EDEXCEL GCSE BIOLOGY

BIOLOGY



EXAM QUESTION PACK

UNIT B1 FOUNDATION TIER 5BI1F PAPERS

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Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | Candidate Number

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Monday 15 January 2018 – Afternoon
Time: 1 hour

Paper Reference
5BI1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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Answer ALL questions

Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Pollution

1 Carbon dioxide and sulfur dioxide are air pollutants.

The table shows the mass of carbon dioxide added to and removed from the atmosphere per year by three processes.

process	mass of carbon dioxide / per year / tonnes	
	added to the atmosphere	removed from the atmosphere
X	140	0
Y	20	0
Z	0	135

(a) (i) Calculate the overall change in the mass of carbon dioxide in the atmosphere per year.

(1)

..... tonnes

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

Process X occurs in animals, plants and bacteria.

Process X is

(1)

☒ **A** breathing

☒ **B** combustion

☒ **C** photosynthesis

☒ **D** respiration

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(iii) Process Z occurs in plants.

Name process Z.

(1)

.....

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

Process Y is the burning of fossil fuels.

Some fossil fuels release sulfur dioxide into the atmosphere.

A fossil fuel that can release carbon dioxide and sulfur dioxide is

(1)

☒ **A** coal

☒ **B** ethanol

☒ **C** hydrogen

☒ **D** methane

(b) (i) Explain how blackspot fungus is used as an indicator species.

(2)

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.....

(ii) Explain how sulfur dioxide can cause acid rain.

(2)

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(Total for Question 1 = 8 marks)

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Reactions

2 The table shows the total stopping distance for a car when driven at different speeds.

speed / mph	reaction distance / metres	braking distance / metres	total stopping distance / metres
20	6	6	12
30	9	14	23
40	12	24	36
50	15	38	53
60	18	54	72
70	21	75	96

(a) (i) Calculate how many times greater the total stopping distance is at 60 mph than at 20 mph.

(2)

.....

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

The estimated total stopping distance in metres for a car driven at 80 mph would be between

(1)

☒ **A** 95 m – 105 m

☒ **B** 110 m – 120 m

☒ **C** 130 m – 135 m

☒ **D** 150 m – 160 m

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(b) Some drugs can affect reaction times.

(i) Which drug increases reaction time?

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

(1)

☒ **A** nicotine

☒ **B** caffeine

☒ **C** alcohol

☒ **D** paracetamol

(ii) The drug morphine can also increase reaction time.

Describe how morphine has this effect on reaction time.

(2)

(c) Car drivers react to the colour change of a traffic light.

Describe how this information travels from the eye to the brain.

(2)

(Total for Question 2 = 8 marks)

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Plant growth

3 The photograph shows a bean plant growing in soil.



(Source: @ alarmy.com)

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

These roots have grown downwards because of

(1)

☒ **A** negative gravitropism

☒ **B** negative phototropism

☒ **C** positive gravitropism

☒ **D** positive phototropism

(ii) Suggest an advantage for the roots growing downwards.

(1)

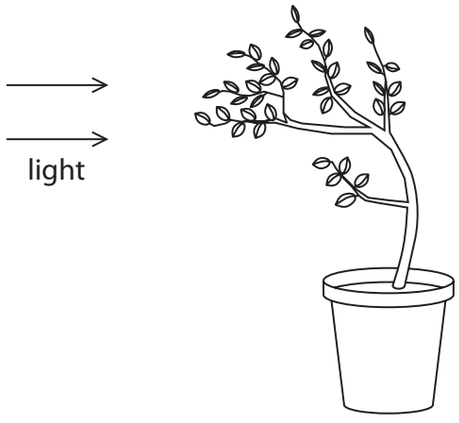
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(b) The diagram shows a plant responding to light from one direction.



(i) Describe the changes that occur in the shoot of a plant in response to light from one direction.

(2)

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(ii) Explain why the shoot of a plant will not grow if the tip is removed.

(2)

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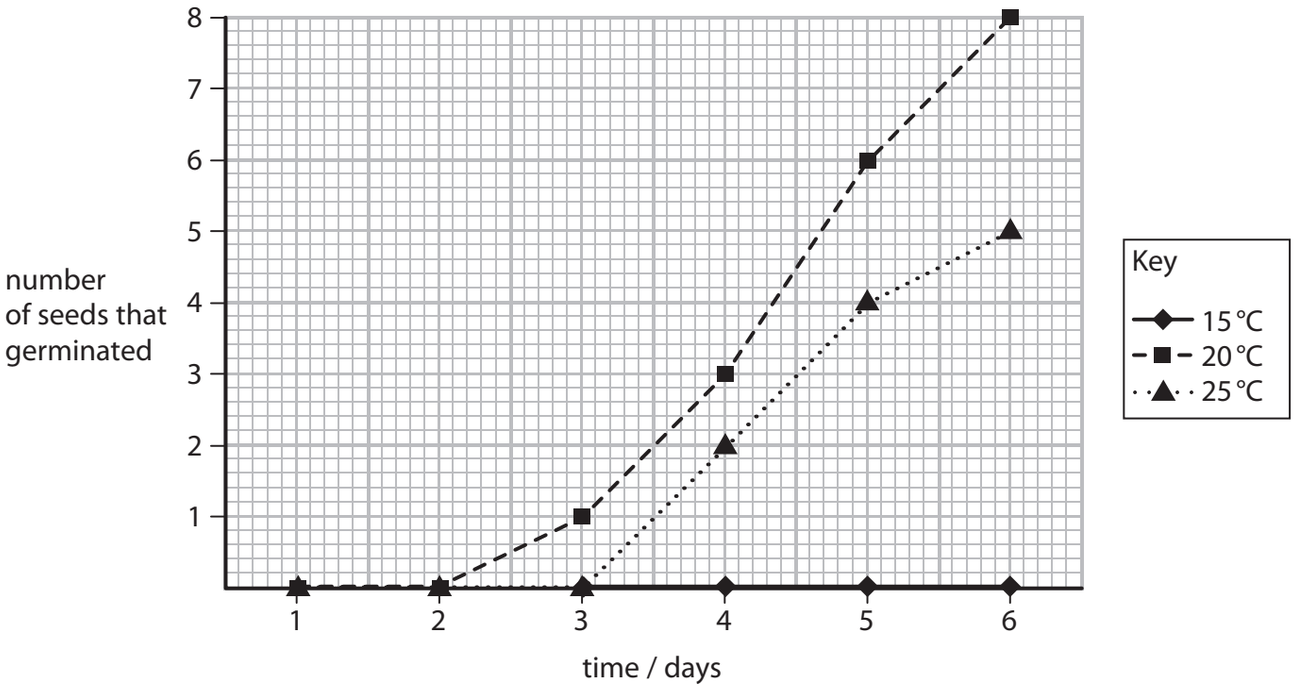
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(c) The graph shows the effect of temperature on the germination of seeds.



(i) Describe the effect of the three temperatures on the germination of these seeds.

(3)

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

The hormone that causes seed germination is

(1)

☒ **A** auxin

☒ **B** gibberellin

☒ **C** glucagon

☒ **D** insulin

(Total for Question 3 = 10 marks)

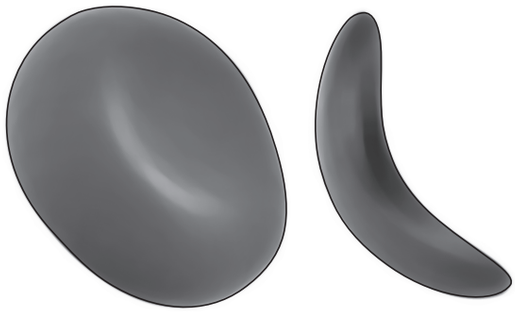
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Sickle cell disease

4 The diagram shows two red blood cells.

One is affected by sickle cell disease and the other is not.



(a) (i) Explain why a person with sickle cell disease can only exercise for a short period of time.

(3)

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(ii) The inheritance of sickle cell disease can be represented using **D** or **d**.

Use words from the box to complete the following sentences.

(3)

recessive	heterozygous	phenotype
genotype	homozygous	dominant

The alleles **dd** represent the ..... of a person with sickle cell disease.

The allele **d** is ..... and when a person inherits two of these alleles, that person is ..... .

(b) John and Sally want to have children.

John and Sally both have the alleles **Dd** for sickle cell disease.

Complete the Punnett square and calculate the percentage probability of their first child inheriting sickle cell disease.

(2)

	D	d
D		
d		

probability ..... %

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(c) Cystic fibrosis is another genetic disorder.

Explain why lung infections are more common in people with cystic fibrosis.

(2)

.....

.....

.....

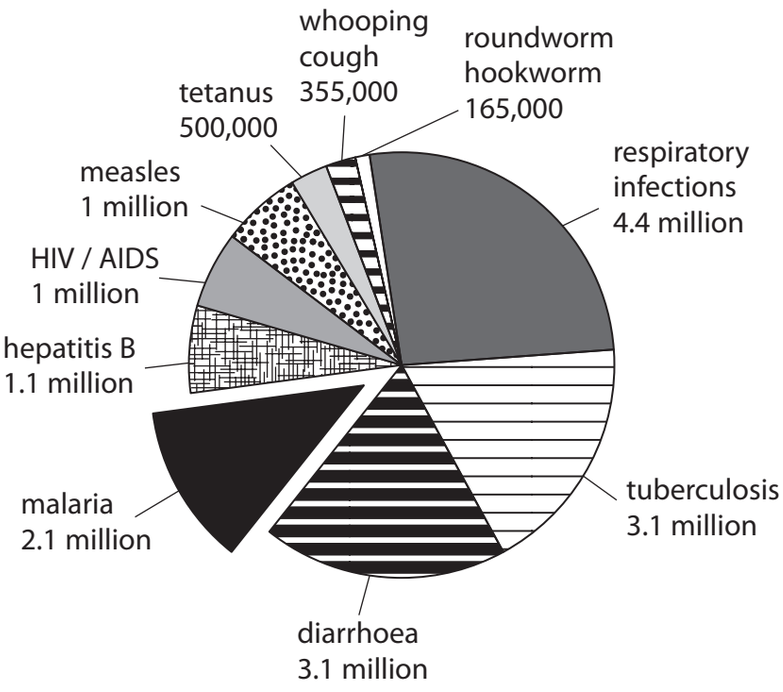
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(Total for Question 4 = 10 marks)

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Disease

5 (a) The pie chart shows how many people died worldwide in 2015 from 10 common diseases.



(i) The total number of deaths from these diseases was 16 820 000.

Calculate the percentage of deaths that were caused by malaria.

(2)

..... %

(ii) Describe how malaria is spread.

(2)

.....

.....

.....

.....

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(iii) Some of these diseases are caused by bacteria.

Describe how an antiseptic can be used to reduce the number of bacterial infections.

(2)

*(b) Describe how the human body uses physical barriers and chemical defences to prevent infection.

(6)

(Total for Question 5 = 12 marks)

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Classification

6 (a) (i) The table shows three kingdoms.

Complete the table with a tick (✓) for each feature present in the cells of these kingdoms.

(3)

kingdom	features present		
	nucleus	chlorophyll	cell walls
Animalia			
Fungi			
Plantae			

(ii) Explain why viruses are not classified into a kingdom.

(2)

.....

.....

.....

.....

(iii) Name the phylum of the kingdom Animalia that contains vertebrates.

(1)

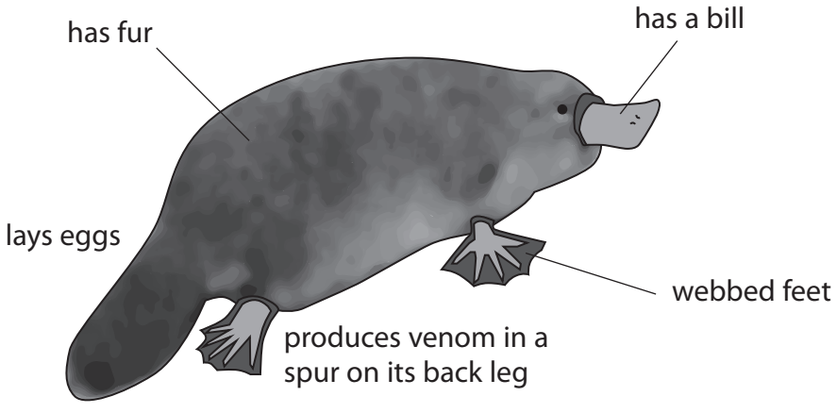
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*(b) The duck-billed platypus cannot always maintain its own body temperature, so has to rely on the environment.

The image shows some characteristics of the duck-billed platypus.



Explain why scientists have problems classifying the duck-billed platypus into the group mammalia.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

January 2018

Pearson Edexcel GCSE
In Biology (5BI1F)
Paper 01

edexcel

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January 2018
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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Acceptable answers	Marks
1 (a) (i)	25 (tonnes)		(1)

Question number	Answer	Acceptable answers	Marks
1 (a) (ii)	**D** ☒ respiration		(1)

Question number	Answer	Acceptable answers	Marks
1 (a) (iii)	photosynthesis	accept phonetic spellings of photosynthesis	(1)

Question number	Answer	Acceptable answers	Marks
1 (a) (iv)	**A** ☒ coal		(1)

Question number	Answer	Acceptable answers	Marks
1 (b) (i)	An explanation linking the following points: • blackspot fungus cannot grow (1) • where there are high levels of sulfur dioxide pollution (1)		(2)

Question number	Answer	Acceptable answers	Marks
1 (b) (ii)	An explanation linking **two** of the following points: • sulfur dioxide reacts with / dissolves in water (1) • to form sulfurous acid (1)	accept clouds for water accept sulphuric acid	(2)

Total for question 1 = 8 marks

Question number	Answer	Acceptable answers	Marks
2 (a) (i)	substitution 72 (÷) 12 (1) evaluation (x)6	accept 2 marks for bald correct answer	(2)

Question number	Answer	Acceptable answers	Marks
2 (a) (ii)	**C** ☒ 130m -135m		(1)

Question number	Answer	Acceptable answers	Marks
2 (b)(i)	**C** ☒ alcohol		(1)

Question number	Answer	Acceptable answers	Marks
2 (b)(ii)	A description linking **two** of the following points: • blocks nerve impulses (1) • neurotransmitters cannot move (1) • across synapses (1)		(2)

Question number	Answer	Acceptable answers	Marks
2 (c)	A description linking **two** of the following points: • light is the stimulus (1) • electrical impulse (1) • travels along sensory neurone (1)	accept optic nerve for sensory neurone	(2)

Total for question 2 = 8 marks

Question number	Answer	Acceptable answers	Marks
3 (a) (i)	**C** ☒ positive gravitropism		(1)

Question number	Answer	Acceptable answers	Marks
3 (a) (ii)	Any **one** of the following: absorb water / absorb minerals / to anchor the plant in the ground		(1)

Question number	Answer	Acceptable answers	Marks
3 (b) (i)	A description linking **two** of the following: • the plant shoot to bends towards the light (1) • cell elongation (1) • (on) the shaded side of the shoot (1)		(2)

Question number	Answer	Acceptable answers	Marks
3 (b) (ii)	An explanation linking the following points: • auxin (1) • is found in the tip of the plant (1)		(2)

Question number	Answer	Acceptable answers	Marks
3 (c) (i)	A description including **three** of the following: • at 15 ^{0}C no seeds germinate (1) • at 20 ^{0}C 8 seeds germinated / 20 ^{0}C is the optimum temperature for seed germination / seeds start germinating at day 2 (1) • at 25 ^{0}C 5 seeds germinated / seed germination was not as efficient at 25 ^{0}C as at 20 ^{0}C / seeds start germinating at day 3 (1)		(3)

Question number	Answer	Acceptable answers	Marks
3 (c) (ii)	**B** ☒ gibberellin		(1)

Total for question 3 = 10 marks

Question number	Answer	Acceptable answers	Marks
4 (a) (i)	An explanation linking **three** of the following points: • red blood cells deformed / sickle shaped (1) • oxygen carrying capacity of blood is reduced (1) • less (aerobic) respiration (1) • less energy released (1)	blocked blood vessels (1) painful joints (1)	(3)

Question number	Answer	Acceptable answers	Marks
4 (a) (ii)	genotype (1) recessive (1) homozygous (1)	Answers must be in the correct order. Accept correct phonetic spelling	(3)

Question number	Answer	Acceptable answers	Marks
4 (b)	<table><tr><td></td><td>D</td><td>d</td></tr><tr><td>D</td><td>DD</td><td>Dd</td></tr><tr><td>d</td><td>Dd</td><td>dd</td></tr></table> (1) (probability) 25 (%) (1)	one mark for offspring genotypes one mark for correct probability	(2)

