

GCSE (9–1) Biology B (Twenty First Century Science)

H

J257/04 Depth in biology (Higher Tier)

Sample Question Paper

Date – Morning/Afternoon

Version 2.1

Time allowed: 1 hour 45 minutes

You may use:

- a scientific or graphical calculator
- a ruler



First name

Last name

Centre
number

Candidate
number

INSTRUCTIONS

- Use black ink. HB pencil may be used for graphs and diagrams only.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

INFORMATION

- The total mark for this paper is **90**.
- The marks for each question are shown in brackets [].
- Quality of extended responses will be assessed in questions marked with an asterisk (*).
- This document consists of **32** pages.

Answer **all** the questions.

1 A student did an experiment to find out more about the process of osmosis.

(a) The student was provided with ten pieces of potato, each about 5 cm long.

She was also given five dishes each containing a different **unknown** concentration of sugar solution.

The student put two pieces of potato in each dish and left them for 30 minutes. She then removed the potato pieces and re-measured their length.

The student recorded the results in Table 1.1.

Dish of sugar solution	Length of potato (cm)				Change in mean length (cm)	Percentage change (%)
	Original	After 30 minutes in sugar solution				
		Piece 1	Piece 2	Mean		
1	4.9	5.0	5.4	5.2	+0.3
2	5.1	4.3	4.1	4.2	−0.9	−18.4
3	5.0	4.8	4.4	4.6	−0.4	−8.0
4	5.2	5.7	5.9	5.8	+0.6	+11.5
5	4.9	4.8	4.8	4.8	−0.1	−2.0

Table 1.1

(i) The student has not finished working out the results.

Calculate the missing value and write it in the table.

[2]

- (ii) The table below shows the concentration of sugar solution in each of the five dishes.

Use the results from the student's experiment to show which solution was in each dish.

Write down the correct dish numbers from Table 1.1 in the column headed '**Dish**'.

Sugar solution concentration (mol/dm ³)	Dish
0.2	
0.4	
0.6	
0.8	
1.0	

- (iii) The student measured the length of the pieces of potato as a quick way to obtain results.

Why does this method not measure the total change to the pieces of potato?

.....
 [1]

- (iv) How could the student modify the experiment to show the rate of water movement by osmosis in pieces of potato?

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 [2]

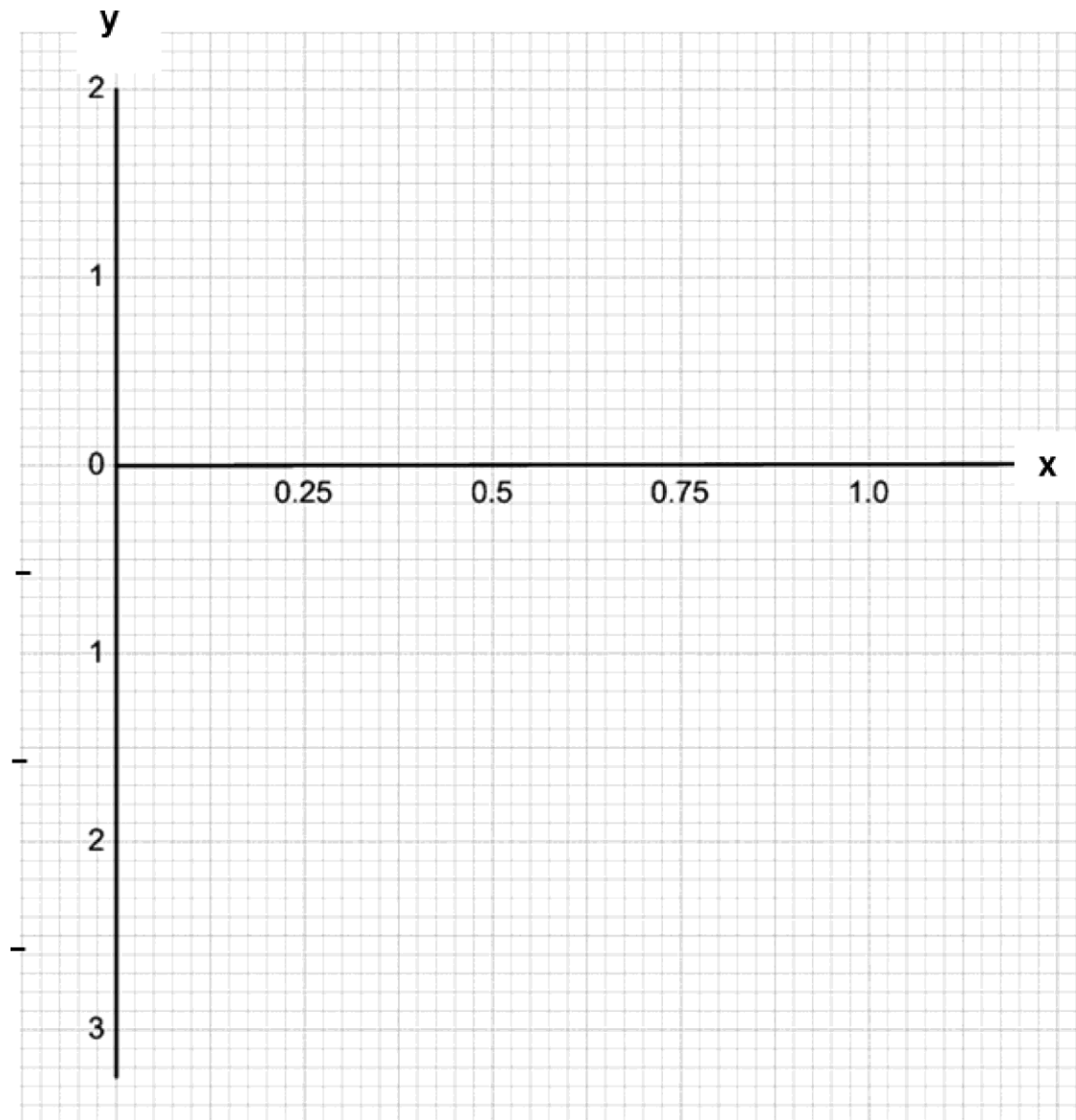
(b) Another student did a similar experiment.

