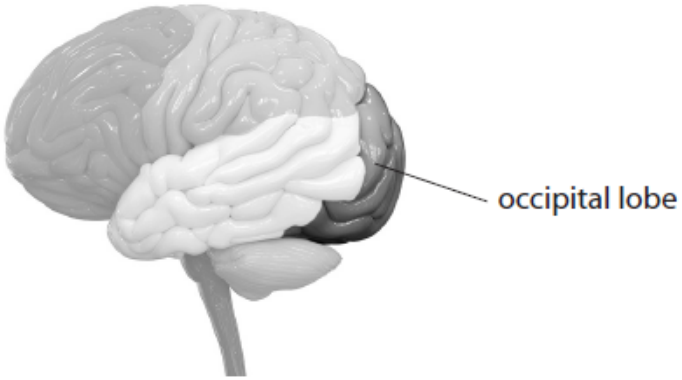
Use the equation: $\text{speed} = \frac{\text{distance}}{\text{time}}$

(3)

..... seconds

(ii) The impulse travels to the occipital lobe of the brain.

The occipital lobe is labelled in Figure 4.



(Source: © Magic mine/Shutterstock)

Figure 4

Which part of the brain contains the occipital lobe?

(1)

☒ **A** cerebral hemispheres

☒ **B** medulla oblongata

☒ **C** cerebellum

☒ **D** hypothalamus

(iii) State the sense most likely to be affected if the occipital lobe is damaged.

(1)

.....

(Total for question = 5 marks)

Q29.

Give the name of the phase of the cell cycle during which DNA replication takes place.

(1)

.....

(Total for question = 1 mark)

Q30.

During prophase of mitosis, the

(1)

☒ **A** cell elongates

☒ **B** cell halves in size

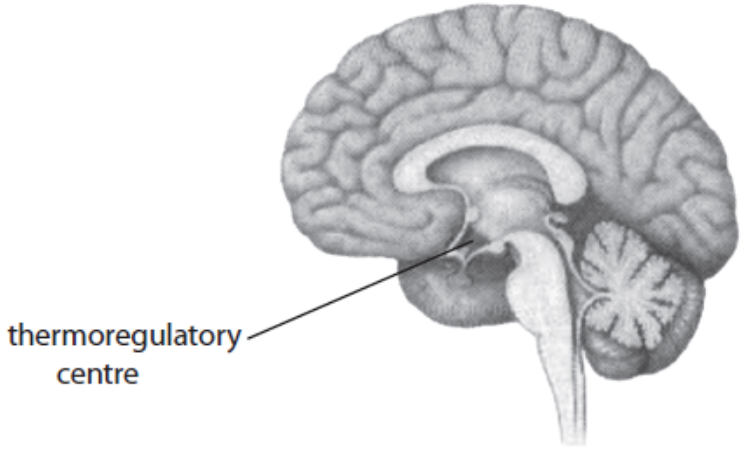
☒ **C** cytoplasm divides

☒ **D** nuclear membrane breaks down

(Total for question = 1 mark)

Q31.

The diagram shows a brain with the thermoregulatory centre labelled.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The part of the brain that contains the thermoregulatory centre is the

(1)

☒ **A** cerebrum

☒ **B** cerebellum

☒ **C** hypothalamus

☒ **D** medulla

(ii) The thermoregulatory centre controls internal body temperature.

Explain how the blood vessels in the skin help to control internal body temperature.

(4)

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Q32.

Transport and exchange of materials

Some students investigated water movement in plant cells.

They measured the mass of five pieces of potato.

Each piece of potato was put into a different concentration of salt solution.

After one hour the pieces of potato were dried and the mass of each was recorded.

The results are shown in the table.

concentration of salt solution / %	mass / g			percentage change / %
	start	after 1 hour	change	
0	10.2	13.1	+2.9	+28.4
10	9.8	11.4	+1.6	+16.3
20	10.3	9.8	–0.5	
30	10.1	8.9	–1.2	–11.9
40	9.7	7.7	–2.0	–20.6

(a) (i) Calculate the percentage change in the mass of the potato in the 20% salt solution.

(2)

..... %

(ii) Suggest why calculating a percentage change is more useful than calculating the change in mass in this investigation.

(1)

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(b) Mitosis occurs in plant cells during growth.

Describe the division of a cell by mitosis.

(3)

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*(c) Explain how active transport and diffusion provide a plant with named substances it needs for growth.

(6)

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(Total for question = 12 marks)

Q33.

Transport and exchange of materials

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.....

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(6)

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(Total for question = 12 marks)

Q34.

Figure 1 shows an eye.

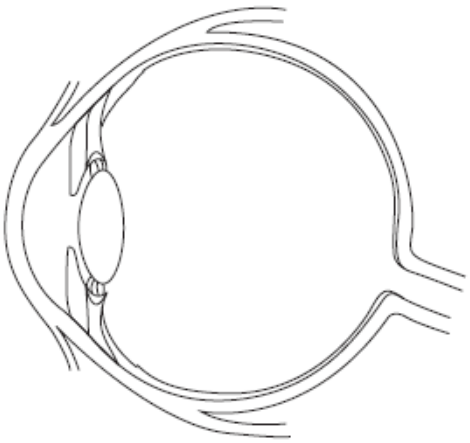


Figure 1

(i) When the eye changes from focusing on a distant object to focusing on a near object

(1)

☒ **A** the lens gets thinner to bend the light rays more

☒ **B** the lens gets thicker to bend the light rays more

☒ **C** the lens gets thinner to bend the light rays less

☒ **D** the lens gets thicker to bend the light rays less

(ii) Give a reason why people who are short-sighted cannot see distant objects clearly.

(1)

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.....

(iii) State the type of lens that can be used to correct short-sightedness.

(1)

.....

.....

(Total for question = 3 marks)

Q35.

The student observed 89 cells on the microscope slide.

Figure 4 shows the number of cells at each stage of the cell cycle.

stage of cell cycle	number of cells
Interphase	44
Prophase	12
Metaphase	6
Anaphase	18
Telophase	9

Figure 4

Use this equation to calculate the mitotic index for this slide.

$$\text{mitotic index} = \frac{\text{number of cells in mitosis}}{\text{total number of cells}} \times 100$$

Give your answer to three significant figures.

(3)

Mitotic index .....

(Total for question = 3 marks)

- cell divides / cell division / cell