Question number	Answer	Acceptable answers	Marks
4 (c)	An explanation linking the following points: • build-up of / thick / sticky mucus (1) • which traps (more) bacteria (causing infection) (1)	accept more mucus	(2)

Total for question 4 = 10 marks

Question number	Answer	Acceptable answers	Marks
5 (a) (i)	(2 100 000 / 16 820 000) x 100 (1) 12.5 (%)	 accept: 12.485 /12.49 (%)	(2)

Question number	Answer	Acceptable answers	Marks
5 (a) (ii)	A description linking **two** of the following points: • (*Anopheles*) mosquito (1) • pierces the skin (1) • transferring infected blood from person to person (1)	 accept: protozoan in blood is transferred (1)	(2)

Question number	Answer	Acceptable answers	Marks
5 (iii)	A description linking the following points: • antiseptic sprayed on (an infected) surface / skin (1) • kills bacteria / pathogen (1)		(2)

Question Number		Indicative Content	Mark
QWC	***b**	A description to include some of the following points Physical barriers • skin to prevent entry of microorganisms into the bloodstream • cilia lining the nasal passages • cilia lining the bronchi to prevent entry to lungs • cilia move pathogens out of the lungs • mucus to trap pathogens • scabs prevents entry into the bloodstream • eyelashes stop entry into the eyes • earwax provides some protection against bacteria • nasal hairs prevent entry of pathogens Chemical barriers • hydrochloric acid in the stomach to kill microorganisms • lysozymes in tears to kill microorganisms • sebum on skin (antibacterial)	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited description of either a physical or a chemical barrier to infection • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple description of both physical and chemical barriers to infection or a detailed description of a physical or chemical barrier. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed description of both physical and chemical barriers to infection • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 5 = 12 marks

Question number	Answer	Marks
6 (a) (i)	<table><tr><th rowspan="2">kingdom</th><th colspan="3">features present</th></tr><tr><th>nucleus</th><th>chlorophyll</th><th>cell walls</th></tr><tr><td>Animalia</td><td>✓</td><td></td><td></td></tr><tr><td>Fungi</td><td>✓</td><td></td><td>✓</td></tr><tr><td>Plantae</td><td>✓</td><td>✓</td><td>✓</td></tr></table> One mark for each correct line of the table	(3)

Question number	Answer	Acceptable answers	Marks
6 (a) (ii)	An explanation linking the following statements: • viruses are considered by scientists to be non-living (1) • • as they rely on a host organisms to reproduce/grow (1)		(2)

Question number	Answer	Acceptable answers	Marks
6 (a) (iii)	chordata / chordate	accept: phonetic spellings of chordata / chordates	(1)

Question Number		Indicative Content	Mark
QWC	**6b***	A explanation to include some of the following points Scientists place vertebrates into groups based on • mammals have fur on their bodies • the platypus has fur • oxygen absorption in mammals is through the lungs • the platypus has lungs • mammals give birth to live young / viviparous • the platypus lays eggs /oviparous • mammals are homeotherms • the platypus cannot always regulate its body temperature so is not fully homeothermic • mammals do not produce venom • the platypus produces venom • mammals do not have bills/beaks • the platypus has a bill/beak • few mammals have webbed feet • the platypus has webbed feet	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited explanation that links at least **one** characteristic of a mammal to the characteristics of a duck-billed platypus. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple explanation that links at least **two** characteristics of a mammal to the characteristics of a duck-billed platypus. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed explanation that links at least **three** characteristics of a mammal to the characteristics of a duck-billed platypus • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 6 = 12 marks

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Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Tuesday 16 May 2017 – Afternoon
Time: 1 hour

Paper Reference
5BI1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

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Advice

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Answer ALL questions

Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Classification and evolution

1 (a) *Hallucigenia* is an organism that is now extinct.
This computerised image shows *Hallucigenia*.



© Danielle Dufault

(i) *Hallucigenia sparsa* is the binomial name for this organism.

Draw **one** straight line from each part of the binomial name to its correct classification.

(2)

binomial name	**classification**
	class
Hallucigenia	family
	genus
sparsa	order
	species

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(ii) *Hallucigenia* was a multicellular organism that ate other organisms.

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

(1)

Hallucigenia belongs to the Kingdom

☒ **A** Animalia

☒ **B** Fungi

☒ **C** Plantae

☒ **D** Protoctista

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

(1)

An organism that feeds on other organisms is called

☒ **A** an autotroph

☒ **B** a heterotroph

☒ **C** a homeotherm

☒ **D** a poikilotherm

(ii) Fossils of *Hallucigenia* were discovered 100 years ago.
The heads were missing from these fossils.
In 2015, scientists discovered a fossil of *Hallucigenia* with a head.

Suggest one reason why the heads of *Hallucigenia* were missing.

(1)

.....

.....

.....

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(c) Describe why organisms may become extinct due to a change in the climate.

(3)

(Total for Question 1 = 8 marks)

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Feeding relationships

2 (a) The photograph shows the close relationship between an oxpecker and an antelope.



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

(1)

The oxpecker and the antelope both benefit from this relationship.
This type of relationship is called

☒ **A** geotropism

☒ **B** mutualism

☒ **C** oviparous

☒ **D** viviparous

(ii) Describe how both the oxpecker and the antelope benefit from this close relationship.

(2)

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(b) Fleas depend on a host species and suck blood from the host.

(i) State the name of this type of feeding relationship.

(1)

.....

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

(1)

Other living organisms that suck blood from their host include

☒ **A** lichen

☒ **B** head lice

☒ **C** houseflies

☒ **D** mistletoe

(c) Describe how a tapeworm depends on its host for survival.

(3)

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(Total for Question 2 = 8 marks)

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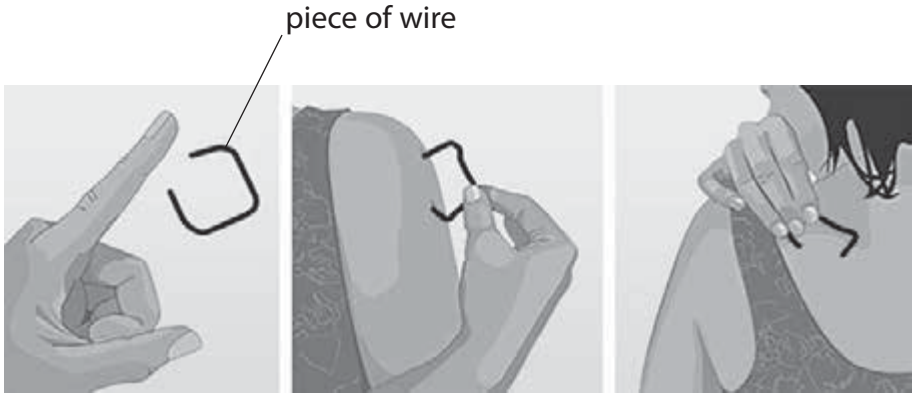
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The nervous system

3 (a) A student investigated the sensitivity of different parts of the body.

The diagram shows a piece of wire with the ends at a set distance apart.
Different parts of the body were touched with this wire.



Suggest one safety precaution that should be considered when doing this investigation.

(1)

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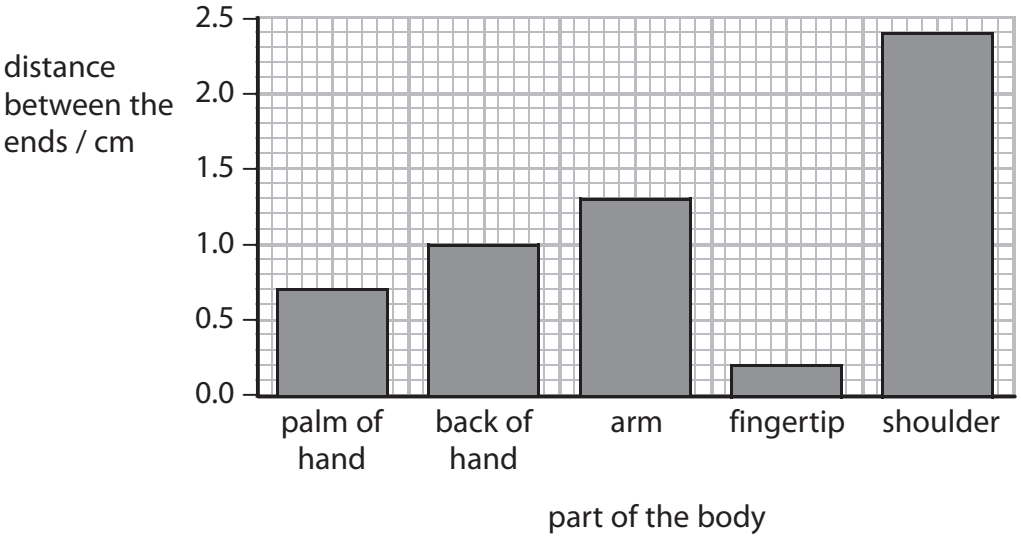
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(b) This investigation was repeated with the ends of the wire at different distances apart. The student recorded the distance between the ends when both ends were felt on the skin. The investigation was repeated on different parts of the body.

The results of the investigation are shown in the graph.



(i) Write the parts of the body in order of sensitivity starting with the least sensitive.

(2)

least sensitive

most sensitive

(ii) Suggest the advantage of the difference in sensitivity of the back of the hand and the palm of the hand.

(2)

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

(1)

Nerve impulses pass from touch receptors to the spinal cord through

☒ **A** motor neurones

☒ **B** relay neurones

☒ **C** reflex neurones

☒ **D** sensory neurones

(d) Explain the advantage of the reflex arc.

(2)

(e) Describe how information is passed between two neurones.

(2)

(Total for Question 3 = 10 marks)

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Disease

4 (a) A large outbreak of cholera occurred in London in 1894.

The table shows some data about this outbreak of cholera in London.

area of London	number of houses	total number of deaths from cholera	number of deaths in 10,000 houses
Southwark	40,046	1 263	315
Lambeth	26,107	98	37
rest of London	256,423	1 422	59

(i) Calculate the total number of deaths from cholera in London in 1894.

(2)

.....

(ii) Suggest a reason for the differences in the total number of deaths from cholera in Southwark and Lambeth.

(2)

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(iii) Cholera is an infectious disease caused by a microorganism.

Use a word from the box to complete the following sentence.

(1)

viruses	bacteria
fungi	protozoa

The microorganisms that cause cholera are .....

(b) (i) Describe how the physical defences of the human body prevent the entry of microorganisms that cause infections.

(3)

.....

.....

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(ii) Describe how some chemicals produced by the human body provide defence against infection.

(2)

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(Total for Question 4 = 10 marks)

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Ecosystems

5 The photograph shows a locust.



(a) (i) Locusts feed on maize plants and locusts are eaten by lizards.
Lizards are eaten by snakes.

Complete a food chain for these organisms.

(2)

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

(1)

Maize plants get energy to grow from the

☒ **A** locust

☒ **B** air

☒ **C** soil

☒ **D** sunlight

(b) (i) One square metre of maize plants has a biomass of 8800 g.
When the maize plant is eaten, 8% of this biomass is passed on to the locusts.

Calculate how much of the maize plant biomass is passed on to the locusts.

(2)

..... g

(ii) State one reason why only 8% of the biomass from the maize plants is passed on to the locusts.

(1)

.....

.....

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*(c) Explain how carbon is cycled in the environment, including the role of all living organisms and the use of fossil fuels.

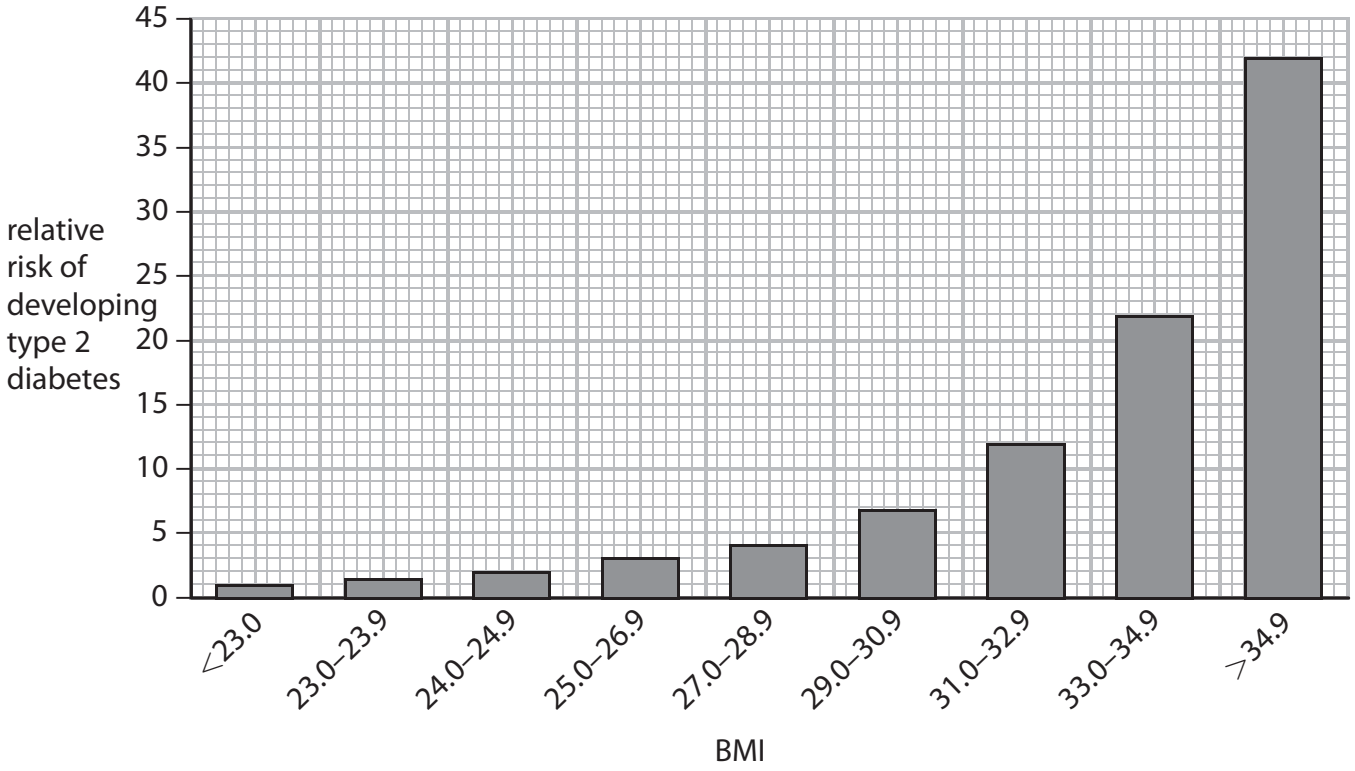
(6)

(Total for Question 5 = 12 marks)

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Diabetes

6 (a) The graph shows the relative risk of developing type 2 diabetes within nine different Body Mass Index (BMI) ranges.



(i) Calculate the difference in the relative risk of developing type 2 diabetes for a BMI of 29.0–30.9 and a BMI of >34.9.

(2)

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(ii) Suggest why the relative risk of developing type 2 diabetes is greater above a BMI of 29.0.

(2)

(iii) Describe why it is difficult for a person with type 2 diabetes to control their blood sugar level.

(2)

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*(b) It is also difficult for a person with type 1 diabetes to control their blood sugar level.

