

<b>Candidate Forename</b>		<b>Candidate Surname</b>	
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<b>Centre Number</b>						<b>Candidate Number</b>				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B631/01**

**GATEWAY SCIENCE**

**BIOLOGY B**

**Unit 1 Modules B1 B2 B3 (Foundation Tier)**

**THURSDAY 14 JANUARY 2010: Morning**

**DURATION: 1 hour**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**Candidates answer on the Question Paper**

**A calculator may be used for this paper**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Pencil**

**Ruler (cm/mm)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully and make sure that you know what you have to do before starting your answer.**
- **Answer ALL the questions.**
- **Write your answer to each question in the space provided, however additional paper may be used if necessary.**

## **INFORMATION FOR CANDIDATES**

- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **The total number of marks for this paper is 60.**

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**Answer ALL the questions.**

**SECTION A – MODULE B1**

**1 Nathan is a GCSE Biology student.**

**Nathan is investigating how pulse rates change during exercise.**

**(a) Nathan measures the pulse rates of four students while they are at rest.**

**All the students then do the same type of exercise for the same amount of time.**

**Nathan then measures their pulse rates again immediately after their exercise.**

**The table shows his results. Some of the results are missing.**

- (i) Complete the table to show the missing results.

<b>STUDENT NAME</b>	<b>RESTING PULSE RATE IN BEATS PER MINUTE</b>	<b>PULSE RATE AFTER EXERCISE IN BEATS PER MINUTE</b>	<b>INCREASE IN PULSE RATE DURING EXERCISE IN BEATS PER MINUTE</b>
<b>Alex</b>	<b>68</b>	<b>100</b>	<b>32</b>
<b>Jody</b>	<b>82</b>	<b>130</b>	_____
<b>Nicola</b>	<b>75</b>	<b>125</b>	<b>50</b>
<b>Rejna</b>	<b>70</b>	_____	<b>35</b>

[2]

- (ii) Look at the results table.

Write down the name of the student whose pulse rate increased the most during exercise.

\_\_\_\_\_ [1]

**(b) Pulse rates increase during exercise.**

**This means the blood flows more quickly to and from the muscles.**

**Explain why it is important that blood flows more quickly during exercise.**

**In your answer include**

- the names of the substances carried to and from the muscles**
- why the substances need to be carried to and from the muscles.**

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**[3]**

**[Total: 6]**

**2 Annabelle is feeling unwell.**

**She is suffering from the symptoms of flu.  
These include a fever, sore throat and a runny nose.**

**(a) Flu is an infectious disease caused by a pathogen.**

**What type of pathogen causes flu?**

**Put a ring around the correct answer in the list.**

**BACTERIA**

**FUNGUS**

**PROTOZOA**

**VIRUS**

**[1]**

(b) Annabelle's body has several ways of defending itself from infection by pathogens.

Draw straight lines to connect each BODY DEFENCE to HOW IT WORKS.

One line has been drawn for you.

BODY DEFENCE

HOW IT WORKS

acid in the stomach

stops pathogens entering the body

blood clotting

traps dirt and pathogens

mucus in the lungs

seals wounds

skin

kills pathogens in food

[2]



**(c) Annabelle's body can also defend itself by producing antibodies when a pathogen invades.**

**Her antibodies give her immunity if the same pathogen invades again.**

**This is called ACTIVE IMMUNITY.**

**People can also have PASSIVE IMMUNITY.**

**Write about how passive immunity is different from active immunity.**

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[1]

**[Total: 4]**

**3 This question is about the nervous system.**

**Jeanette is cleaning her desk.**

**She accidentally puts her finger on the point of a drawing pin.**

**Without thinking, she quickly pulls her hand away from the drawing pin.**

**(a) What type of response is shown by Jeanette?**

\_\_\_\_\_ [1]

**(b) In this response**

**(i) what is the stimulus?**

\_\_\_\_\_ [1]

**(ii) what is the effector?**

\_\_\_\_\_ [1]

**(c) Jeanette has a headache. She decides to take a painkiller.**

**(i) Look at the list of drugs.**

**Which one is a painkiller?**

**Put a ring around the correct answer.**

**ASPIRIN      ECSTASY      LSD      NICOTINE**

**[1]**

**(ii) How does the painkiller stop Jeanette feeling pain?**

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[1]