These are his results in Table 1.2.

Sugar solution concentration (mol/dm³)	Change in mean length (mm)
1.00	−1.9
0.75	−1.2
0.50	−0.5
0.25	+0.3
0.00	+1.0

Table 1.2

- (i) Using the information in Table 1.2, label the x and y axis on the grid below. [1]



- (ii) Plot the student's results on the grid. [2]
 (iii) Draw a line of best fit on the grid. [1]
 (iv) Use your graph to find the concentration of sugar solution where the potato pieces do not change in length.

Sugar solution concentration = mol / dm³ [1]

- (v) What can you conclude, in terms of osmosis, at this concentration?

.....

 [1]

- 2 A group of students do an enzyme investigation.

Catalase is the name of the enzyme.

The word equation below shows the reaction.



- (a) Name the substrate and the enzyme in this reaction.

Substrate:

Enzyme:.....[1]

- (b)* The students investigated the effect of temperature on the rate of this enzyme-controlled reaction.

Fig 2.1 shows a graph of their results.

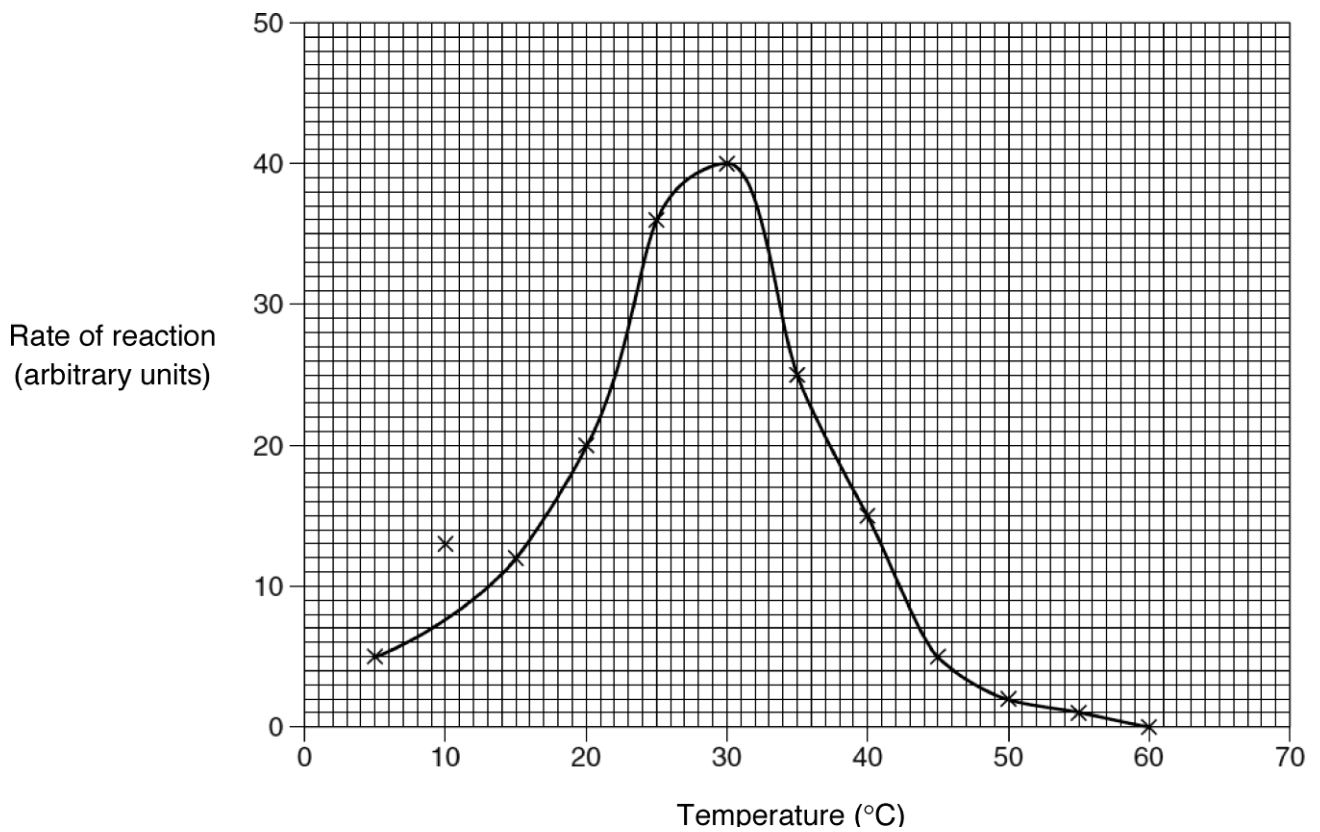


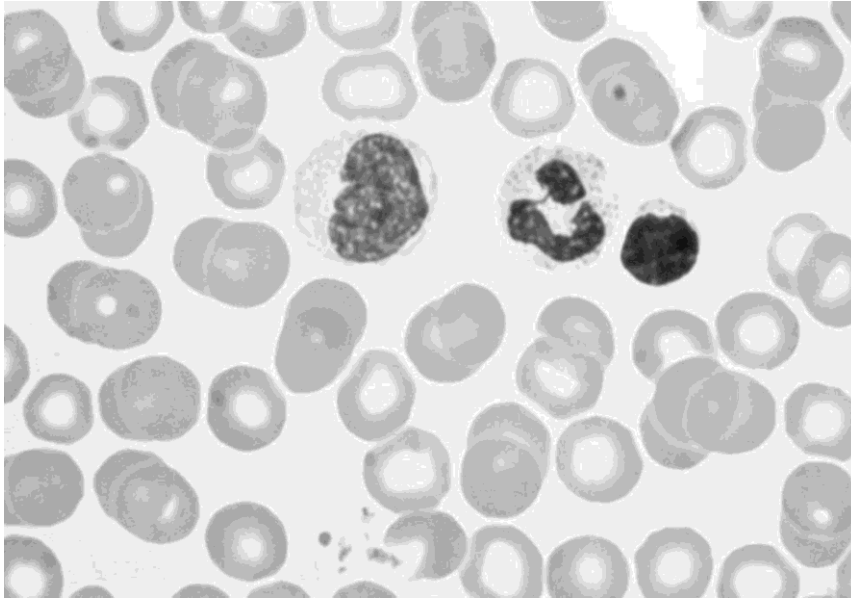
Fig 2.1

Using the graph in Fig 2.1, describe and explain the effect of temperature on this enzyme.