Describe how people with type 1 diabetes **and** people with type 2 diabetes can control their blood sugar levels.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

Summer 2017

Pearson Edexcel GCSE

In Biology (5BI1F) Paper 01

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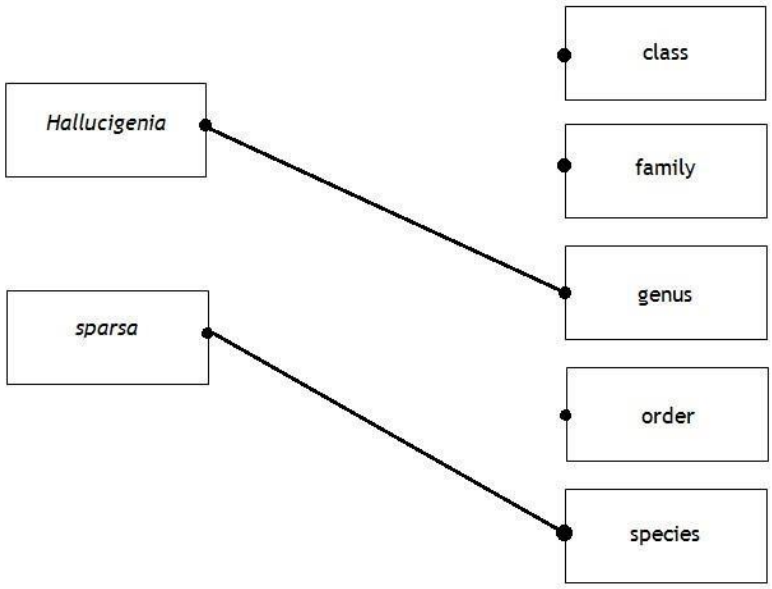
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Summer 2017
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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Marks
1 (a) (i)	**binomial name** **classification**  reject more than one line from a binomial name	(2)

Question number	Answer	Marks
1 (a) (ii)	**A** Animalia **The only correct answer is A** ***B** is not correct because Fungi do not eat other organisms* ***C** is not correct because Plantae do not eat other organisms* ***D** is not correct because Protoctista do not eat other organisms*	(1)

Question number	Answer	Marks
1 (b) (i)	**B** a heterotroph **The only correct answer is B** ***A*** *is not correct because an autotroph produces its own food* ***C*** *is not correct because homeotherm is an organism that generates their own body heat and this word is not a feeding mechanism* ***D*** *is not correct because a poikilotherm is an organism that uses external sources for body heat and this word is not a feeding mechanism*	(1)

Question number	Answer	Acceptable answers	Marks
1 (b) (ii)	(head) made of soft tissue / decayed / heads were eaten (1)	accept fossil was damaged / head rotted / head decomposed	(1)

Question number	Answer	Acceptable answers	Marks
1 (c)	A description including three of the following: • organisms may be less well <u>adapted</u> (to a changing climate) (1) • so they are outcompeted by other organisms (1) • harder to find food / shelter (1) • do not live long enough to reproduce / less successful reproduction (1)	cannot <u>adapt</u> description of named resources / habitat destroyed not able to reproduce	(3)

Total for question 1 = 8 marks

Question number	Answer	Marks
2 (a) (i)	**B** mutualism **The only correct answer is B** ***A** is not correct because geotropism is a plant response and is not a feeding relationship* ***C** is not correct because oviparous is an organism that produces eggs that mature and hatch after being expelled from the body and is not classed as a feeding relationship* ***D** is not correct because viviparous is an organism bring forth live young which have developed inside the body of the parent and is not classed as a feeding relationship*	(1)

Question number	Answer	Acceptable answers	Marks
2 (a) (ii)	A description to include the following: • oxpecker benefits by eating (parasitic) insects from (the skin of) the antelope (1) • the antelope does not become infected (by the parasitic insects that are removed) (1)	accept any named example of insect / bugs accept does not have blood sucked	(2)

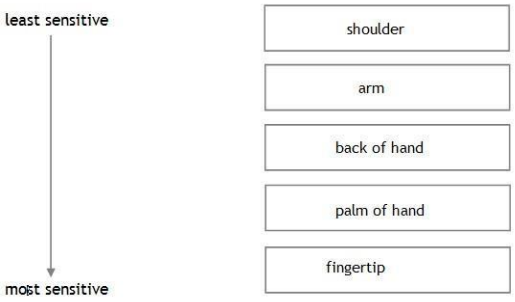
Question number	Answer	Acceptable answers	Marks
2 (b) (i)	parasitism	parasitic	(1)

Question number	Answer	Marks
2 (b) (ii)	**B** head lice **The only correct answer is B** ***A** is not correct because lichen do not suck blood from a host* ***C** is not correct because houseflies do not suck blood from a host* ***D** is not correct because mistletoe does not suck blood from a host*	(1)

Question number	Answer	Acceptable answers	Marks
2 (c)	A description including three of the following: • attaches to the inside / lives inside (the host) / intestine (1) • using hooks / suckers (1) • absorbing (digested) food from their host (1) • lays eggs which leave host in faeces (to infect other organisms) (1)	allow nutrients	(3)

Total for question 2 = 8 marks

Question number	Answer	Acceptable answers	Marks
3 (a)	not too sharp / do not press too hard	Accept do not use on broken or inflamed skin / check for allergic reactions to metal Accept disinfected / cleaned	(1)

Question number	Answer	Acceptable answers	Marks
3 (b) (i)		two marks for correct order One mark for correct interpretation of the graph, i.e. correct answer but in reverse order(fingertip → palm of hand → back of hand → arm → shoulder) If fingertip and shoulder in correct place then give 1 mark	(2)

Question number	Answer	Acceptable answers	Marks
3 (b) (ii)	A suggestion including the following linked together: • most sensitive on the palm of the hand / react faster (1) • because the palm of the hand is used for touching / hot things (1)	Contact with danger / prevent damage from the environment accept reverse argument for the back of the hand	(2)

Question number	Answer	Marks
3 (c)	**D** sensory neurons **The only correct answer is D** ***A** is not correct because motor neurones pass impulses from the CNS to effectors* ***B** is not correct because relay neurones are found in the spinal cord between sensory and motor neurones.* ***C** is not correct because a reflex neurone is another name for a relay neurone and these are found in the spinal cord between sensory and motor neurones.*	(1)

Question number	Answer	Acceptable answers	Marks
3 (d)	Explanation to include: • rapid / fast response (1) • to limit damage / get away from danger (1)	Immediate / without thinking	(2)

Question number	Answer	Marks
3 (e)	A description linking the following: • neurotransmitters / chemical signals (1) • (are passed across) the synapse (1)	(2)

Total for question 3 = 10 marks

Question number	Answer	Acceptable answers	Marks
4a (i)	1263 (+) 98 (+) 1422 (1) = 2783	2 marks for correct answer with no working	(2)

Question number	Answer	Acceptable answers	Marks
4 (a) (ii)	A suggestion to include the following: • more houses in Southwark / more people in Southwark / overcrowding in Southwark (1) • cleaner water supply in Lambeth / better sanitation (1)	accept reverse argument	(2)

Question number	Answer	Marks
4 (a) (iii)	bacteria (1)	(1)

Question number	Answer	Acceptable answers	Marks
4 (b) (i)	A description including three of the following: • skin as a barrier (1) • mucus traps pathogens (1) • cilia sweep pathogens (back up the trachea) / moves mucus (1)	does not let bacteria in NOT trap accept scab / blood clot provides a barrier (1)	(3)

Question number	Answer	Acceptable answers	Marks
4 (b) (ii)	An description including the following linked together: • (hydrochloric) stomach acid (1) OR • lysozymes in tears (1) AND • kills pathogens / bacteria / microorganism (1)	Not infection / disease	(2)

Total for question 4 = 10 marks

Question number	Answer	Acceptable answers	Marks
5 (a) (i)	maize (plants) → locusts → lizards → snakes If correct order in boxes, but no arrows (1)	If correct order, but in reverse, showing arrows also reversed (Right to Left) then award 2 marks.	(2)

Question number	Answer	Marks
5 (a) (ii)	**D** sunlight **The only correct answer is D** *A is not correct because maize plant do not get energy from the locust* ***B** is not correct because maize plants obtain carbon dioxide from the air* ***C** is not correct because maize plants obtain minerals and water from the soil*	(1)

Question number	Answer	Acceptable answers	Marks
5 (b) (i)	8800 ÷ 100 = 88 (1) 88 x 8 = 704 (g)	Accept alternative methods of calculating percentages 2 marks for correct answer no working	(2)

Question number	Answer	Marks
5 (b) (ii)	not all of the plant is eaten / not all can be digested	(1)

Question Number		Indicative Content	Mark
QWC	***5c**	A explanation to include some of the following points • the atmosphere contains carbon dioxide (CO_2) Photosynthesis • plants take in CO_2 during photosynthesis • Plants make carbon compounds from CO_2 Respiration • plants release CO_2 during respiration • plants are eaten by animals • carbon is passed from organism to organism • animals release CO_2 during respiration Decomposition • microorganisms feed on dead plant and animal matter • microorganisms release CO_2 during respiration or decomposition Combustion • fossil fuels are formed from dead plants and animals • fossil fuels contain stored carbon • CO_2 is released when fossil fuels are combusted	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited explanation of at least one process of the carbon cycle • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple explanation of at least two processes of the carbon cycle or a detailed explanation of one process of the carbon cycle including some reference to carbon dioxide • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed explanation of at least three of the processes of the carbon cycle including some reference to carbon dioxide • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 5 = 12 marks

Question number	Answer	Acceptable answers	Marks
6 (a) (i)	42 (-) 6.9 (1) = 35 / 35.1 / 35.2	Accept numbers in the range of 6.8 - 7 2 marks for correct answer no working	(2)

Question number	Answer	Acceptable answers	Marks
6 (a) (ii)	A suggestion to include two of the following: • (likely to be) obese (1) • likely to have a high fat diet / high sugar diet (1) • likely to have a sedentary lifestyle (1)	not overweight or fat do not accept examples lack of exercise	(2)

Question number	Answer	Acceptable answers	Marks
6 (a) (iii)	A description to include the following: • <u>resistant</u> (1) • (to) <u>insulin</u> (1)	ignore immune only accept the insulin mark if it is in the context of resistance / unresponsive	(2)

Question Number		Indicative Content	Mark
QWC	*6b	A description to include some of the following points People with type 1 diabetes: • insulin injections • into subcutaneous fat layer • easily absorbed into the bloodstream • level of physical activity affects level of insulin required • careful control of carbohydrate diet People with type 2 diabetes: • glucose not absorbed into body cells such as the liver / muscles • exercise regularly • careful control of carbohydrate diet • medication (such as Acarbose or Metformin) to reduce glucose in the blood after a meal	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited description of how diabetes is controlled. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple description of how type 1 **and** type 2 diabetes are controlled or a detailed description of one type of diabetes. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed description of how type 1 **and** type 2 diabetes are controlled including a reference to insulin injections into fat layer and carbohydrate diet control. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 6 = 12 marks

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Surname	Other names

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Centre Number | | | | | |

Candidate Number | | | | |

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Tuesday 17 May 2016 – Afternoon
Time: 1 hour

Paper Reference
5BI1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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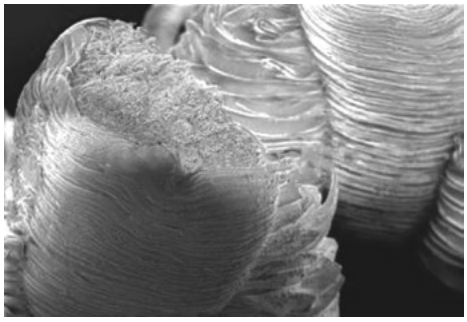
Answer ALL questions

Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Extreme environments

1 The photograph shows a thermophilic organism.
A thermophilic organism can live at very high temperatures.

This organism is unicellular (single-celled) and does not have a nucleus.



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

The kingdom this thermophilic organism belongs to is

(1)

☒ **A** Fungi

☒ **B** Plantae

☒ **C** Prokaryotes

☒ **D** Protoctista

(b) This thermophilic organism produces its own food from the sulfur in a hydrothermal vent.

(i) What is the name given to organisms that produce their own food?

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

(1)

☒ **A** autotrophs

☒ **B** heterotrophs

☒ **C** oviparous

☒ **D** viviparous

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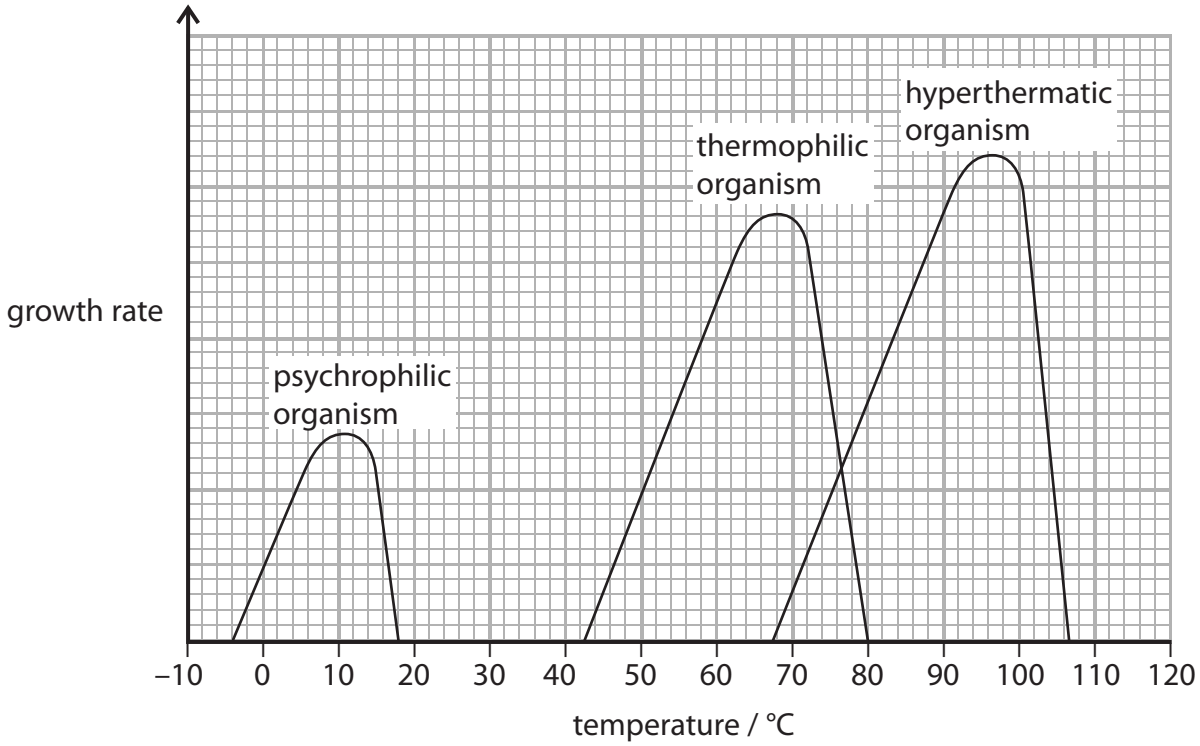
(ii) Plants also produce their own food.

State the name of the process that plants use to produce their own food.

(1)

.....

(c) The graph shows the growth rates of three types of organism at different temperatures.



(i) State the temperature range in which the thermophilic organisms grow.

(1)

.....

(ii) State the optimum temperature for the growth of the thermophilic organisms.

(1)

.....

(iii) Thermophilic organisms can live in deep-sea hydrothermal vents.

Describe the environmental conditions in a deep-sea hydrothermal vent.

(3)

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(Total for Question 1 = 8 marks)

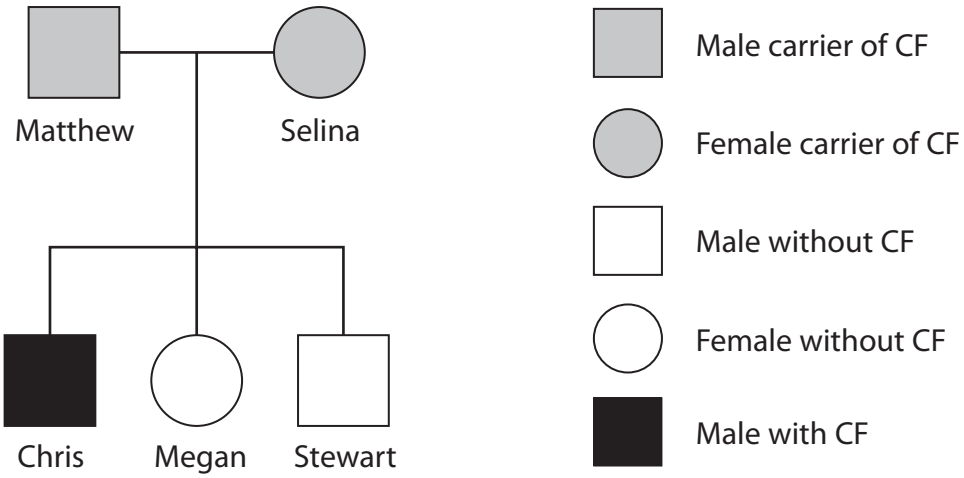
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Cystic fibrosis (CF)

2 Cystic fibrosis (CF) is a recessive genetic disorder.

Matthew and Selina both have the genotype Ff.
They are carriers of this disorder.

The diagram shows how CF was passed down from Matthew and Selina to their children.



(a) (i) State the percentage of the male children with CF.

(1)

.....

(ii) State the genotypes of Chris and Megan for cystic fibrosis.

(2)

Chris .....

Megan .....

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(iii) Explain why Matthew and Selina, who do not have cystic fibrosis, can have a child with cystic fibrosis.

(2)

(b) Describe the symptoms of cystic fibrosis.

(3)

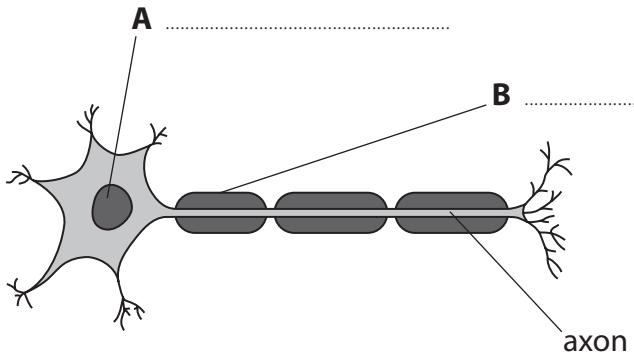
(Total for Question 2 = 8 marks)

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3 The diagram shows a neurone.