**[Total: 5]**

**4 This question is about reproduction and inheritance.**

**(a) James and Carol have a daughter called Claire.**

**Carol needed fertility treatment before Claire was born.**

**This is because her ovaries did not produce enough of one type of cell.**

**(i) Name the cell that Carol needed to produce in her ovaries.**

\_\_\_\_\_ [1]

**(ii) Carol needed sex hormone treatment to become fertile.**

**How do sex hormones travel to the ovaries?**

\_\_\_\_\_ [1]

**(b) Claire has inherited characteristics from James and Carol.**

**The information for these characteristics is carried on chromosomes.**

**How many chromosomes are found in ONE of Claire's skin cells?**

\_\_\_\_\_ [1]

- (c) Carol has wavy hair, a scar on her face, green eyes and round earlobes.

Write down ONE characteristic of Carol from the list above that can ONLY be caused by her environment.

\_\_\_\_\_ [1]

- (d) Claire is a girl.

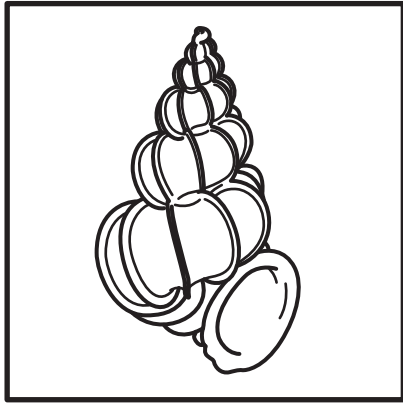
What sex chromosomes does she have?

\_\_\_\_\_ [1]

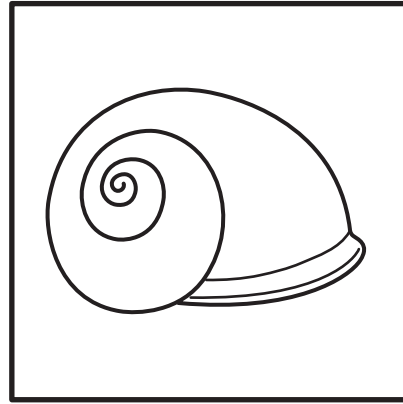
[Total: 5]

**SECTION B – MODULE B2**

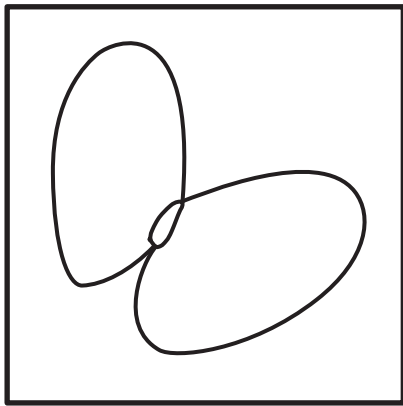
**5 Cathy collects some shells from the sea shore.**