[6]

- 3 (a) Blood is made up of cells, plasma and platelets.

The picture shows blood cells as seen down a microscope.



Draw a labelled scientific drawing of a white blood cell in the space below.

Label the nucleus and the cell membrane.

- (b)** The function of the heart is to pump blood round the circulatory system.

The coronary arteries provide a blood supply to the cardiac muscle of the heart, although the heart is already full of blood.

Explain why coronary arteries are still needed.

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..... [2]

- (c)** James carries out a heart dissection of a heart from a lamb.

- (i)** He discovers that the wall of the left ventricle of the heart is made from thicker cardiac muscle than the wall of the right ventricle.

Explain the difference in thickness of the two ventricle walls.

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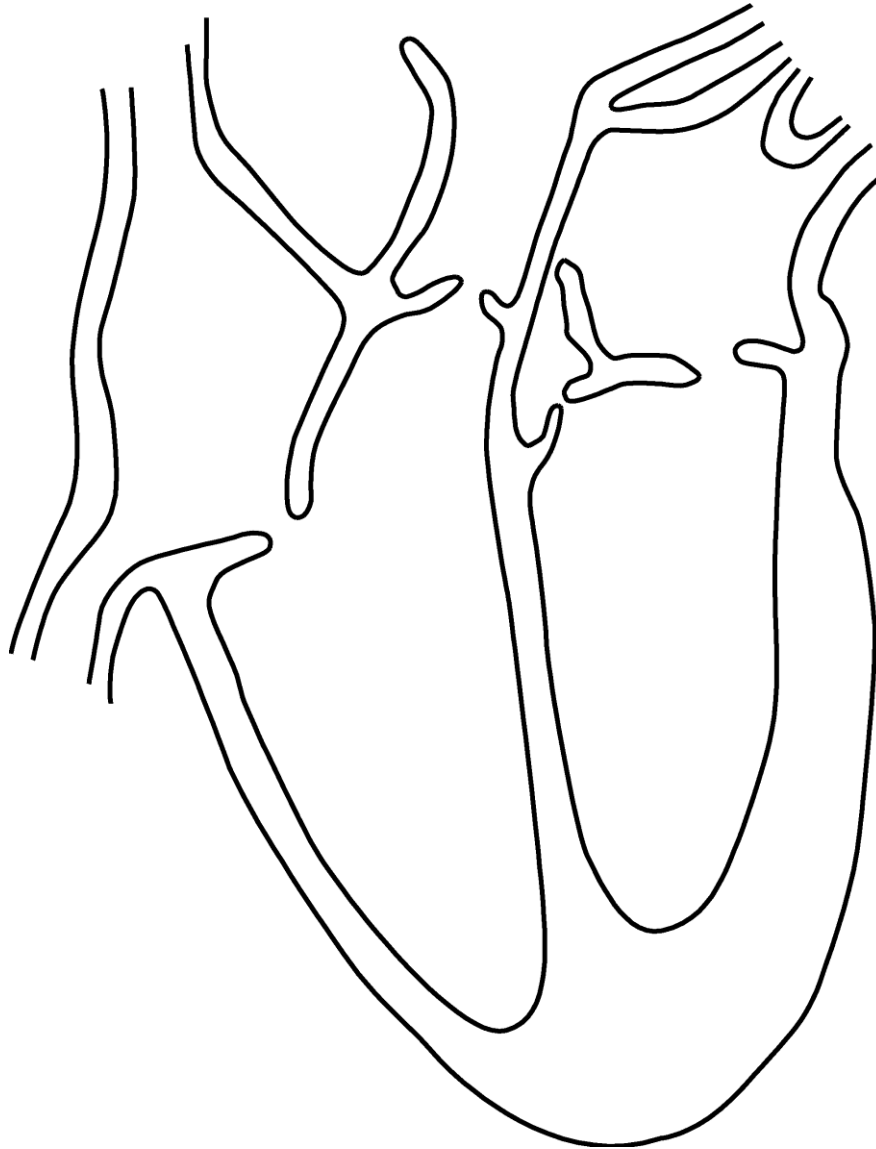
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..... [2]

- (ii) The diagram shows a line drawing that Jon does of his dissection.

Label the left ventricle with a straight line.



[1]

- (iii) Place arrows on the diagram above to show the direction of blood flow out of the heart through the left **and** right sides of the heart.