(a) (i) Name the parts labelled **A** and **B**.

(2)



(ii) Describe the role of **B**.

(2)

(b) Signals travel along the axon.

How do these signals travel?

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

(1)

☒ **A** as electrical impulses

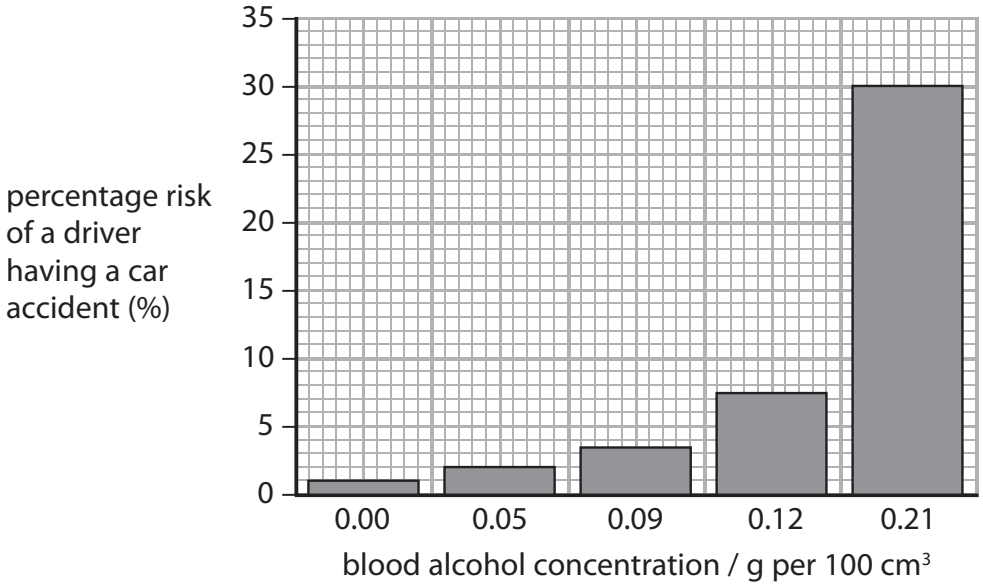
☒ **B** as chemical transmitters

☒ **C** as lysozymes

☒ **D** as hormonal responses

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(c) The graph shows the effect of blood alcohol concentration on the percentage risk of a driver having a car accident.



(i) Calculate the increase in the risk of having a car accident for a driver with a blood alcohol concentration of 0.00 g per 100 cm^3 and a driver with a blood alcohol concentration of 0.21 g per 100 cm^3.

(2)

.....%

(ii) Explain why an increase in blood alcohol concentration has this effect on the risk of having a car accident.

(2)

.....

.....

.....

.....

(d) A reflex arc allows a person to respond rapidly to a stimulus.
Explain how a reflex arc produces a rapid response.

(2)

.....

.....

.....

.....

.....

(Total for Question 3 = 11 marks)

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Diabetes

4 Type 2 diabetes is associated with being obese.
A high Body Mass Index (BMI) is an indication of obesity.
BMI is calculated using this equation.

$$\text{Body Mass Index} = \frac{\text{mass in kilograms}}{(\text{height in metres})^2}$$

(a) Calculate the BMI for a 90 kg man who is 1.50 metres tall.

(2)

.....

(b) (i) A person with type 2 diabetes has a reduced response to the hormone that lowers blood glucose concentration.

State the name of this hormone.

(1)

.....

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

The hormone responsible for lowering blood glucose concentration is released from the

(1)

- ☒ **A** brain
- ☒ **B** liver
- ☒ **C** lungs
- ☒ **D** pancreas

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(iii) Describe how a person with type 2 diabetes can control their blood glucose concentration without medication.

(2)

(c) (i) Describe how a person with type 1 diabetes can control their blood glucose concentration with medication.

(2)

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

The hormone responsible for lowering blood glucose concentration converts glucose into

(1)

- ☒ **A** protein
- ☒ **B** enzymes
- ☒ **C** carbon dioxide
- ☒ **D** glycogen

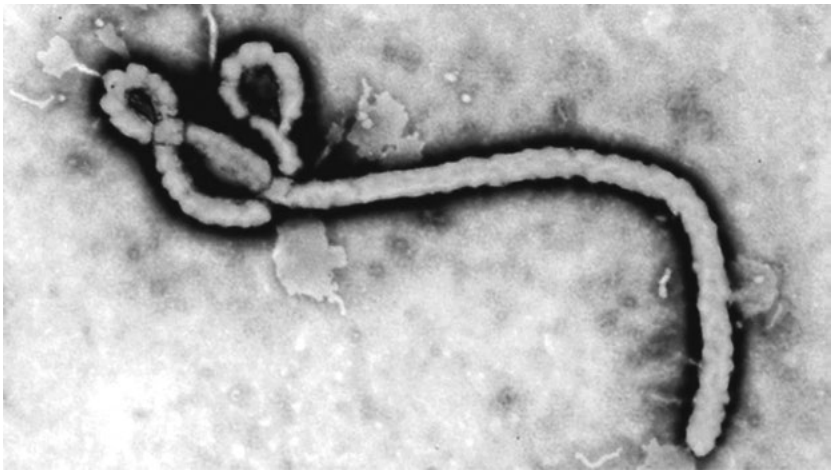
(Total for Question 4 = 9 marks)

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Disease

5 The image shows an Ebola virus.

The Ebola virus causes a disease called haemorrhagic fever which is very infectious.



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

The Ebola virus is also a

(1)

- ☒ **A** autotroph
- ☒ **B** heterotroph
- ☒ **C** pathogen
- ☒ **D** protozoan

(ii) Explain why scientists do not classify viruses into any of the five kingdoms.

(2)

.....

.....

.....

.....

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DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(iii) The Ebola virus is transferred from person to person through blood and other body fluids.

Name one other common disease transferred by body fluids.

(1)

.....

(b) Describe how antiseptics can be used to prevent the spread of infection.

(2)

.....

.....

.....

.....

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*(c) Describe how the human body can prevent the entry of organisms that cause disease.

Include physical barriers and chemical defences in your answer.

(6)

(Total for Question 5 = 12 marks)

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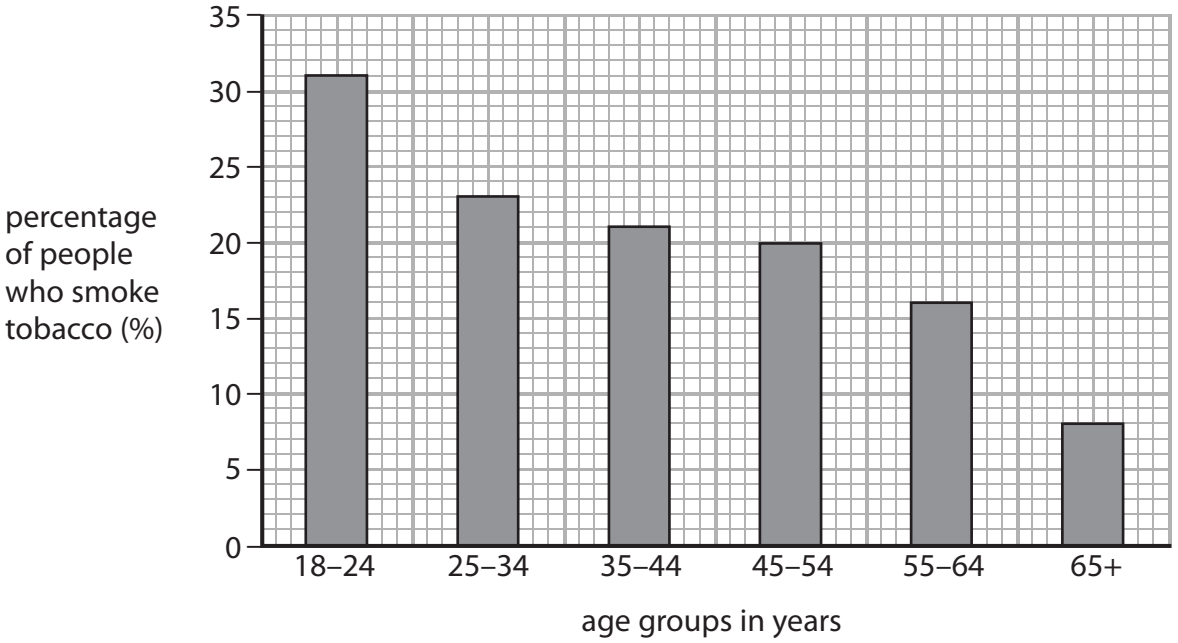
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6 The graph gives some information about smoking in the UK.
It shows the percentage of people in different age groups who smoke.



(a) (i) There are 500 people in each age group.

Calculate the number of people who smoke tobacco in the 35–44 age group.

(2)

..... people

(ii) Explain why a person who smokes tobacco has a higher chance of developing lung cancer than someone who does not smoke tobacco.

(2)

.....

.....

.....

.....

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(iii) Explain why a person who smokes tobacco may not be able to exercise for as long as a person who does not smoke tobacco.

(2)

.....

.....

.....

.....

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*(b) Nicotine belongs to a group of drugs called stimulants.

Describe the effects on the human body of the group of drugs called stimulants and three other groups of drugs.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

Summer 2016

Pearson Edexcel GCSE in Biology (5BI1F) Paper 01 Unit B1: Influences on Life

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities.

Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

Question number	Answer	Notes	Marks
1 (a)	**C** Prokaryotes		(1)

Question number	Answer	Notes	Marks
1 (b)(i)	**A** autotrophs		(1)

Question number	Answer	Notes	Marks
1 (b)(ii)	photosynthesis	Allow any recognisable spelling	(1)

Question number	Answer	Notes	Marks
1 (c) (i)	42/43 to 80 (^{0}C) OR 38/37 (^{0}C)		(1)

Question number	Answer	Notes	Marks
1 (c) (ii)	Any response in the range: 66 to 70 (^{0}C)		(1)

Question number	Answer	Notes	Marks
1 (c) (iii)	A description including three of the following: • hot / high temperatures (1) • high pressure (1) • dark (1) • sulphurous / acidic (1) • saline / salty (1)	lack of sunlight accept low / lack of oxygen	(3)

Total marks for question 1 – 8 marks

Question number	Answer	Notes	Marks
2 (a) (i)	50%	½ Half 0.50	(1)

Question number	Answer	Notes	Marks
2 (a) (ii)	Chris – ff / homozygous recessive (1) Megan – FF / homozygous dominant (1)		(2)

Question number	Answer	Notes	Marks
2 (a) (iii)	An explanation to include the following: • (both) parents are heterozygous (1) • each parent passes one recessive allele / child will have has two recessive alleles (1)	 accept Ff / carriers accept ff	(2)

Question number	Answer	Notes	Marks
2 (b)	A description to include the following: • sticky mucus / build up of mucus (1) Any **two** from the following: • breathing difficulties (1) • (increase) risk of infection (1) • weight loss (1) • infertility (1) • fatigue / tiredness (1)	accept explanations of how symptoms arise eg blocked pancreatic duct as alternatives to symptom	(3)

(Total for Question 2 = 8 marks)

Question number	Answer	Notes	Marks
3 (a) (i)	**A –** nucleus (1) **B -** myelin (sheath) (1)	Accept cell body	(2)

Question number	Answer	Notes	Marks
3 (a) (ii)	A description to include the following: • <u>insulation</u> (of the axon) (1) • increase the speed of the impulse / transmission (1)		(2)

Question number	Answer	Notes	Marks
3 (b)	**A** as electrical impulses		(1)

Question number	Answer	Notes	Marks
3 (c) (i)	30(%) and 1(%) (1) 29(%)	2 marks for correct answer	(2)

Question number	Answer	Notes	Marks
3 (c) (ii)	An explanation linking **two** of the following: • (alcohol is a) depressant (1) • slower speed of reaction / increases time it takes to react / increases reaction time (1) • impairs judgement / loss of inhibitions (1)		(2)

Question number	Answer	Notes	Marks
3 (d)	An explanation linking: • brain not used (1) • automatic / involuntary (1)	accept do not have to think about it	(2)

(Total for Question 3 = 11 marks)

Question number	Answer	Notes	Marks
4 (a)	1.5 x 1.5 / 1.5^2 / 2.25 (1) 90 / 2.25 = 40	2 marks for correct answer	(2)

Question number	Answer	Notes	Marks
4 (b) (i)	insulin		(1)

Question number	Answer	Notes	Marks
4 (b) (ii)	**D** pancreas		(1)

Question number	Answer	Notes	Marks
4 (b) (iii)	A description to include the following • exercise / physical activity (1) • reduce carbohydrate intake (1)	 accept diet control	(2)

Question number	Answer	Notes	Marks
4 (c) (i)	A description to include the following: • (injection of) insulin (1) • into a fat layer (1)		(2)

Question number	Answer	Notes	Marks
4 (c) (ii)	**D** glycogen		(1)

(Total for Question 4 = 9 marks)

Question number	Answer	Notes	Marks
5 (a) (i)	**C** pathogen		(1)

Question number	Answer	Notes	Marks
5 (a) (ii)	An explanation including the following: • not considered to be living (1) • does not complete (all) life processes (independently) (1)	accept examples of life processes	(2)

Question number	Answer	Notes	Marks
5 (a) (iii)	HIV / AIDS / sexually transmitted diseases	accept other diseases passed by bodily fluids	(1)

Question number	Answer	Notes	Marks
5 (b)	A description to include the following: • used externally / on surfaces / onto the skin (1) • kills pathogen(s) / microorganisms (1)		(2)

Question Number		Indicative Content	Mark
QWC	***5c**	A description to include some of the following points: Physical barriers • skin to prevent entry of organisms into the bloodstream • cilia lining the nasal passages / bronchi to prevent entry to lungs / remove mucus • mucus to trap pathogens • scabs to prevent entry of microorganisms into the bloodstream • eyelashes prevent entry into the eye • nasal hairs trap organisms entering breathing system • ear wax traps organisms Chemical defences • (hydrochloric) acid in the stomach kills organisms • lysozymes / enzymes in tears kill organisms • sebum on skin (antibacterial) kills organisms	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited description of either a physical barrier OR a chemical defence • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple description of both a physical barrier AND a chemical defence OR a detailed description of one • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed description of both a physical barrier AND a chemical defence • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

(Total for Question 5 = 12 marks)

Question number	Answer	Notes	Marks
6 (a) (i)	21 (%) (1) 105	2 marks for correct answer	(2)

Question number	Answer	Notes	Marks
6 (a) (ii)	An explanation to include the following: • (tobacco smoke contains) tar (1) • (which is a) <u>carcinogen</u> (1)	can cause mutations	(2)

Question number	Answer	Notes	Marks
6 (a) (iii)	An explanation to include the following: • (tobacco smoke contains) carbon monoxide (1) • reduces how much oxygen can be carried to the muscles / binds to red blood cells / reduces oxygen carrying capacity (1)	less oxygen in blood	(2)

Question Number		Indicative Content	Mark
QWC	***6(b)**	A description to include some of the following points: • drugs are chemical substances that affects the CNS causing a change in behaviour and can be addictive Stimulants • increase neurone speed / neurotransmission • across synapses • speed up reaction time / decrease reaction time • example includes caffeine / cocaine Depressants • decrease neurone speed / neurotransmission • across synapse / brain activity • slow down reaction time / increase reaction time • example includes alcohol Painkillers • feel less pain from a damaged body area • reduce nerve impulses being received by the brain • blocking synapses • example includes morphine / paracetamol Hallucinogens • affects synapses in the brain altering perception • sight / hearing / touch can be changed • example includes LSD / acid / magic mushrooms / cannabis	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited description of at least one group of drugs OR a definition of a drug • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple description of at least two groups of drugs OR a detailed description of one group of drugs including the effects on the nervous system • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed description of the effects of at least three groups of drugs including the effects on the nervous system • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

(Total for Question 6 = 12 marks)

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Pearson Edexcel GCSE

Centre Number | | | | | |

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Biology/Science

Unit B1: Influences on Life

Foundation Tier

Tuesday 12 May 2015 – Afternoon
Time: 1 hour

Paper Reference
5BI1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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Answer ALL questions

Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Classification

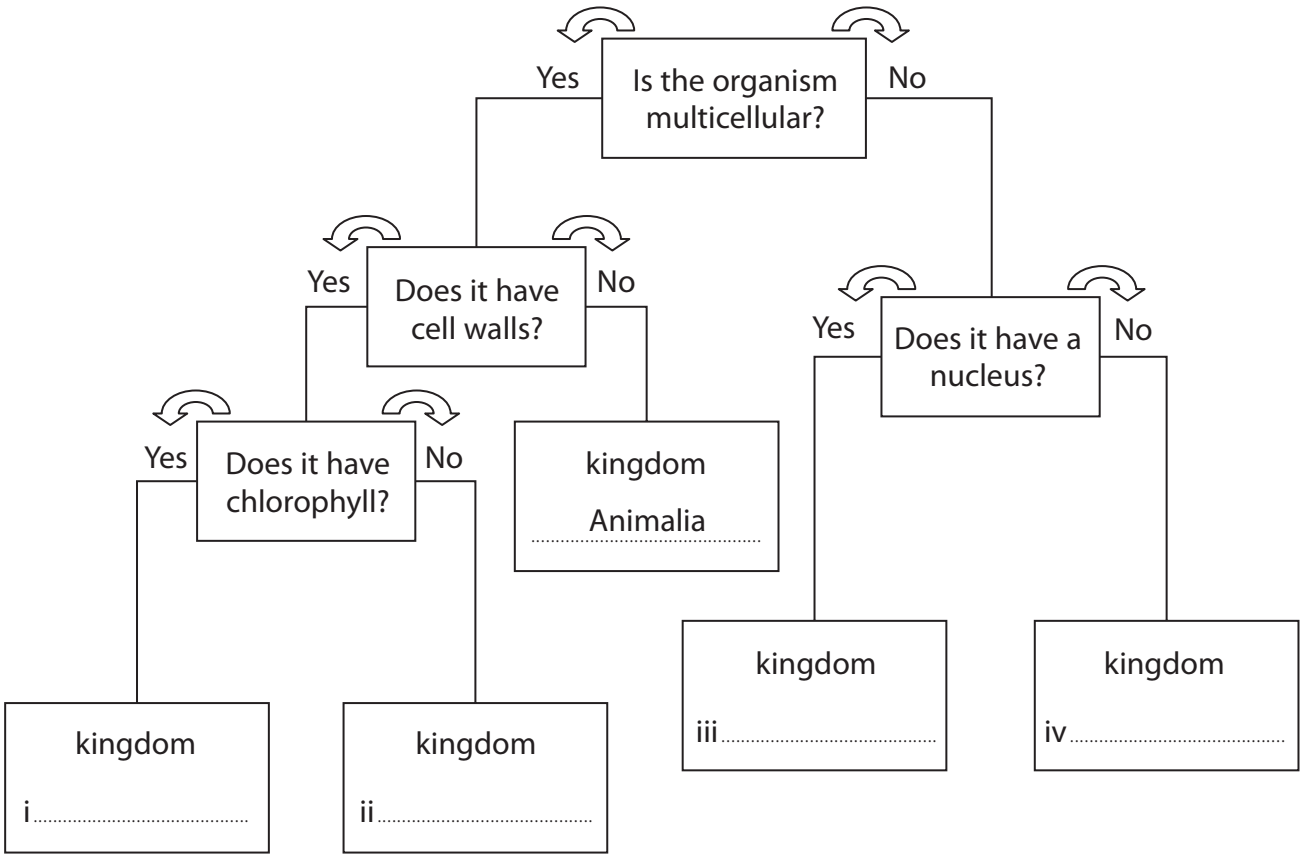
1 (a) John produced a key to classify organisms into their kingdoms.

The names of the kingdoms are shown in the box.

Animalia	Fungi	Plantae
Prokaryotes	Protoctista	

Use words from the box to complete the key. One has been done for you.

(4)



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(b) (i) The kingdom Animalia includes vertebrates and invertebrates.

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

Vertebrates have

(1)

- ☒ **A** a supporting rod running the length of their body
- ☒ **B** cells that contain chloroplasts
- ☒ **C** the ability to feed saprophytically
- ☒ **D** the ability to feed autotrophically

(ii) There are several groups of vertebrate.

Which group absorbs oxygen using gills?

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

(1)

- ☒ **A** birds
- ☒ **B** fish
- ☒ **C** mammals
- ☒ **D** reptiles

(c) Some organisms can form hybrids.

Explain how a hybrid is formed.

(2)

.....

.....

.....

.....

.....

(Total for Question 1 = 8 marks)

Type 2 diabetes

2 Research shows that overweight people may develop Type 2 diabetes.

(a) Body Mass Index (BMI) can be used to identify people who are overweight.

BMI can be calculated using the equation:

$$\text{BMI} = \frac{\text{mass in kilograms}}{\text{height in metres} \times \text{height in metres}}$$

(i) Calculate the BMI for a person who has a mass of 77 kilograms and a height of 1.6 metres.

(2)

BMI = ...

(ii) Scientific research has shown a link between high BMI and the development of Type 2 diabetes.

Describe how the scientific community would validate this research.

(2)

.....

.....

.....

.....

.....

.....

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(b) Blood glucose levels are controlled by hormones.

(i) Use words from the box to complete the following sentences.

(2)

glycogen	liver	insulin
brain	pancreas	auxin

Type 2 diabetes develops when a person becomes resistant to the

hormone .....

This hormone is produced in the .....

(ii) Describe **two** ways a person with Type 2 diabetes can control their blood glucose levels without the use of hormones.

(2)

.....

.....

.....

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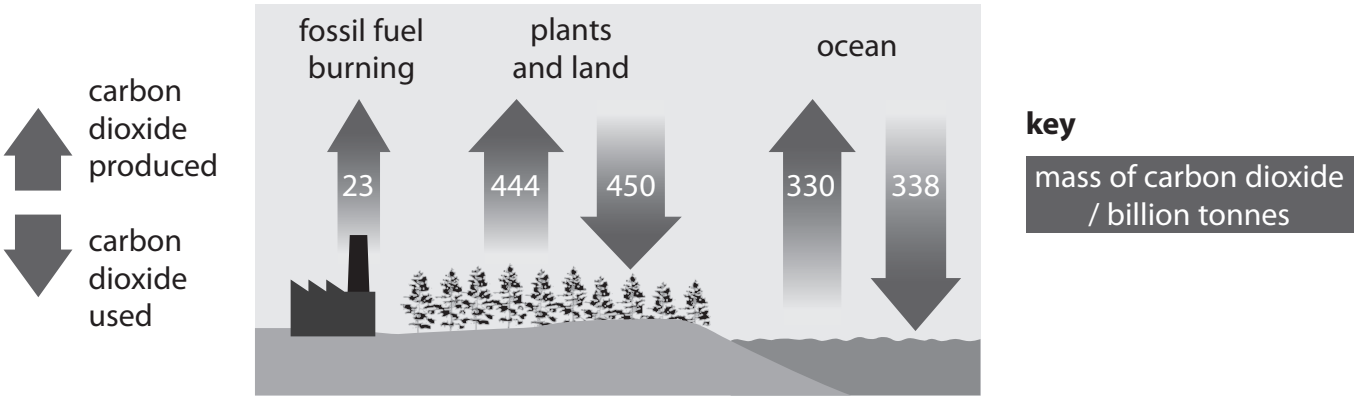
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(Total for Question 2 = 8 marks)

The carbon cycle

3 The diagram shows the mass of carbon dioxide used and produced during one year.



(a) (i) Calculate the difference in mass of carbon dioxide used and produced by the plants and land.

(2)

..... billion tonnes of carbon dioxide

(ii) The total mass of carbon dioxide used was 788 billion tonnes.

Calculate the total mass of carbon dioxide produced.

(2)

..... billion tonnes of carbon dioxide

(b) (i) Suggest **one** effect of an increase in the mass of carbon dioxide produced in the atmosphere.

(1)

.....

.....

.....

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(ii) Explain why plants remove carbon dioxide from the atmosphere.

(2)

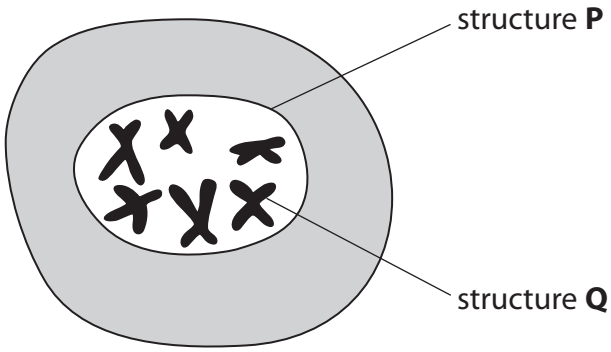
(iii) Suggest **two** ways of reducing the mass of carbon dioxide in the atmosphere.

(2)

(Total for Question 3 = 9 marks)

Genetic inheritance

4 The diagram shows a cell.



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

Structure **P** is the

(1)

- ☒ **A** chloroplast
- ☒ **B** gene
- ☒ **C** cytoplasm
- ☒ **D** nucleus

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

Structure **Q** is a

(1)

- ☒ **A** chromosome
- ☒ **B** cell wall
- ☒ **C** cell membrane
- ☒ **D** phenotype

(iii) A gene can exist in alternative forms.

State the genetic term used for an alternative form of the same gene.

(1)

.....

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(b) Cystic fibrosis is a recessive genetic disorder.

Two parents, Paul and Sue, each have the same genotype **Ff** for cystic fibrosis.

(i) Complete the Punnett square to show the possible genotypes of the offspring of Paul and Sue.

(1)

Sue \ Paul		F	f
	F		
	f		

(ii) State the probability that Paul and Sue will have a child with cystic fibrosis.

(1)

.....

(c) Explain why a person can be underweight due to cystic fibrosis.

(2)

.....

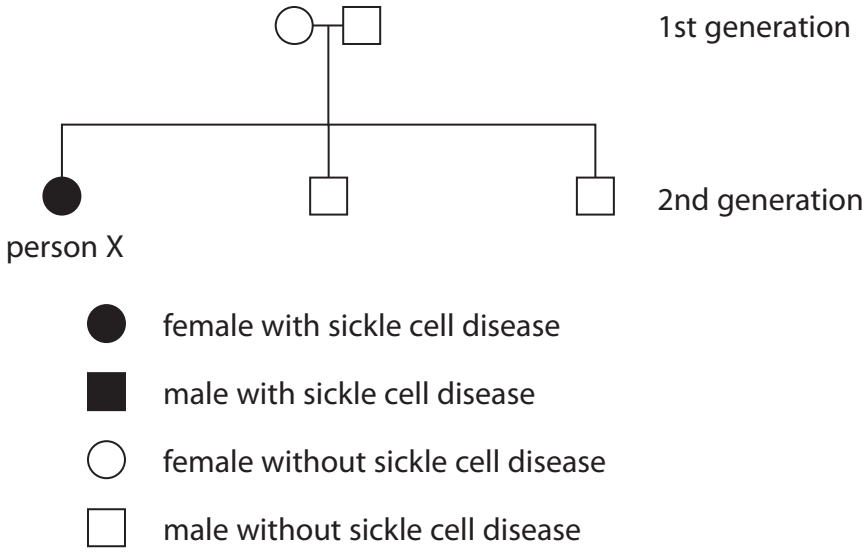
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(d) Sickle cell disease is another recessive genetic disorder.

The pedigree chart shows the inheritance of sickle cell disease in two generations of a family.



(i) Explain why person X inherited sickle cell disease.

(2)

(ii) Explain why a person with sickle cell disease may have difficulty exercising.

(2)

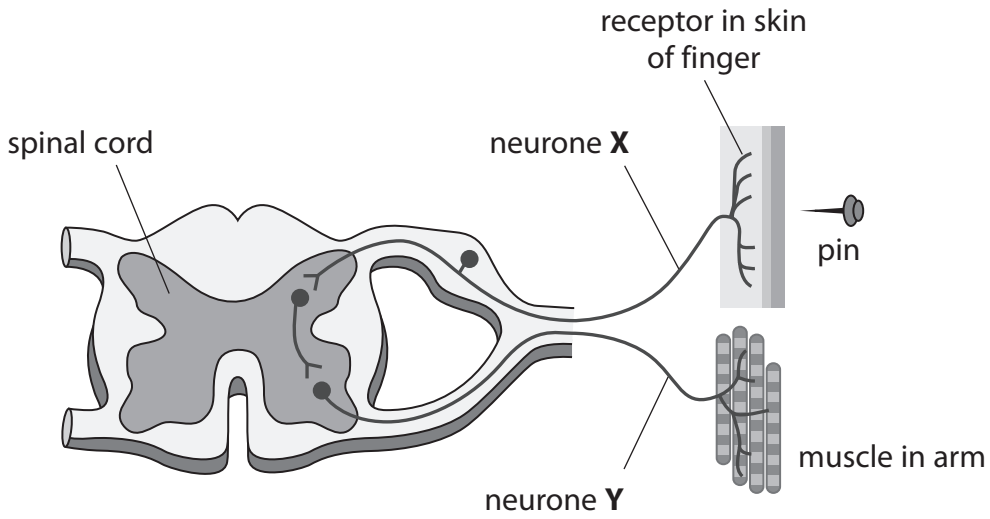
(Total for Question 4 = 11 marks)

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The nervous system

5 The diagram shows a reflex arc in the human body.



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

Neurone **X** carries an impulse from the skin to the spinal cord.

Neurone **X** is a

(1)

☒ **A** motor neurone

☒ **B** reflex neurone

☒ **C** sensory neurone

☒ **D** relay neurone

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

Neurone **Y** carries a message from the spinal cord to the muscle.

Neurone **Y** is a

(1)

☒ **A** motor neurone

☒ **B** reflex neurone

☒ **C** sensory neurone

☒ **D** relay neurone

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(iii) Explain the advantage of the reflex action that will occur when the pin pierces the skin of the finger.

(2)

(b) Describe how the brain is linked to the skin of the finger in this reflex arc.

(2)

*(c) Alcohol and caffeine affect the time the body takes to react to a stimulus.

Describe how alcohol and caffeine have different effects on reaction times.

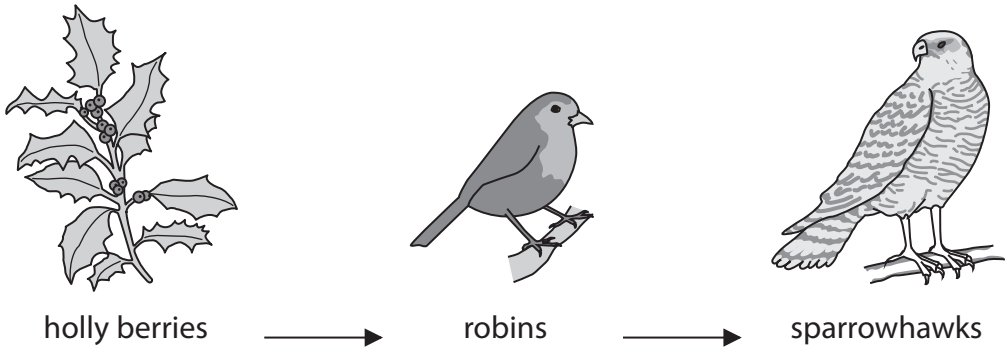
(6)

(Total for Question 5 = 12 marks)

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Energy

6 The diagram shows a woodland food chain.



The table shows the number and biomass of each part of the food chain.

part of food chain	number	biomass / g
holly berries	10000	5000
robins	25	1500
sparrowhawks	2	800

(a) (i) Draw a pyramid of biomass for this food chain in the box.

(1)

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(ii) Calculate the difference in biomass between the robins and the sparrowhawks.

(2)

..... g

(iii) Biomass decreases at each trophic level in this food chain.

Use words from the box to complete the following sentences.

(3)

respiration	photosynthesis	longer
phototropism	excretion	limited

During ....., the holly tree leaves use light energy to make glucose.

The robins release energy from the glucose during the process of .....

The length of the food chain is ..... because energy is lost at each trophic level.

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*(b) Fleas are parasites.

A parasite is an organism that depends on a host species to survive.