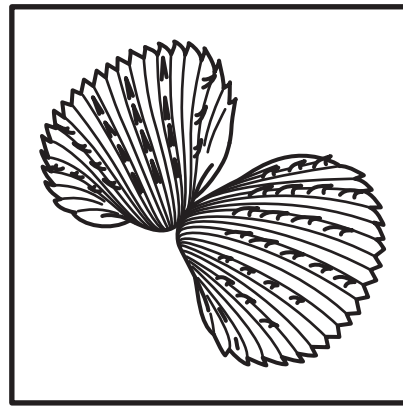
**A**



**B**

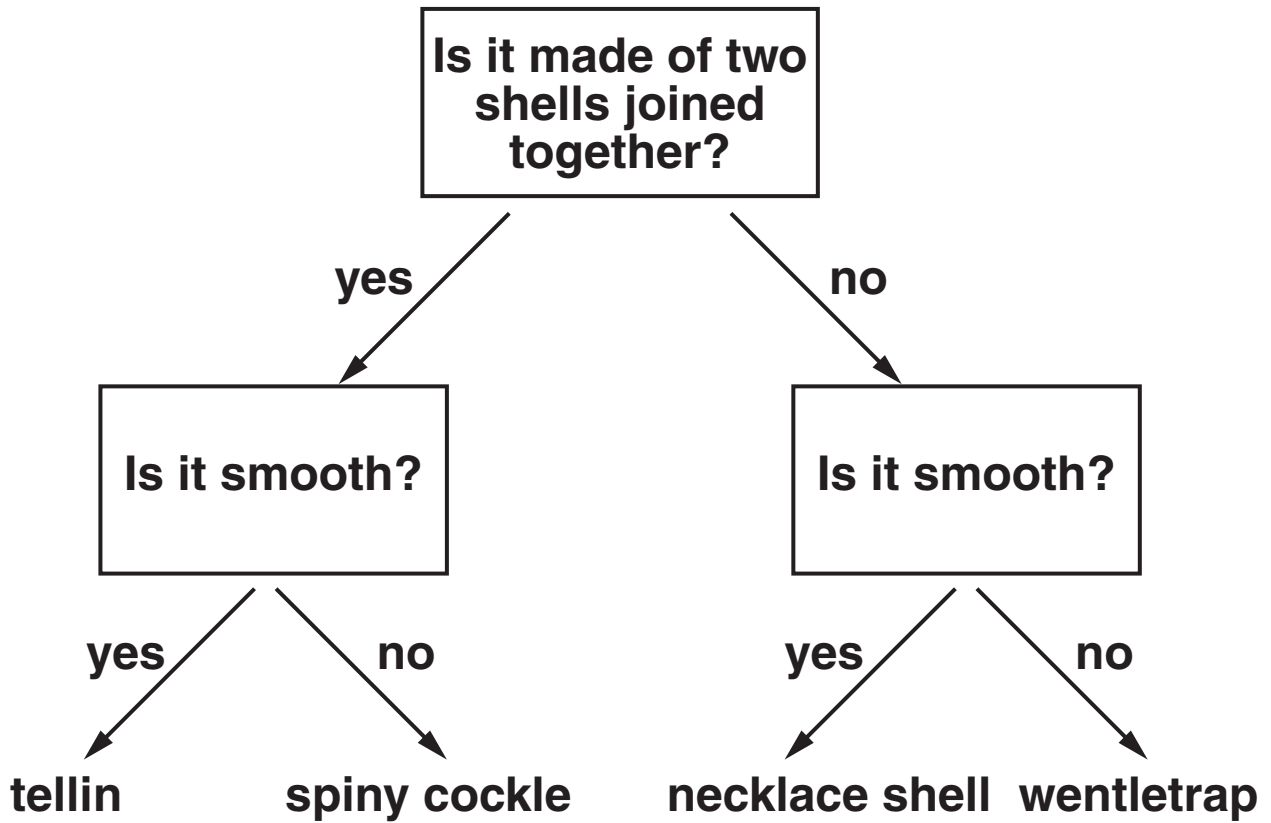


**C**



**D**

**(a) Use the key to name shell A and shell C.**



The name of shell A is \_\_\_\_\_

The name of shell C is \_\_\_\_\_ [2]

- (b) The shells come from a group of animals called molluscs.

Molluscs do NOT have a backbone.

What group of animals do molluscs belong to?

\_\_\_\_\_ [1]

- (c) Cathy reads a guide book to find out more about the shells.

Most MOLLUSCS feed on tiny plants called ALGAE.

The MOLLUSCS themselves are eaten by sea birds such as GULLS as well as other animals such as CRABS.

GULLS also sometimes eat CRABS.

Put ticks (✓) in the table to show which of the organisms described in the article are predators.

ORGANISM	PREDATOR
algae	
crab	
gull	
mollusc	

[2]

[Total: 5]



6 (a) Pine trees make food by photosynthesis.

(i) What type of food is made by photosynthesis?

\_\_\_\_\_ [1]

(ii) What gas is made by photosynthesis?

\_\_\_\_\_ [1]

(b) Some pine trees are grown for wood.

Wood is an example of a SUSTAINABLE RESOURCE.

Explain what is meant by a sustainable resource.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

(c) Pine trees grow faster in the summer than the winter.