[2]

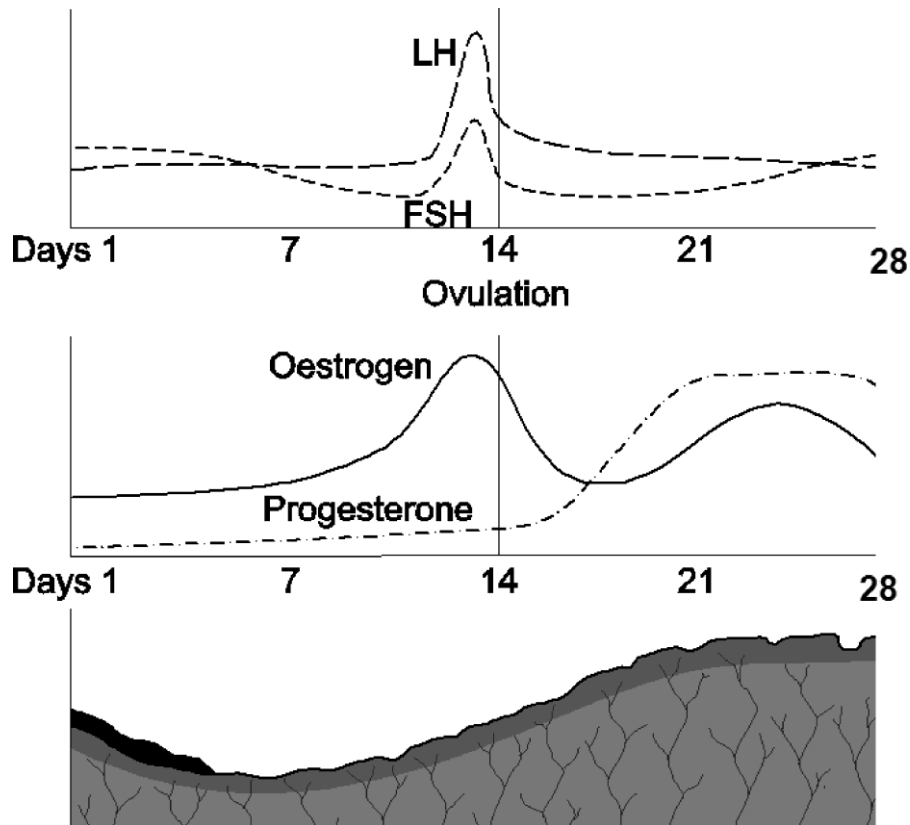
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TURN OVER FOR THE NEXT QUESTION

- 4 The menstrual cycle is controlled by four hormones.

These hormones have an effect on target organs such as the ovaries and the uterus.

The graphs and diagram below show the hormone levels of the four hormones and the relative thickness of the uterus lining during a typical 28 day menstrual cycle.



[6]

- (b) Ali and Layla are recently married and wish to delay starting a family.

Consider the data in the table below about the effectiveness of various methods of contraception.

Method of contraception	Percentage of pregnancies that occurred despite using contraception
Birth control pill	7.6
Condom	13.9
Hormone implants	0.2
Hormone injections	3.1
Diaphragm	12.1

Suggest the most appropriate method of contraception for Ali and Layla to use by evaluating the data above.

Give reasons for your answer.

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..... [4]

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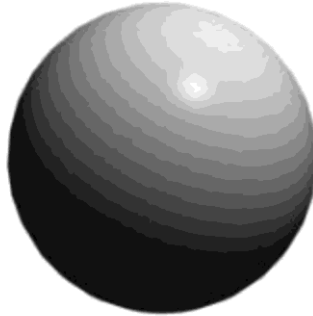
5 The use of microscopes has greatly increased our understanding of the cell.

(a) Cells come in different shapes and sizes.

Look at the diagrams of two **spherical** cells **A** and **B**.



Cell A



Cell B

Estimate how many times larger cell **B** is than cell **A**.

Describe the method you used to make your estimation.

Estimate × larger

.....

 [3]

(b) (i) A group of students decide to look at human egg cells and human red blood cells using a light microscope.

Name a structure that would be visible in the human egg cell but **not** in the human red blood cell.

..... [1]

(ii) A human egg cell is approximately $10^2 \mu\text{m}$ in diameter.

A human red blood cell is approximately $10 \mu\text{m}$ in diameter.

How many times larger is an egg cell compared to a red blood cell?

..... × larger [1]

(iii) Suggest an advantage of both cells being the size they are.

Human egg cell

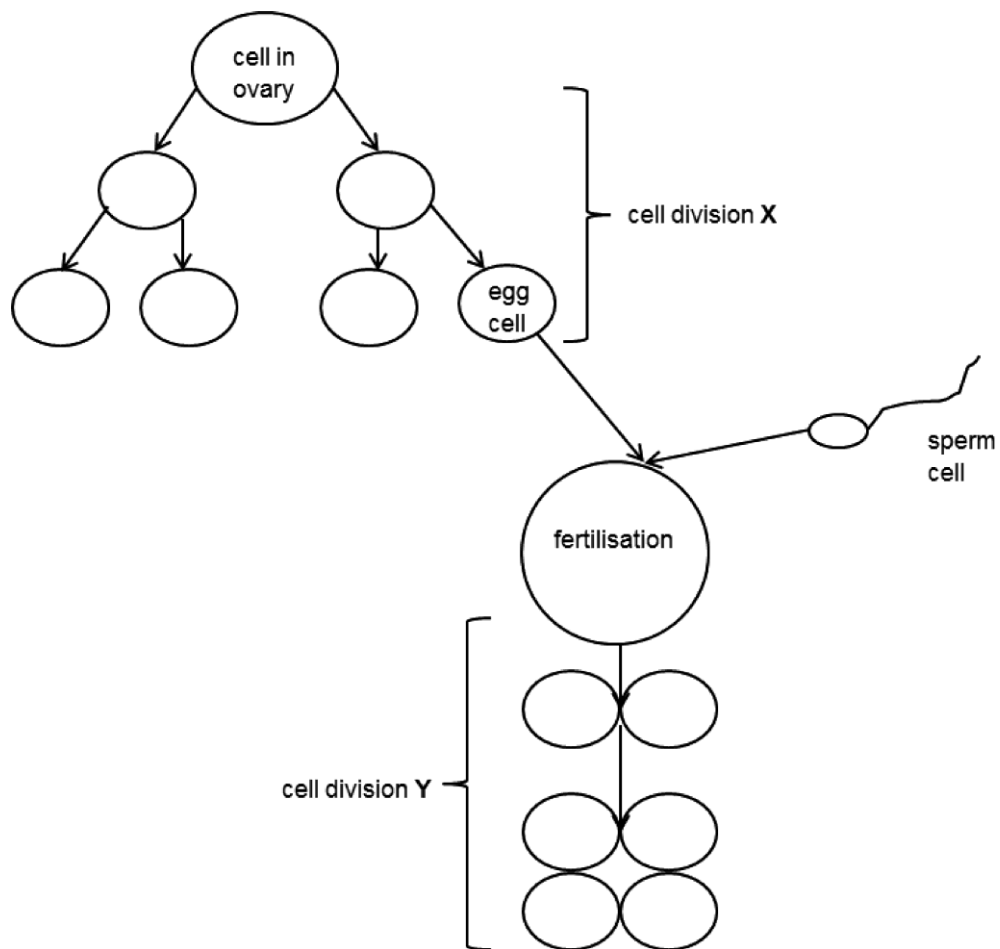
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Red blood cell

..... [2].