Describe, using **two** other examples, how parasites depend on host species to survive.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

Summer 2015

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
-

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question Number	Answer	Acceptable answers	Mark
1(a)	i. Plantae ii. Fungi iii. Protoctista iv. Prokaryotes	4 marks for 4 correct responses 3 marks for 3 correct responses 2 marks for 2 correct responses 1 mark for 1 correct responses	**(4)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	**A** ☒ a supporting rod running the length of their body		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	**B** ☒ fish		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(c)	An explanation linking the following: • 2 different / similar species (1) • who interbreed (1)	named species reproduce / mate	**(2)**

Total for Question 1 = 8 marks

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	77 ÷ 1.6 x 1.6 / 2.56 (1) = 30	Accept two marks for correct answer accept 30.07 - 30.08 / 30.1	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	A description to include two of the following: writing in scientific journals (1) peer review (1) attending scientific conferences (1)	 meeting / talking to other scientists	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	Answers must be in this order. insulin pancreas		**(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	A description to include two of the following: diet carefully regulated / monitored/ less carbohydrate (1) physical activity undertaken / exercise (1) medication (to lower blood glucose) (1)	 accept sugar	**(2)**

Total for Question 2 = 8 marks

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	444 and 450 (1) 6 (billion tonnes of carbon dioxide)	Accept two marks for correct answer	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	23 and 444 and 330 (1) 797 (billion tonnes of carbon dioxide)	Accept two marks for correct answer	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	A suggestion from: • more heat trapped in the Earth's atmosphere (1) • (increased) greenhouse effect (1) • more photosynthesis (1)	Global warming Do not accept plants grow more	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	An explanation linking the following: • photosynthesis (1) • to make carbon compounds (1)	glucose / carbohydrates	**(2)**

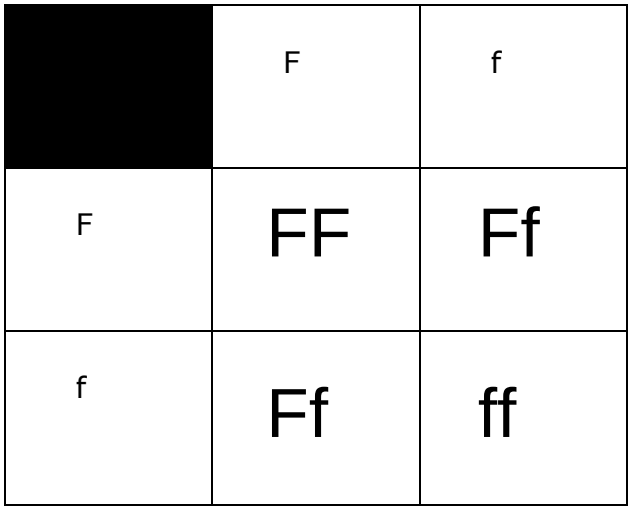
Question Number	Answer	Acceptable answers	Mark
3b(iii)	Any **two** suggestions from: • reduce deforestation (1) • reduce burning fossil fuels (1) • increase the planting of trees / plants (1)	Accept any practical example of the reduction of burning fossil fuels	**(2)**

Total for Question 3 = 9 marks

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	**D** ☒ nucleus		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	**A** ☒ chromosome		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	allele		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(i)		Accept fF for Ff	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	25%, 0.25, ¼, 1 in 4	ECF from clipped table for ff Accept ratio of 1:3 Reject ratio of 1:4	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(c)	An explanation to include two of the following: • build up / thick mucus / sticky mucus (1) • blocking the pancreas / pancreatic duct / blocking the release of enzymes (1) • reduction in food digestion / absorption (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
4(d)(i)	An explanation to include the following • both parents are heterozygous / carriers (1) • person X inherited both the recessive alleles (1)	 both have a recessive allele / gene accept gene	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(d)(ii)	An explanation to include two of the following • red blood cells deformed / lower red blood cell count (1) • blocking of capillaries / oxygen carrying capacity of the blood is reduced (1) • muscles / joints ache (1) • less respiration by muscles / less energy released (1)	 Accept misshaped / differently shaped less oxygen carried (to muscles) Do not accept "weakening" Do not accept "tired"	**(2)**

Total for Question 4 = 11 marks

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	**C** ☒ sensory neurone		**(1)**

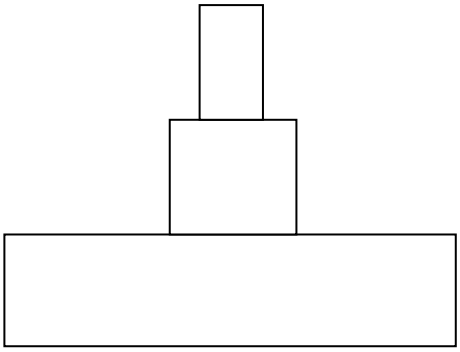
Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	**A** ☒ motor neurone		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(iii)	An explanation linking the following: • fast (response) (1) • no (further) damage is caused (1)	automatic / immediate	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)	A description linking **two** of the following: • brain connected to the spinal cord (1) • spinal cord is connected to the skin / finger by neurones (1)	Accept spine	**(2)**

Question Number		Indicative Content	Mark
QWC	***5(c)**	A description to include some of the following points Effect of alcohol • Alcohol is a depressant • Alcohol causes people to feel drowsy • Alcohol increases reaction times • Makes reactions slower • Impulses get to the brain slower • Neurotransmission is slower at the synapse Effect of caffeine • Caffeine is a stimulant • Caffeine causes people to be more alert • Caffeine shortens reaction time • Impulses get to the brain faster • Neurotransmission is quicker at the synapse • In extreme cases too much caffeine can have the opposite effect due to over stimulation	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description of either the effect of alcohol and / or caffeine • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description of both alcohol and caffeine and related to reaction times OR a detailed description of alcohol or caffeine related to reaction time • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description of both alcohol and caffeine on reaction including their actions as depressants and stimulants and a reference to action on nerve impulses or the synapse • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for Question 5 = 12 marks

Question Number	Answer	Mark
6(a)(i)	lowest level should be approximately three times the size of the second level which should be approximately twice the size of the top level 	**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	1 500 and 800 (1) 700 (g)	Accept two marks for correct answer	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(a)(iii)	photosynthesis respiration limited	must be in correct order.	**(3)**

Question Number		Indicative Content	Mark
QWC	***6(b)**	A description of two examples to include some of the following points • parasites live in or on their host • parasite and host live together but only the parasite benefits headlice / ticks • live on their host • bite host • live off the blood of their host / suck blood tapeworm • live in their host • within the intestinal system • hooks and suckers attach to host intestines • flat body so tapeworm can easily absorb host's digested food molecules • outer layer has substances to ensure it is not digested by host • tapeworm eggs defecated and can also infect other vertebrates when swallowed mistletoe • grows on host • roots grow into the hosts xylem and phloem vessels • absorbs the host's water and mineral ions	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description of one example of parasitism and / or definition of parasitism • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description of at least two examples of parasitism or a detailed explanation of one • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description of two examples of parasitism with reference to blood / digested food / mineral ions and water • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for Question 6 = 12 marks

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Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Tuesday 13 May 2014 – Morning
Time: 1 hour

Paper Reference
5BI1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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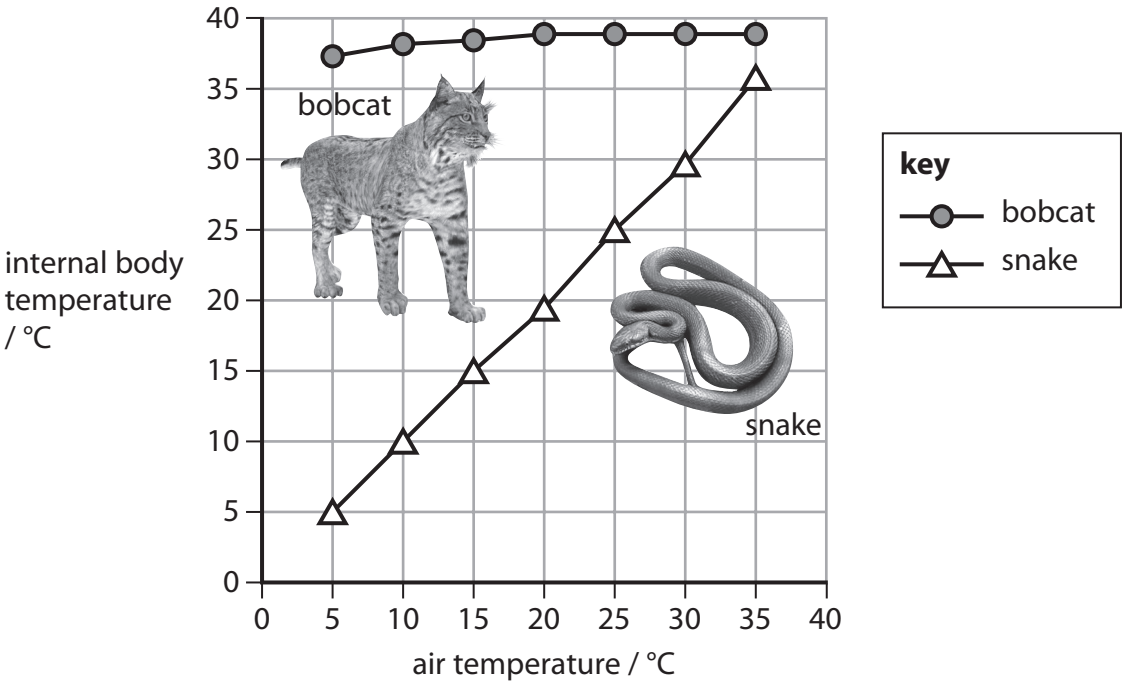
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Answer ALL questions

Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Thermoregulation

1 The graph shows the effect of air temperature on the internal body temperatures of a bobcat and a snake.



(a) (i) Calculate the change in the internal body temperature of the snake between an air temperature of 10 °C and 30 °C.

(2)

answer = ... °C

(ii) Suggest why the internal body temperature of the snake has a wide range.

(2)

.....

.....

.....

.....

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(b) (i) The internal body temperature of the bobcat is kept within a narrow range.

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

Animals that keep their internal body temperature within a narrow range are

(1)

- ☒ **A** homeotherms
- ☒ **B** oviparous
- ☒ **C** poikilotherms
- ☒ **D** viviparous

(ii) When the bobcat gets too hot, it can sweat through the skin on its paws.

Explain how this helps the bobcat to regulate its internal body temperature.

(2)

.....

.....

.....

.....

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

Temperature regulation in the human body is controlled by the

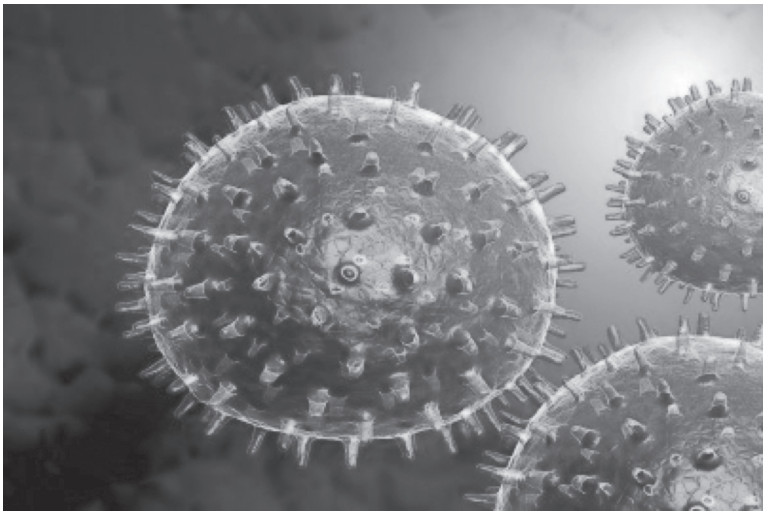
(1)

- ☒ **A** cilia
- ☒ **B** hypothalamus
- ☒ **C** liver
- ☒ **D** pancreas

(Total for Question 1 = 8 marks)

Disease

2 The picture shows the influenza virus.



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

The influenza virus is spread from one person to another

(1)

☒ **A** in the air

☒ **B** by houseflies

☒ **C** by mosquitoes

☒ **D** in water

(ii) Use words from the box to complete the following sentences.

(2)

antigens	skin	antibodies
mucus	cilia	sweat

The human body has many physical barriers to protect itself from the influenza virus.

These barriers include ..... which is sticky and can trap the influenza virus if it enters the human body.

The body has ..... which can move any trapped influenza viruses out of the body.

(iii) Suggest why a doctor would **not** give antibiotics to a person suffering from the influenza virus.

(1)

.....

.....

(b) Describe how the human body uses its own chemical defences to prevent infection.

(2)

.....

.....

.....

.....

(c) Describe how antiseptics can be used to prevent the spread of infection in a kitchen.

(2)

.....

.....

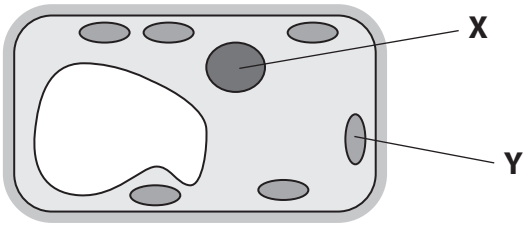
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(Total for Question 2 = 8 marks)

The Kingdom Plantae

3 (a) The diagram shows a cell from an organism that belongs to the Kingdom Plantae.



(i) Structure **Y** is where the plant makes its own glucose, using sunlight.

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

Structure **Y** is a

(1)

☒ **A** cell wall containing cellulose

☒ **B** chloroplast containing chlorophyll

☒ **C** nucleus containing DNA

☒ **D** vacuole containing sap

(ii) Structure **X** contains chromosomes.

Name structure **X**.

(1)

.....

(b) Use words from the box to complete the following sentences.

(2)

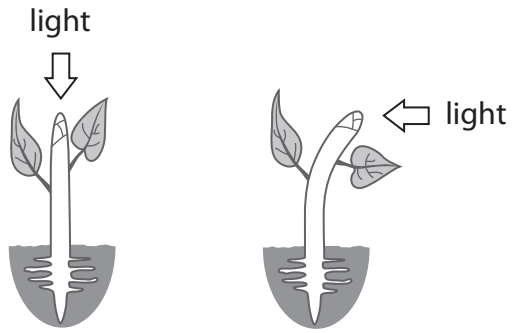
heterotrophs	autotrophs	multicellular
saprophytes	unicellular	hybrids

Organisms in the Kingdom Plantae are ..... because they make their own glucose using sunlight.

Fungi do not belong to the Kingdom Plantae because they are ....., which means they feed on dead and decaying organisms.

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(c) The diagram shows the response of two plant shoots to light from two different directions.



(i) Describe what has happened to plant shoot **2** in response to light.

(1)

(ii) Explain how plant shoot **2** responded to light.

(3)

(iii) Suggest why this response is beneficial to the plant.

(1)

(d) State the force that acts on plant roots causing them to grow downwards into the soil.

(1)

(Total for Question 3 = 10 marks)

The nervous system

4 (a) A scientist investigated the effect of a drug on the reaction times of three volunteers.

Volunteer **A** took 2 doses of the drug.

Volunteer **B** took 1 dose of the drug.

Volunteer **C** did not take the drug.

The scientist repeated his investigation three times.

The results are shown in the table.

volunteer	1st reaction time / ms	2nd reaction time / ms	3rd reaction time / ms	mean reaction time / ms
A	17	25	24	22
B		38	40	41
C	62	70	63	65

(i) Calculate the missing reaction time for volunteer **B**.

(2)

answer = ... ms

(ii) Using information from the table, describe the effect of this drug on reaction time.

(2)

.....

.....

.....

.....

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(iii) Explain how this drug causes a change in reaction time.

(2)

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

The type of drug that causes the effect shown in this investigation is a

(1)

- ☒ **A** depressant
- ☒ **B** hallucinogen
- ☒ **C** painkiller
- ☒ **D** stimulant

(b) Describe how a reflex arc helps to protect the human body from danger.