Write down ONE reason why.

\_\_\_\_\_  
\_\_\_\_\_ [1]

[Total: 5]

- 7 Mosasaurs are animals that lived in the sea around 65 to 70 million years ago.**

**Mosasaurs had a large head and a streamlined body ending in a long paddle-like tail. They were about 15m long. Their eyes faced forward and their large, powerful jaws contained many sharp teeth. They had four small flippers.**

- (a) Scientists think that mosasaurs were predators.**

**Describe TWO ways in which mosasaurs were adapted as predators.**

**1** \_\_\_\_\_  
\_\_\_\_\_

**2** \_\_\_\_\_  
\_\_\_\_\_ [2]

- (b) There are no mosasaurs alive today.**

- (i) What word describes animal species that have not survived?**

\_\_\_\_\_ [1]

- (ii) What evidence did scientists use to work out what mosasaurs looked like?**

\_\_\_\_\_ [1]

**[Total: 4]**

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**8 Lichens are an example of an indicator species.**

**The higher the level of sulfur dioxide pollution the less likely lichens are to be found.**

**They can be found growing on surfaces such as rocks, walls and gravestones.**

**(a) Iain is investigating how many lichens are growing in different parts of the country.**

**He does this by looking at gravestones in three different towns.**

**These are his results.**

	<b>TOWN</b>		
	<b>SMITHTON</b>	<b>HUGHESLY</b>	<b>CHAPMANSTOW</b>
<b>total number of gravestones looked at</b>	<b>80</b>	<b>45</b>	<b>64</b>
<b>number of gravestones with lichens</b>	<b>12</b>	<b>9</b>	<b>16</b>
<b>percentage of gravestones with lichens</b>	<b>15%</b>		<b>25%</b>

- (i) Calculate the percentage of gravestones with lichens in Hughesly.

answer \_\_\_\_\_ % [2]

- (ii) Which town is likely to have the LEAST sulfur dioxide pollution?

\_\_\_\_\_ [1]

- (b) Lichens are made of fungi and algae.

The fungi give the algae water and minerals that the fungi absorb from whatever they are growing on.

The algae give the fungi food that the algae make by photosynthesis.

What term is used to describe the relationship between the fungi and the algae?

\_\_\_\_\_ [1]

**(c) Lichens are found on surfaces such as rocks, walls and gravestones.**

**Suggest why they are NOT usually found on soil.**

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**[2]**

**[Total: 6]**

## Section C – Module B3

**9 Human blood contains red cells and white cells.**

**(a) Write down the job of red blood cells.**

\_\_\_\_\_ [1]

**(b) Blood is moved around the body in blood vessels called arteries.**

**Write down the name of ONE OTHER type of blood vessel.**

\_\_\_\_\_ [1]

**(c) Write down the name of the organ that pumps blood around the body.**

\_\_\_\_\_ [1]

**(d) Each white blood cell contains a nucleus.**

**Write down the job of the nucleus in a cell.**

\_\_\_\_\_ [1]

**(e) Look at the statements.**

**Which ONE is a correct statement about substances in the blood?**

**Put a tick (✓) in the box next to the correct statement.**

<b>Carbon dioxide leaves the blood in the lungs.</b>	
<b>Food enters the blood in the lungs.</b>	
<b>Oxygen enters the blood in the small intestine.</b>	
<b>Oxygen leaves the blood in the lungs.</b>	

**[1]**

**[Total: 5]**



**10 Butch is a husky dog.**

**Huskies, like Butch, are a breed of dog used for pulling sledges.**

**(a) Husky dogs are produced by selective breeding.**

**They need to be strong to pull sledges.**

**To breed the best huskies the strongest females are bred with the strongest males.**

**Describe the next stages in selective breeding.**

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[2]

**(b) Scientists could clone Butch.**

**Which term best describes CLONING?**

**Put a ring around the correct answer.**

**ASEXUAL REPRODUCTION**

**CELL DIVISION**

**MEIOSIS**

**SEXUAL REPRODUCTION**

**[1]**

**(c) The dog cloned from Butch will have the same characteristics as Butch.**

**Explain why.**

\_\_\_\_\_ **[1]**

**[Total: 4]**

**11 Chicken embryos grow from a single cell to become chicks ready to hatch.**

**(a) Cell division is needed for the chicken embryo to grow.**

**Cell division will continue even after the chicken is fully grown.**

**Write down ONE OTHER reason, apart from growth, why cells divide.**

\_\_\_\_\_ [1]