(c) There are two types of cell division.

Human egg cells are produced by one type of cell division. The other type is used for growth of new cells.



Identify the two types of cell division shown in the diagram above.

Cell division X

Cell division Y [2]

- (d) After cells divide they become specialised to form tissues with different functions.

Explain what happens during this process of specialisation.

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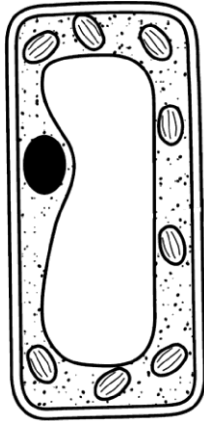
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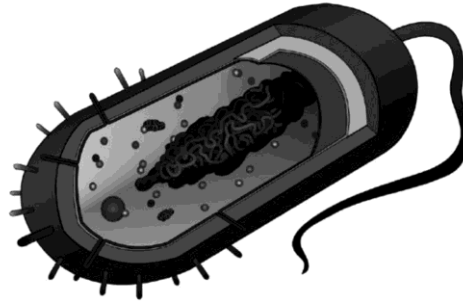
TURN OVER FOR THE NEXT QUESTION

- 6 (a) Cells of living organisms carry out their functions in a variety of ways.

Cell A and **Cell B** are cells from different types of living organism.



Cell A



Cell B

Explain one **similarity** and one **difference** in the genetic material of the two cells.

Similarity	Difference

[2]

- (b) Patients in hospital can be at risk from infections such as MRSA. The bacteria that cause MRSA are resistant to a variety of antibiotics.

New antibiotics need to be developed as a result of infections such as MRSA.

Use the theory of natural selection to describe how antibiotic resistance in bacteria is increasing.

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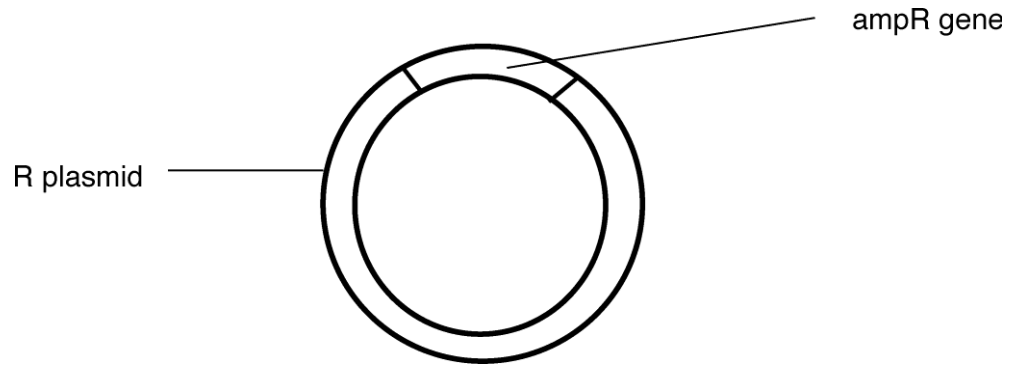
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..... [5]

(c) Plasmids, such as the R plasmid shown below, may be found in bacteria.



What features of the R plasmid make it suitable as a **vector** in genetic engineering?

Use information in the diagram to help in your answer.

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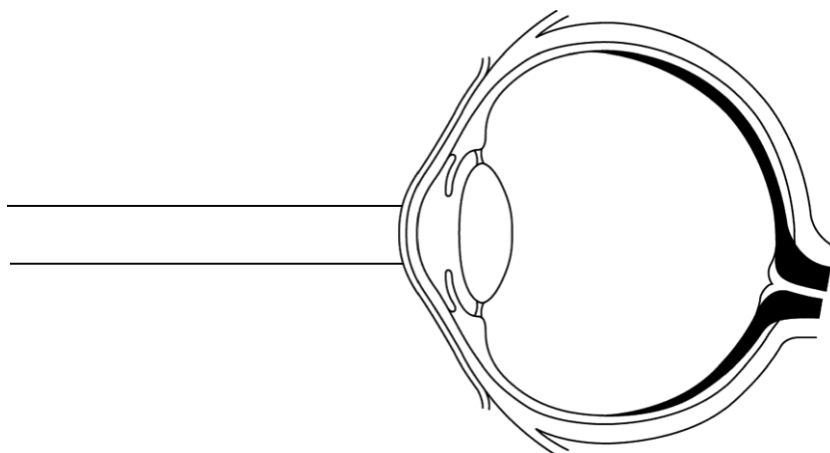
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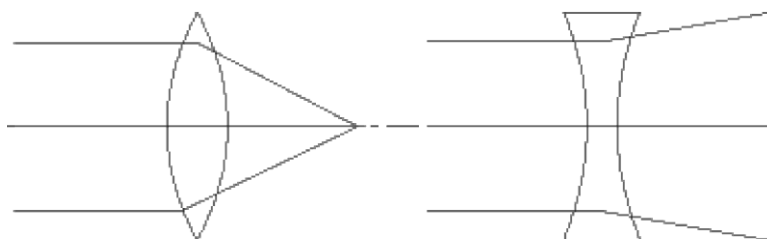
7 Sarah visits her optician who tells her she is **long sighted**.