(3)

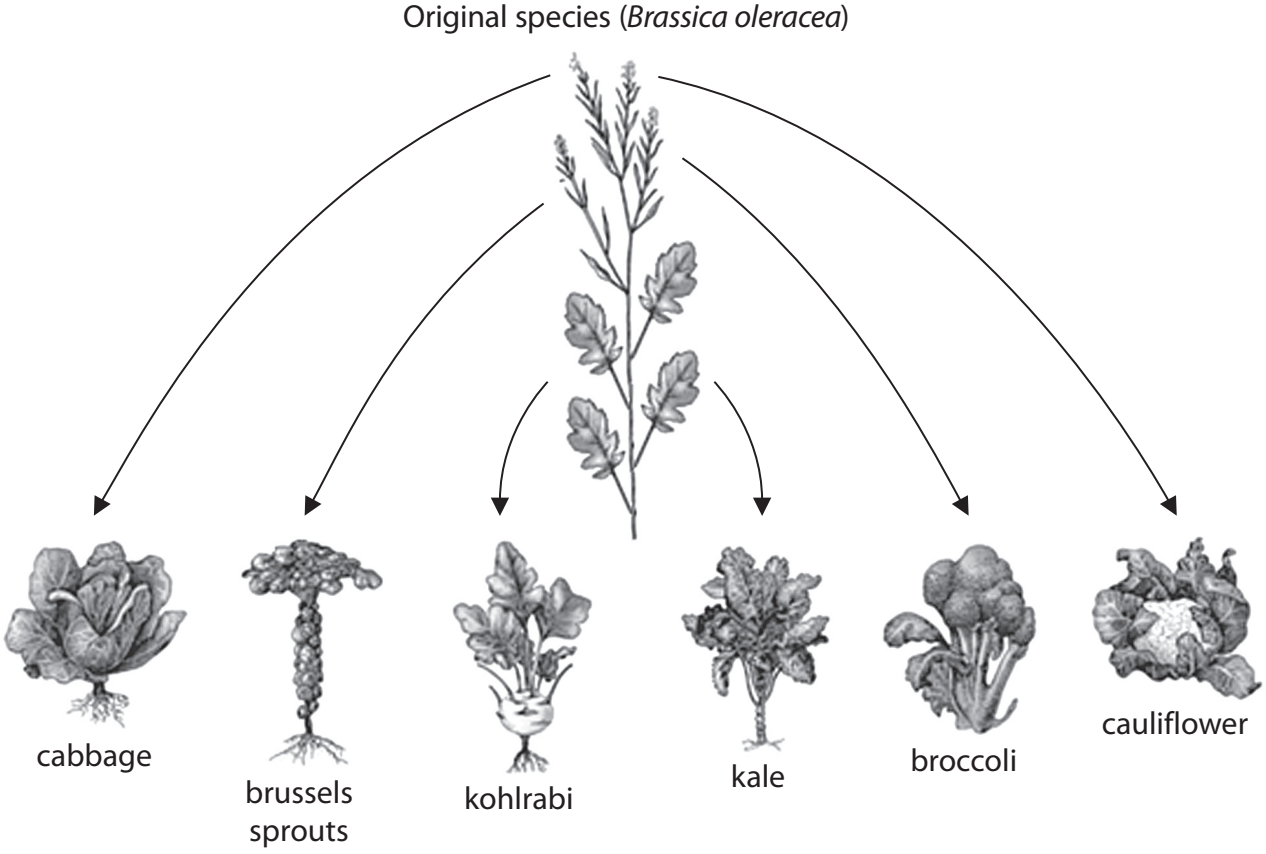
(Total for Question 4 = 10 marks)

Variation in organisms

5 (a) The development of different varieties of vegetable plants can be the result of mutations.

The diagram shows how six different vegetable plants developed from one original species (*Brassica oleracea*).

The arrows indicate the parts of the plant that were changed by the mutation.



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

The diagram shows that kale has developed as a result of a mutation of the

(1)

☒ **A** flower

☒ **B** leaf

☒ **C** root

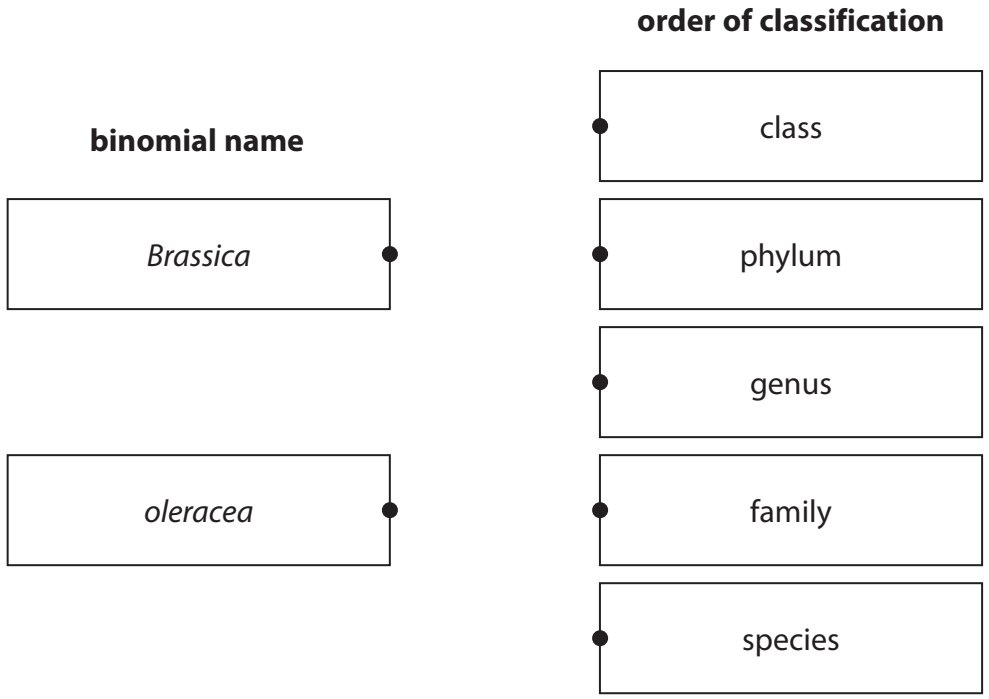
☒ **D** stem

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(ii) The binomial name given to the original species is *Brassica oleracea*.

Draw **two** straight lines to link the parts of the binomial name with the correct order of classification.

(2)



(iii) Explain the meaning of the term **mutation**.

(2)

.....

.....

.....

.....

(iv) Mutation is one cause of variation.

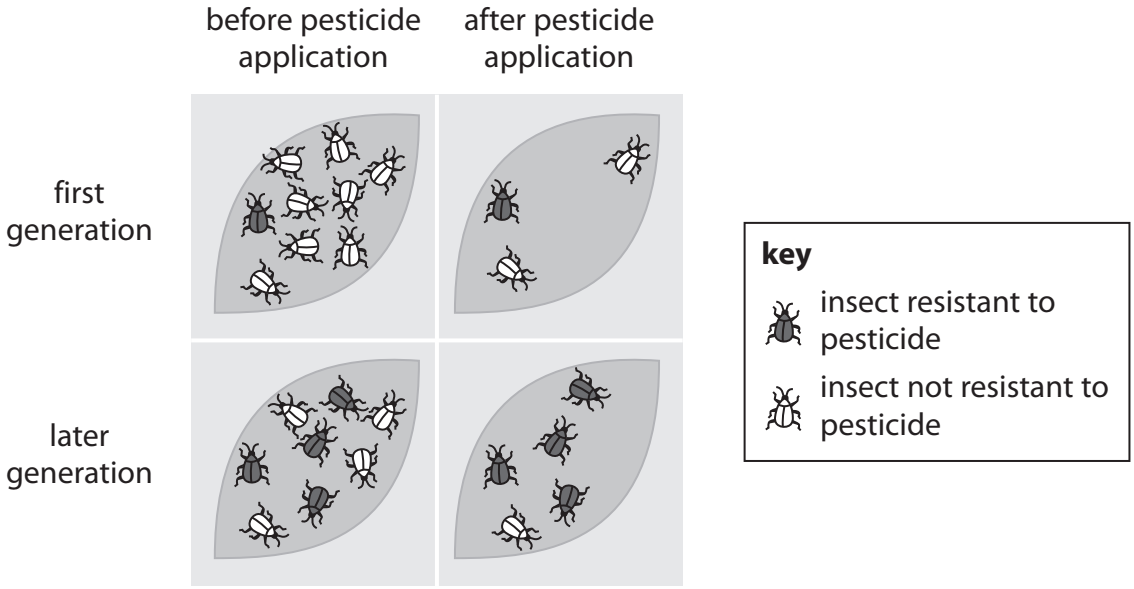
State **one** other cause of variation.

(1)

.....

*(b) Farmers use pesticides to kill insect pests on vegetables.

The diagram shows how some insects may be resistant to a pesticide.



Use the diagram to explain how the presence of resistant organisms helps to support Darwin's theory of evolution.

(6)

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.....

.....

.....

(Total for Question 5 = 12 marks)

Nutrients in the environment

6 (a) The photograph shows a polluted lake near a farmer's field.

The surface of the lake is green and many fish have died.



(i) The lake became polluted because a farmer used a lot of fertiliser on his crops.

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

The process by which the lake has become polluted is called

(1)

☒ **A** eutrophication

☒ **B** gravitropism

☒ **C** phototropism

☒ **D** pollination

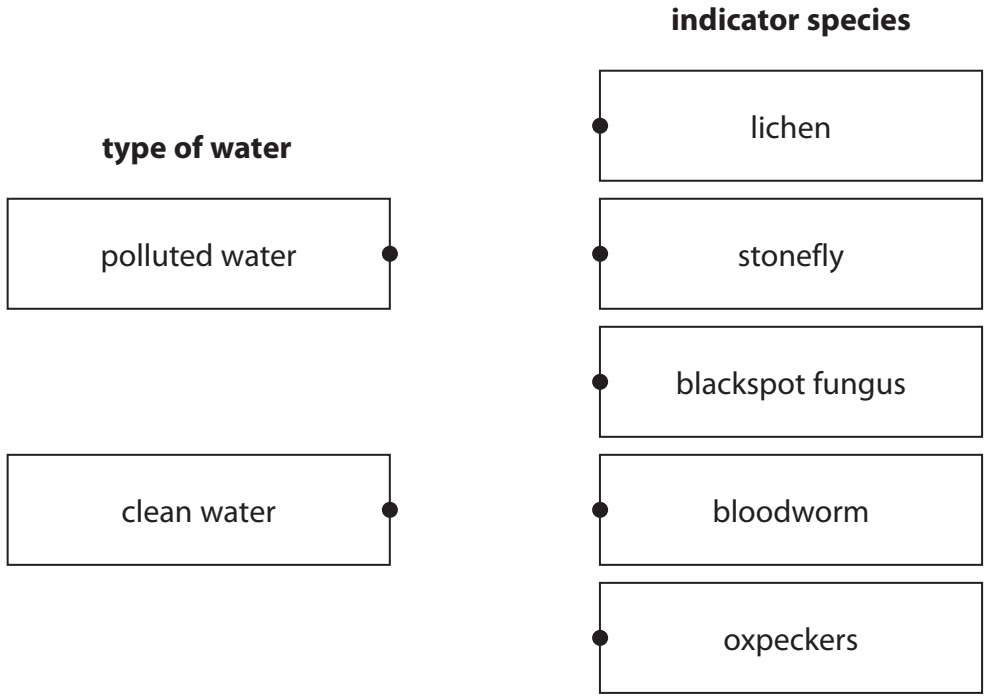
(ii) Explain why the overuse of fertiliser by the farmer caused the fish in the lake to die.

(3)

(iii) The presence of indicator species in a lake can show levels of water pollution.

Draw **one** straight line from **each** type of water to the indicator species that would be found in that water.

(2)



*(b) Carbon is present in all organisms in an environment.

Describe the carbon cycle.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE in Biology (5BI1F) Paper 01

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Question Number	Answer	Acceptable answers	Mark
1(a)(i)	29 or 30 and 10 (1) 19 or 20 (^{0}C)	**Two marks for correct bald answer** Anything between 19 and 20	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	a suggestion including **two** of the following: snake cannot regulate its internal temperature (1) snake is poikilothermic / cold blooded (1) snakes internal temperature is dependent upon its environment (1)	 does not use homeostasis changes with the air temperature / weather / surroundings	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	**A** homeotherms		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	an explanation linking two of the following: sweat contains water (1) (water) evaporates (1) removing heat in the process (1)	 Ignore cools down	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)	**B** hypothalamus		**(1)**

(Total for question 1 – 8 Marks)

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	**A** in the air		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	mucus (1) cilia (1)	Answers must be in the correct order	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	antibiotics only work on bacteria and fungi / antibiotics do not control viral infections		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	a description to include the following lysozymes (in tears) / hydrochloric acid (1) (chemicals) kill or destroy the pathogen / infection / bacteria / virus (1)	accept stomach acid Ignore germs	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)	a description to include the following work surfaces could be sprayed and wiped/ hands could be washed with antiseptics/ utensils could be washed with antiseptics (1) (antiseptics) kill or destroy the pathogen / infection / bacteria / virus (1)	Ignore germs	**(2)**

(Total for question 2 – 8 Marks)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	**B** chloroplast containing chlorophyll		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	nucleus	nucleus containing DNA	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)	autotrophs saprophytes	Must be in the correct order	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	the shoot grows towards the light	bends / phototropism / leans reject negative phototropism	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	an explanation linking three of the following: (positive) phototropism (1) auxin (1) move to the shaded part of the plant shoot (1) causing (cell) elongation (on the shaded side) (1)	reject negative phototropism more growth (on shaded side)	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(c)(iii)	for photosynthesis / makes glucose	accept makes food	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(d)	gravity / gravitational	gravitropism / geotropism	**(1)**

(Total for question – 10 Marks)

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	41 x 3 / 123 (1) = 45 (ms)	accept 2 marks for bald correct answer accept alternative method (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	a description to link the following the higher the dosage the faster the reaction time (1) comparison of two volunteers (1)	drug makes reactions faster volunteer A was fastest / volunteer C was slowest	**(2)**

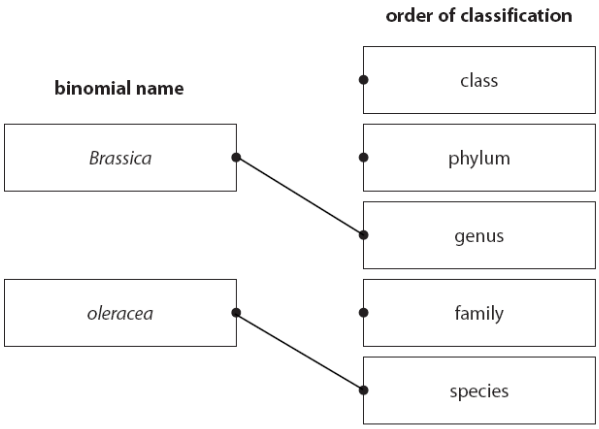
Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	an explanation linking the following increase speed / amount of neurotransmitter / neurotransmission (1) across synapses (1)	increase speed of impulses / electrical messages / electrical signals	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(iv)	**D** stimulant		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)	A description to include three of the following automatic / involuntary (1) quick reactions (1) spinal cord used (only) (1) relay neurones (1)	 don't have to think about it speeds up reactions / immediate brain not used	 **(3)**

(Total for question 4 – 10 Marks)

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	**B** leaf		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)			**(2)**

Question Number	Answer	Acceptable answers	Mark
5(a)(iii)	An explanation linking the following a change / alteration DNA / gene / chromosome / in the genetic code / gene sequence (2)	DNA / gene / chromosome is wrong / goes wrong / incorrect (1)	**(2)**

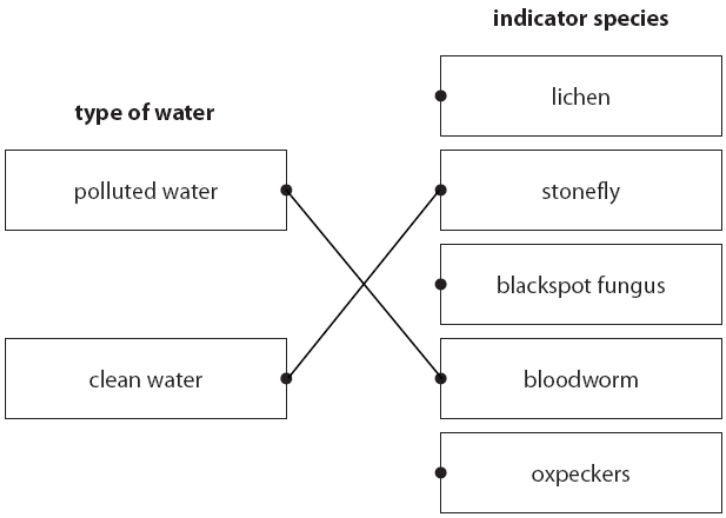
Question Number	Answer	Acceptable answers	Mark
5(a)(iv)	environmental / reproduction / genetic / disease or named examples	Ignore mutation named environmental conditions eg radiation / light / wind / rainfall / diet / weather / climate / pollution	**(1)**

Question Number		Indicative Content	Mark
QWC	***5(b)**	An answer to include some of the following: • the number of black / resistant insects increases over time • the number of white / nonresistant insects decreases over time • the insects that were resistant to the pesticide lived to reproduce • passing the gene for resistance onto offspring • the offspring survived to reproduce • those organisms with advantageous adaptations survive • poorly adapted organisms such as the white insect die out / become extinct • survival of the fittest / natural selection	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation which describes the diagram **OR** a limited explanation of Darwin's theory of evolution • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation which describes the diagram **AND** a simple explanation of Darwin's theory of evolution • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation of Darwin's theory of evolution supported by evidence from the diagram • the answer communicates ideas clearly and coherently and uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

(Total for question 5 – 12 Marks)

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	A - eutrophication		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	An explanation linking three of the following points fertiliser / nitrates leach / moves into the lake (1) algal bloom (1) blocks light / stops (underwater) plants from photosynthesising / (underwater) plants die (1) decomposers break down dead plants (1) uses up oxygen (1) fish cannot <u>respire</u> (1)	not "lake gets polluted" algae grow on surface microorganisms / bacteria	**(3)**

Question Number	Answer	Acceptable answers	Mark
6(a)(iii)			**(2)**

Question Number		Indicative Content	Mark
QWC	***6b**	A description to include some of the following processes of the carbon cycle: • **Photosynthesis** by plants • Remove carbon dioxide from the atmosphere / taken in by plants • Converted into organic compounds / glucose • **Respiration** by organisms / plants / animals • Use glucose to create carbon dioxide • Release carbon dioxide back into atmosphere / breathed out by animals • **Feeding** by animals • Eating of the carbon compounds found in animals and plants • **Decomposers** feed off of dead organisms • Carbon dioxide release back into the atmosphere • As a waste gas of decaying process • **Combustion** of fossil fuels • Oil and gas contain carbon compounds and when burnt • Release carbon dioxide back into atmosphere	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description of one or more processes of the carbon cycle • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description of two or more of the processes of the carbon cycle • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description of three or more processes of the carbon cycle • the answer communicates ideas clearly and coherently and uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

(Total for question 6 = 12 marks)

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Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Monday 20 May 2013 – Afternoon
Time: 1 hour

Paper Reference
5BI1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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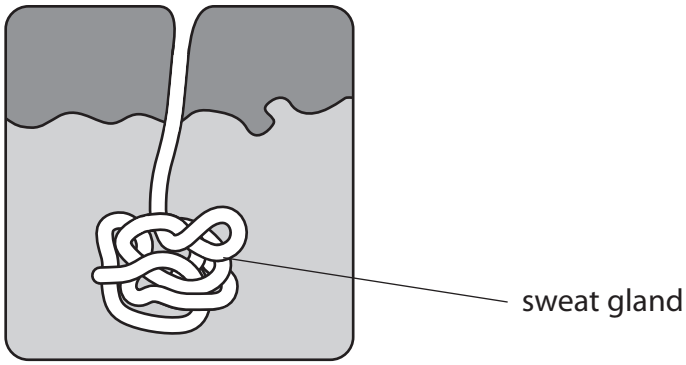
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Answer ALL questions

Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Thermoregulation

1 The diagram shows a sweat gland in a section of skin.



(a) Explain how the sweat gland helps to cool the body.