**(b) Adult male chickens produce sperm cells which are needed for fertilisation.**

**Sperm cells have different features that help them to do their job.**

**Write about TWO features that sperm cells have and why they have them.**

**1. feature \_\_\_\_\_**

**reason \_\_\_\_\_**

**2. feature \_\_\_\_\_**

**reason \_\_\_\_\_ [2]**

**(c) Chicken embryos contain lots of different cells.**

**The cells do different jobs.**

**What process best describes making different types of cells?**

**Put a ring around the correct answer.**

**CELL DIFFERENTIATION**

**CELL DIVISION**

**MITOSIS**

**[1]**

**(d) Chicken embryos contain STEM CELLS.**

**Write down the meaning of the term stem cells.**

\_\_\_\_\_ **[1]**

**[Total: 5]**

**12 This question is about plant hormones.**

**(a) Hormones control growth in plants.**

**Look at the list. Which ONE of the processes is also controlled by plant hormones?**

**Put a tick (✓) in the box next to the correct answer.**

<b>diffusion</b>	
<b>flowering</b>	
<b>photosynthesis</b>	
<b>respiration</b>	

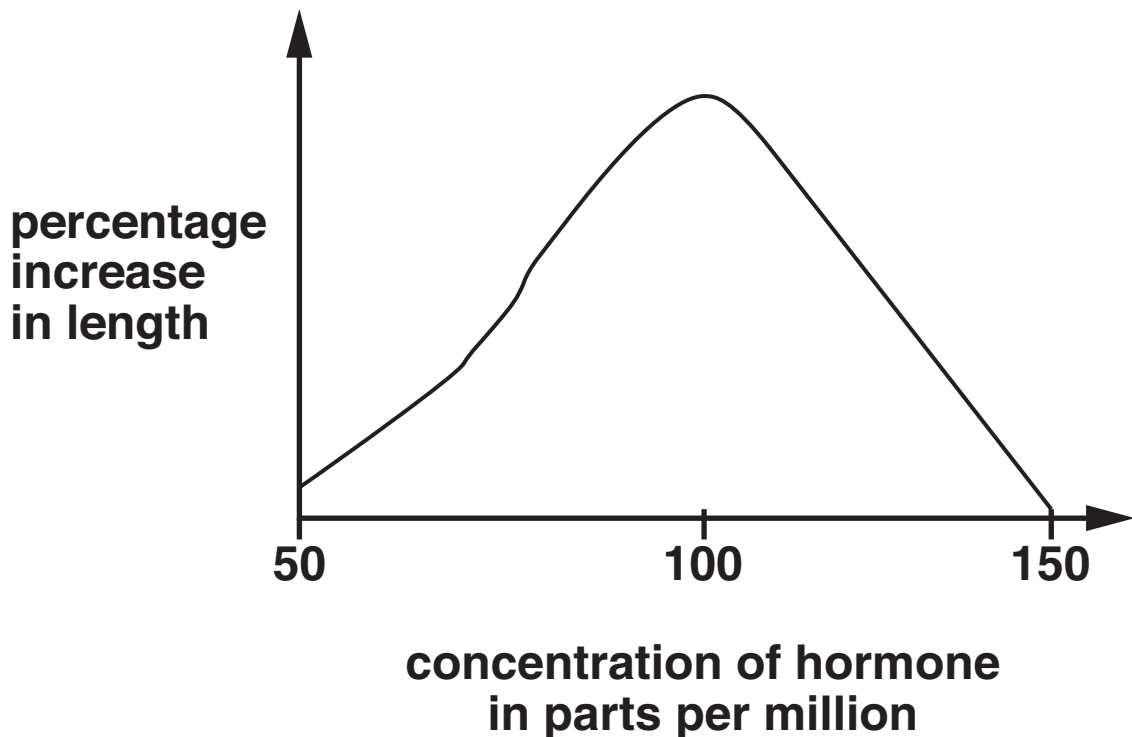
**[1]**

**(b) Pat investigates the effect of plant hormone concentration on shoot growth.**

**She puts shoots of the same length in different concentrations of plant hormone.**

**Pat then measures the increase in length of the shoots.**

**The graph shows her results.**



**Describe the pattern in the results.**

**In your answer include information from the graph.**

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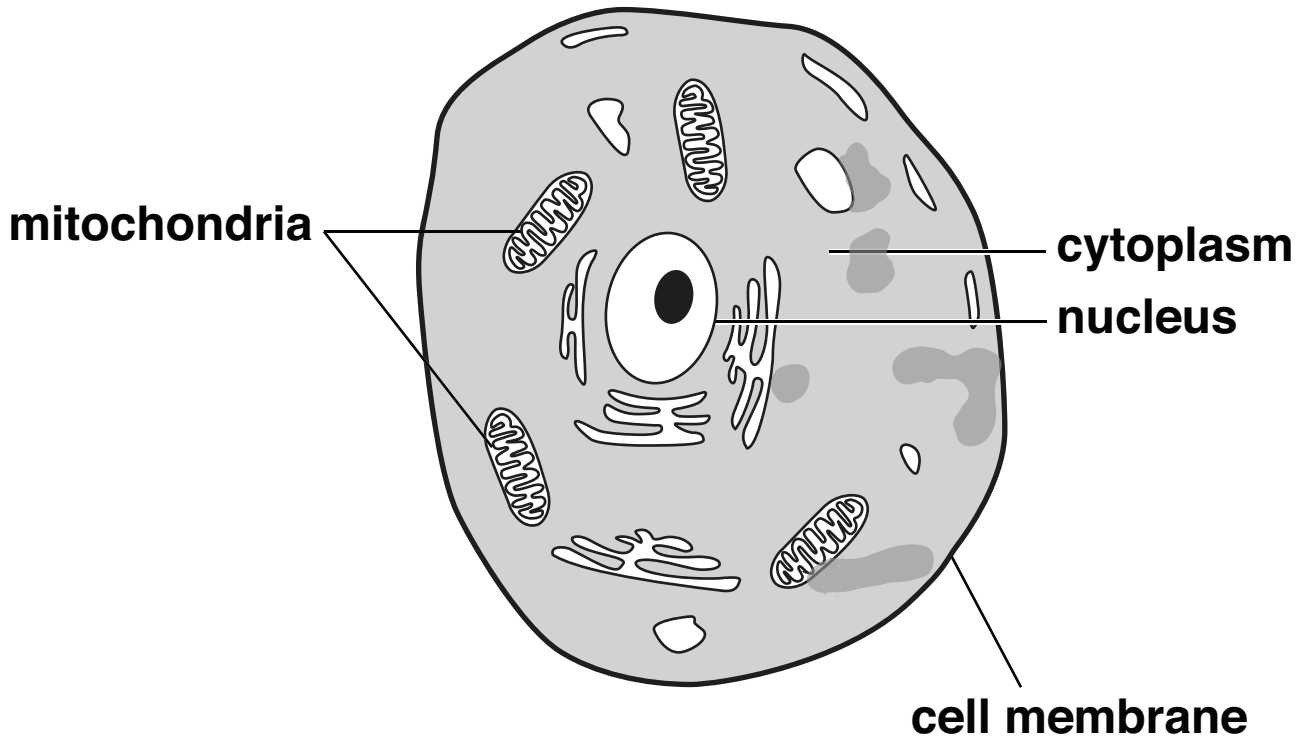
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**[2]**

**[Total: 3]**

**13 Look at the picture of an animal cell.**



**(a) Write down the name of the process that takes place in the mitochondria.**

\_\_\_\_\_ [1]

**(b) The cytoplasm contains enzymes.**

**Write down the effect of enzymes on the speed of chemical reactions.**

\_\_\_\_\_ [1]

**(c) Proteins are made in the cytoplasm.**

**Write down what the proteins are used for.**

\_\_\_\_\_ [1]

**[Total: 3]**

**END OF QUESTION PAPER**



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