- (a) Complete the ray diagram to show what happens to the rays of light when they enter Sarah's eye.



[2]

- (b) Sarah draws ray diagrams for two lenses, **A** and **B**.



Lens A

Lens B

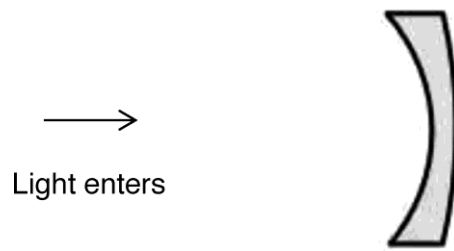
- (i) Suggest which lens, **A** or **B**, would improve Sarah's vision.

Explain your answer.

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..... [2]

- (ii) Sarah investigates other lenses. One is shown below.



Use the ray diagrams from part (b) to suggest the type of visual impairment that a pair of glasses with this lens would correct.

Explain your answer.

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..... [4]

- (c) Failure of vision can sometimes be caused by brain damage and disease.

Describe and explain the limitations of treating damage to the brain.

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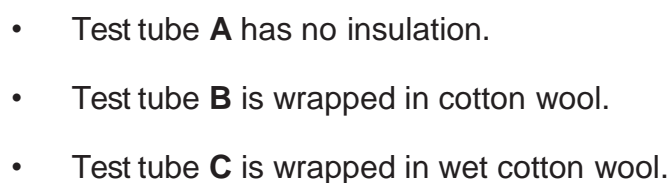
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..... [4]



- In addition to the test tubes above, Kai has access to thermometers, hot water and stopwatches.
- Include information about the results that will be collected, how they will be recorded and how they will be made valid.

[4]

- (b)** Kai's results suggest that being wrapped in wet clothes would be the least effective way of staying warm on a mountain.

Explain what could happen in this situation.

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..... [2]

- (c) (i)** If a person was wrapped in wet clothes on a mountain, their skin would appear pale.

Explain why.

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..... [2]

- (ii)** If a person has an infection, caused by bacteria or a virus, they may have a fever. This means the internal temperature control mechanisms are no longer working correctly.

Suggest why this might be an advantage to a person suffering from a bacterial or viral infection.

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..... [1]

9 Read the article about classification.

Scientists use amino acid sequences to classify living things.

Scientists know that DNA codes for amino acids. They also know that amino acids are joined together to make proteins. By examining the sequence of amino acids in the same proteins in different animals, scientists can work out how closely related the animals are. The more similar the sequence, the more closely related organisms are. This technique is now being used to classify organisms in a completely new and more reliable way than in the past.

The table shows the sequence for 11 amino acids in humans and four other organisms: **A**, **B**, **C** and **D**.

Organism	Sequence of amino acids in a protein											Number of differences
	1	2	3	4	5	6	7	8	9	10	11	
Human	Gly	Asp	Val	Glu	Lys	Gly	Lys	Lys	Ile	Phe	Ile	
A	Gly	Asp	Ile	Glu	Lys	Gly	Lys	Lys	Val	Phe	Val	3
B	Gly	Asp	Val	Glu	Lys	Gly	Lys	Lys	Ile	Phe	Val	1
C	Gly	Asp	Ile	Glu	Lys	Gly	Lys	Lys	Ile	Phe	Val	2
D	Gly	Asn	Pro	Asp	Ala	Gly	Ala	Lys	Leu	Phe	Lys	7

Look at organisms **A**, **B**, **C** and **D**. The shaded boxes show where the sequence of amino acids differs from that found in humans.

The column on the right shows the total number of these differences.

- (a) Describe and explain the conclusions that can be made from the data in the table.

Use the information in the article to help you.

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..... [3]

- (b) Suggest how the data could be improved to make scientists more confident in their conclusions.

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..... [2]

- (c) Look at the statements about the classification and identification of different organisms.

Put a tick (✓) in the boxes next to the **two** statements that describe advantages of using DNA technology.

Can be done without specialised laboratory equipment.

☐

Can be used to compare anatomical features.

☐

Can distinguish between species that look very similar.

☐

[2]

Can identify organisms from photographic evidence.

☐

Can identify species from small parts of the organism.

☐

END OF QUESTION PAPER

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Summary of updates

Date	Version	Details
October 2021	2.1	Updated copyright acknowledgements.

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...day June 20XX – Morning/Afternoon

GCSE (9–1) Biology B (Twenty First Century Science)

J257/04 Depth in biology (Higher Tier)

SAMPLE MARK SCHEME

Duration: 1 hour 45 minutes

MAXIMUM MARK 90

This document consists of 20 pages

MARKING INSTRUCTIONS**PREPARATION FOR MARKING****SCORIS**

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris assessor Online Training*; *OCR Essential Guide to Marking*.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal <http://www.rm.com/support/ca>
3. Log-in to scoris and mark the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the scoris 50% and 100% (traditional 50% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the scoris messaging system.

5. Work crossed out:
 - a. where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks
 - b. if a candidate crosses out an answer to a whole question and makes no second attempt, and if the inclusion of the answer does not cause a rubric infringement, the assessor should attempt to mark the crossed out answer and award marks appropriately.
6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.
7. There is a NR (No Response) option. Award NR (No Response)
 - if there is nothing written at all in the answer space
 - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
 - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the question.Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).
8. The scoris **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
If you have any questions or comments for your Team Leader, use the phone, the scoris messaging system, or email.
9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:

Read through the whole answer from start to finish, using the Level descriptors to help you decide whether it is a strong or weak answer. The indicative scientific content in the Guidance column indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the skills and science content evidenced within the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer. Once the level is located, award the higher or lower mark:

The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in *italics*) have been met.

The lower mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in *italics*) are missing.

In summary:

The skills and science content determines the level.

The communication statement determines the mark within a level.

Level of response questions on this paper are **4(a)** and **2(b)**.

11. Annotations

Annotation	Meaning
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
()	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

12. Subject-specific Marking Instructions

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

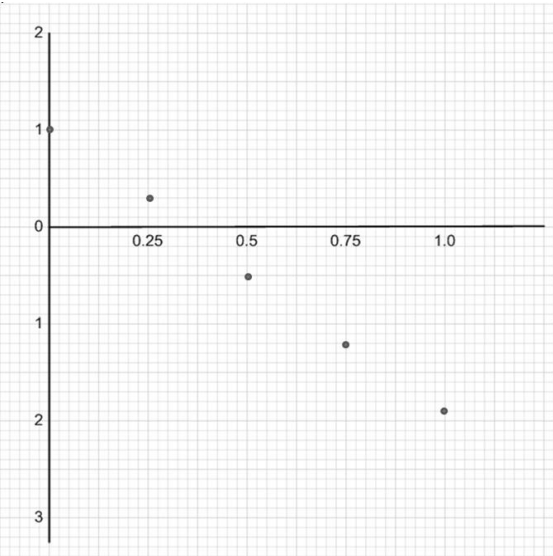
You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

The breakdown of Assessment Objectives for GCSE (9-1) in Biology B:

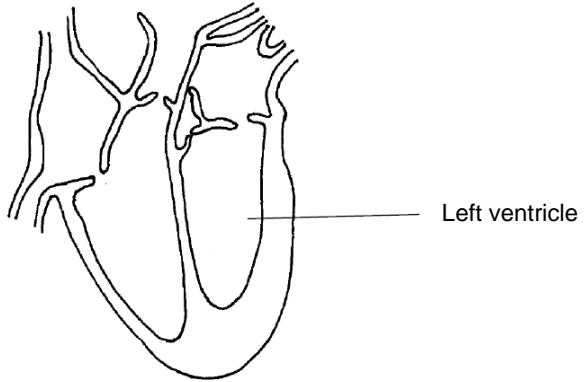
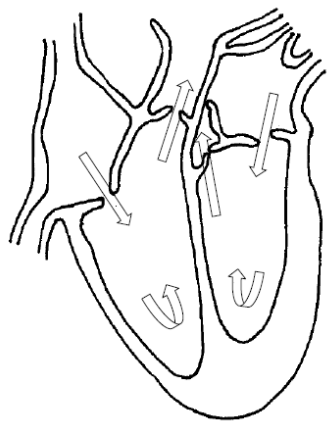
	Assessment Objective
AO1	Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
AO2	Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
AO3	Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.
AO3.1	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.
AO3.2	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.
AO3.2b	Analyse information and ideas to draw conclusions.
AO3.3	Analyse information and ideas to develop and improve experimental procedures.
AO3.3a	Analyse information and ideas to develop experimental procedures.
AO3.3b	Analyse information and ideas to improve experimental procedures.

Question			Answer	Marks	AO element	Guidance
1	(a)	(i)	FIRST CHECK THE ANSWER IN TABLE. If answer = +6.1 award 2 marks (0.3 ÷ 4.9) × 100 ✓ +6.1 ✓	2	2.2	DO NOT ALLOW answer if not given to 1 d.p.
		(ii)	4, 1, 5, 3, 2 ✓	1	3.2a	
		(iii)	Does not take into account width / mass ✓	1	3.3a	
		(iv)	Any two from: Set up experiment as above and re-measure every 10 minutes / other suitable time period ✓ Find out how long it takes until there is no further change in length ✓ Measure mass of potato before and after ✓	2	3.3b	
	(b)	(i)	X = sugar concentration (mol / dm ⁻³) AND Y = change in mean length (mm) ✓	1	2.2	

Question			Answer	Marks	AO element	Guidance
		(ii)		2	2.2	5 plots correct = 2 3 or 4 plots correct = 1
		(iii)	Straight line through points ✓	1	2.2	
		(iv)	0.35 to 0.4 ✓	1	3.1a	
		(v)	Idea that it is the same concentration / isotonic ✓ Water movement is the same in both directions / no net flow ✓	1	3.2b	

Question			Answer	Marks	AO element	Guidance
2	(a)		Substrate – hydrogen peroxide AND enzyme – catalase ✓	1	2.1	
	(b)*		<p>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</p> <p>Level 3 (5–6 marks) <i>Describes in detail the pattern of the graph</i> AND <i>Links this to an explanation of the effect of all temperatures on enzyme function</i> AND <i>Identifies the optimum temperature for the enzyme</i></p> <p><i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Level 2 (3–4 marks) <i>Describes the pattern of the graph</i> AND <i>Links this to an explanation of the effect of temperature on enzyme function</i> OR <i>Identifies the optimum temperature for the enzyme</i></p> <p><i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i></p>	6	3 x 2.1 2 x 3.1a 1 x 3.2a	<p>AO3.1a Identification of patterns in graph For example:</p> <ul style="list-style-type: none"> Rate of reaction increases between 0°C and 30°C Rate of reaction decreases between 30°C and 60°C <p>AO2.1 Details of effect of temperature on enzyme function For example:</p> <ul style="list-style-type: none"> Increase between 0 and 30°C is because there is more kinetic energy So more collisions So more Enzyme-substrate complex form Decrease between 30°C and 60°C is because enzyme is denatured Loss of 3D structure ESC can no longer form as substrate does not fit into the enzyme <p>AO3.2a Identification of the optimum temperature of the enzyme For example:</p> <ul style="list-style-type: none"> Optimum temperature is 30°C

Question			Answer	Marks	AO element	Guidance
			<p>Level 1 (1–2 marks) <i>Describes the pattern of the graph</i> AND <i>Makes reference to the effect of temperature on enzyme function between 0 and 30°C</i> OR <i>Makes reference to the effect of temperature on enzyme function between 30°C and 60°C</i></p> <p><i>The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.</i></p> <p>0 marks <i>No response or no response worthy of credit.</i></p>			

Question			Answer	Marks	AO element	Guidance
		(ii)	<p>Label pointing to left ventricle on diagram ✓</p>  <p>The diagram shows a cross-section of the heart. A line points from the text 'Left ventricle' to the left ventricle.</p>	1	1.1	
		(iii)	<p>Arrows as shown below ✓ ✓</p>  <p>The diagram shows a cross-section of the heart with arrows indicating blood flow. Arrows point from the atria into the ventricles, and from the ventricles into the arteries.</p>	2	1.2	1 mark for correct on each side

Question	Answer	Marks	AO element	Guidance
4 (a)*	<p>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</p> <p>Level 3 (5–6 marks) <i>Explains fully the physical changes that occur during the menstrual cycle</i> AND <i>Links them correctly to evidence from the diagram and graphs</i></p> <p><i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Level 2 (3–4 marks) <i>Explains two physical changes that occur during the menstrual cycle</i> AND <i>Links them correctly to evidence from the diagram and graphs</i></p> <p><i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i></p> <p>Level 1 (1–2 marks) <i>Explains one physical change that occurs during the menstrual cycle</i> AND <i>links it correctly to evidence from the diagram and graphs</i></p> <p><i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i></p>	6	1.1 x3 3.1a x3	<p>AO1.1 Physical and hormonal menstrual cycle changes For example:</p> <ul style="list-style-type: none"> • Uterus becomes thicker because it becomes more vascular • Ovulation is when an egg is released from an ovary • Ovulation occurs when a follicle ruptures / bursts • Has to be an egg present in the oviduct / Fallopian tube for fertilisation could occur • High progesterone and thick uterus lining required for successful implantation. <p>AO3.1a Interpretation of graphs and diagram For example:</p> <ul style="list-style-type: none"> • Days 7-14 uterus lining thickens / develops • Thickening of uterus occurs under the influence of a rise in oestrogen • Day 14 is when ovulation occurs / an egg is released • Follicle bursts due to a peak of LH • Days 15-28, fertilisation could occur • Uterus lining stays thick from days 21-28.

[illegible]

Question			Answer	Marks	AO element	Guidance
5	(a)		Width answers i.e. 4 x larger ✓ Area answers i.e. 12 – 20 x larger ✓✓ Volume answers i.e. 60 – 70 x larger ✓✓✓	3	2.2	If estimates are incorrect allow max 2 marks for appreciation of area (1 mark) and volume (2 marks). Explanation is for using width or area or volume.
	(b)	(i)	Nucleus ✓	1	1.1	
		(ii)	10 ✓	1	2.2	
		(iii)	Only need one egg cell / makes it easier for sperm to find egg cell ✓ RBC needs to move through small spaces / need lots of RBCs ✓	2	2.1 1.1	ALLOW idea of food storage in egg cell
	(c)		Cell division X : meiosis Cell division Y : mitosis	2	2.1	DO NOT ALLOW ambiguous spelling e.g. meiotis
	(d)		Some genes are switched off ✓ Some genes are switched on ✓ These makes proteins ✓ For specific cell types ✓	4	1.1	

Question			Answer	Marks	AO element	Guidance
6	(a)		<i>Similarity:</i> made from DNA / nucleic acid ✓ <i>Difference:</i> in the nucleus in the animal cell and in a loop in the bacteria ✓	2	1.1	
	(b)		Any five from Bacteria with resistance gene have an advantage ✓ Resistance occurs due to a mutation ✓ They will not be killed by antibiotics / are more likely to survive ✓ They will reproduce ✓ And pass on this gene to future generations ✓ So the population becomes more antibiotic resistant ✓	5	2.1	
	(c)		Any two from Separate circular DNA to main loop of DNA ✓ Naturally pass from one bacterial cell to another ✓ Can carry required genes (for resistance) into bacteria ✓	2	2.1	

Question			Answer	Marks	AO element	Guidance
7	(a)		Rays converge ✓ But do not meet ✓	2	1.1	
	(b)	(i)	Explanation of what Sarah needs i.e. more convergence ✓ Lens A gives more convergence / lens B does not ✓	2	2.1	
		(ii)	Lens thinner at centre rather than edges ✓ Therefore it will diverge ✓ Therefore the defective lens must converge light rays too much ✓ Therefore the eye defect is short sight ✓	4	3.2b 2.1 x3	
	(c)		Any four from Damaged tissue difficult to get to ✓ Treatment might damage other areas ✓ Nervous tissue highly specialised / differentiated ✓ Nervous tissue / neurons cannot regrow ✓ Therefore treatment must not cause further damage ✓	4	1.1	

Question			Answer	Marks	AO element	Guidance
8	(a)		Any four from Place same amount of hot water in each test tube ✓ Take temperature of water with thermometer ✓ Take temperature of water in each tube each minute / set time period ✓ For 10 minutes / specified time period ✓ Record in a table ✓	4	2.2	
	(b)		Water next to the skin will evaporate ✓ Taking heat away from the skin, cooling the person ✓	2	2.1	
	(c)	(i)	Any two from Vasoconstriction ✓ Muscles in artery walls contract ✓ Reduction in blood flow through capillaries supplying the skin ✓	2	1.1	
		(ii)	Raised temperature helps to kill the microorganism ✓	1	2.1	

Question			Answer	Marks	AO element	Guidance
9	(a)		Any three from B most similar to humans ✓ D most different to humans ✓ Idea of showing how closely related different organisms are ✓ Reference to different proteins ✓	3	3.1a 3.2b	
	(b)		Longer sequence ✓ Repeat ✓	2	3.3b	
	(c)		✓ Can identify species from small parts of the organism ✓ Can distinguish between species that look very similar	2	1.2	

Summary of updates

Date	Version	Change
May 2018	2	We've reviewed the look and feel of our papers through text, tone, language, images and formatting. For more information please see our assessment principles in our "Exploring our question papers" brochures on our website

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