(2)

.....

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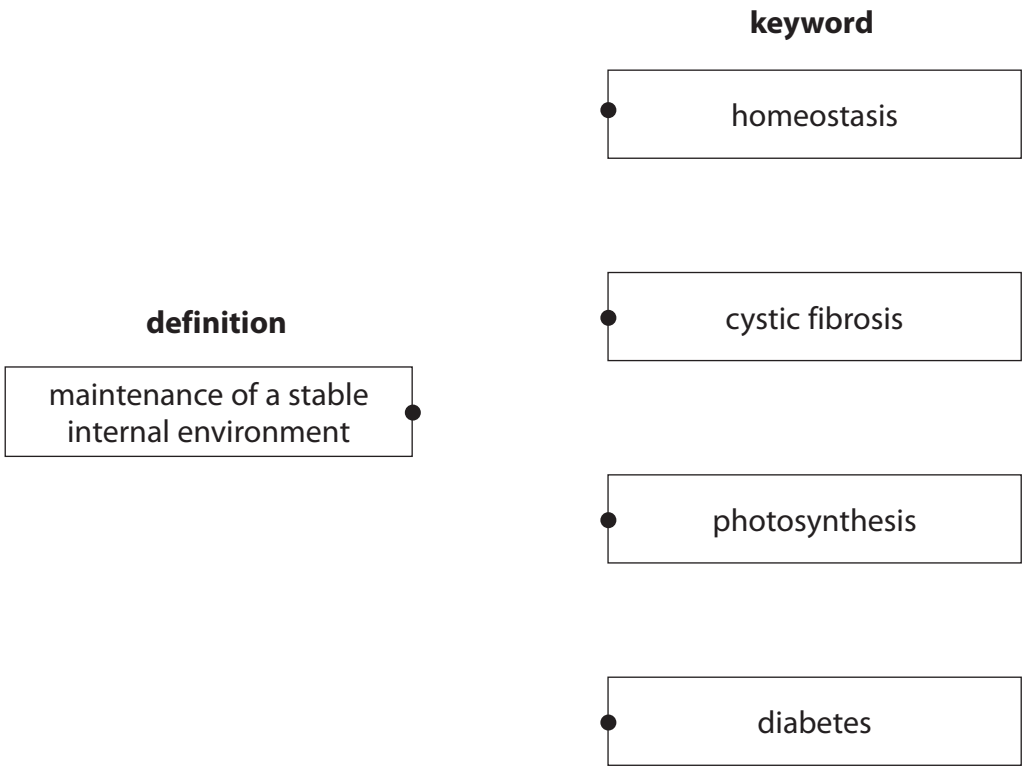
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(b) Draw **one** straight line from the definition to the keyword.

(1)



(c) (i) The hypothalamus is involved in regulating body temperature.

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

The hypothalamus is part of the

(1)

- ☒ **A** brain
- ☒ **B** liver
- ☒ **C** lungs
- ☒ **D** pancreas

(ii) Explain how shivering can help a person regulate their body temperature.

(2)

.....

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(iii) Describe how body hair helps to control a person's temperature on a cold day.

(2)

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(Total for Question 1 = 8 marks)

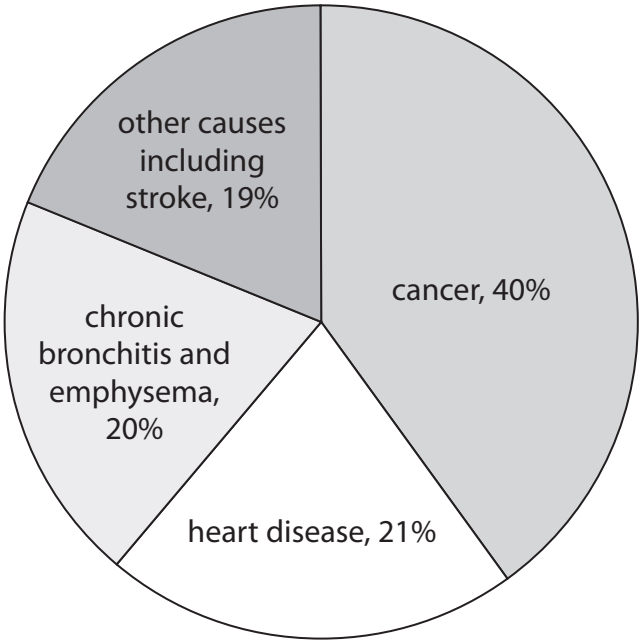
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Question 2 is on the next page

Drugs

2 The pie chart shows the causes of death of people who smoked tobacco.



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

People who smoke tobacco are most likely to die from

(1)

☒ **A** chronic bronchitis and emphysema

☒ **B** heart disease

☒ **C** cancer

☒ **D** other causes including stroke

(ii) The pie chart is based on a sample of 5000 people who smoked tobacco.

Calculate how many of these people died from chronic bronchitis and emphysema.

(2)

answer = ... people

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(iii) Explain how smoking tobacco can cause cancer.

(2)

.....

.....

.....

.....

(b) (i) Caffeine is a type of drug.

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

Caffeine is a

(1)

☒ **A** depressant

☒ **B** hallucinogen

☒ **C** painkiller

☒ **D** stimulant

(ii) Describe the effect caffeine can have on the human body.

(2)

.....

.....

.....

.....

(Total for Question 2 = 8 marks)

Classification

3 The photograph shows the mushroom, *Russula silvicola*.



Russula silvicola is a multicellular organism that does not have chlorophyll.

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

Russula silvicola belongs to the kingdom

(1)

- ☒ **A** Animalia
- ☒ **B** Fungi
- ☒ **C** Prokaryotes
- ☒ **D** Protoctista

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(ii) *Russula silvicola* is the binomial name of this mushroom.

Draw **one** straight line from each part of the binomial name to its classification.

(2)

binomial name

Russula

silvicola

classification

species

family

phylum

genus

order

(b) State **two** characteristics of the kingdom Plantae.

(2)

1 .....

.....

2 .....

.....

(c) (i) Vertebrates belong to the kingdom Animalia.

Use words from the box to complete the following sentence.

(2)

Chordata	chromosome	backbone
Prokaryote	Protoctista	cell

Vertebrates are members of the phylum ..... and most have a ..... running the length of the body.

(ii) State the structures that vertebrate organisms use to absorb oxygen from their surroundings.

(3)

.....

.....

.....

(Total for Question 3 = 10 marks)

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Question 4 is on the next page

Infectious diseases

4 Cholera is a disease caused by a pathogen.

(a) (i) State the type of pathogen that causes cholera.

(1)

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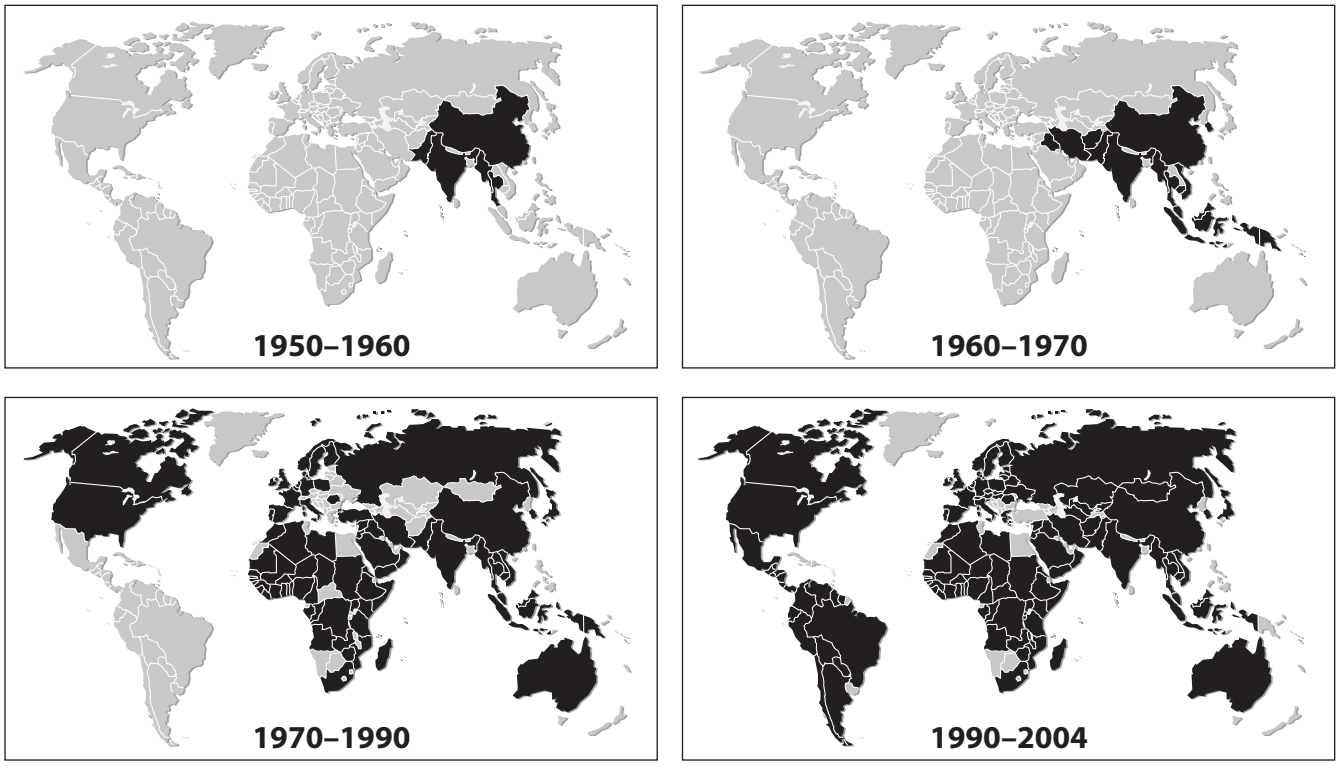
(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The cholera pathogen is spread

(1)

- ☒ **A** in air
- ☒ **B** by houseflies
- ☒ **C** by mosquitoes
- ☒ **D** in water

(b) The maps of the world show areas where there were cases of cholera recorded, from 1950 to 2004.
The areas where cholera was recorded are shaded in black.



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(i) Describe the trend in the recorded cases of cholera shown in the maps.

(1)

.....

.....

(ii) Suggest **two** reasons for this trend.

(2)

1 .....

.....

2 .....

.....

(c) Explain how the **physical** barriers of the body can help to prevent infection by pathogens.

(3)

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(d) State the names of **two** chemicals that can be used to control infection.

(2)

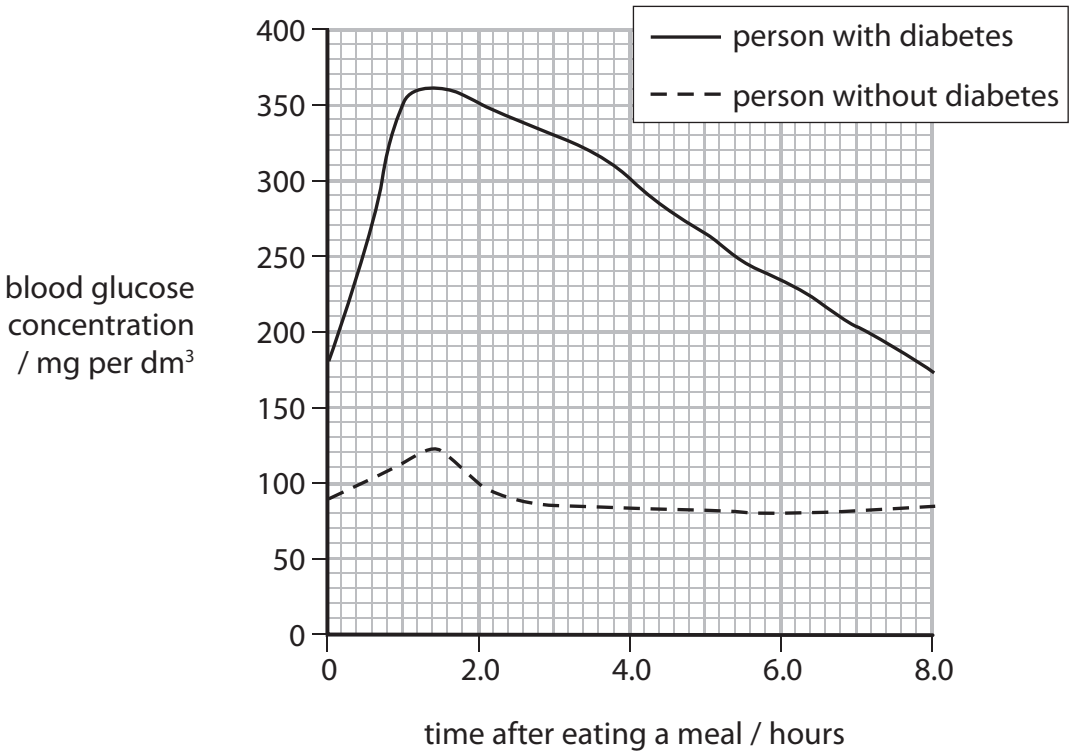
1 .....

2 .....

(Total for Question 4 = 10 marks)

Hormones

5 The graph shows the blood glucose concentrations of two people, over an eight-hour period, after eating a meal.



(a) (i) Describe the changes in blood glucose concentration for the person with diabetes.

(2)

.....

.....

.....

.....

(ii) Calculate the difference in blood glucose concentration between the person with diabetes and the person without diabetes **two** hours after eating a meal.

(2)

answer ..... mg per dm^3

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(iii) In which two-hour period did the blood glucose concentration change the most for the person with diabetes?

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

(1)

☒ **A** 0 – 2 hours

☒ **B** 2 – 4 hours

☒ **C** 4 – 6 hours

☒ **D** 6 – 8 hours

(b) Name the organ that releases insulin to regulate blood glucose concentrations.

(1)

.....

*(c) Plant hormones affect the way plants grow.

Explain how growth hormones cause phototropism and gravitropism in plants.

(6)

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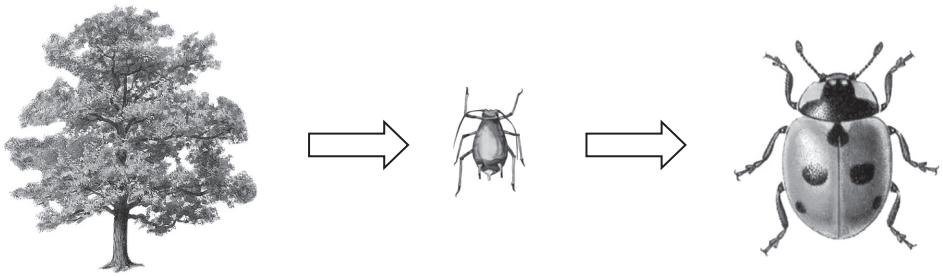
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(Total for Question 5 = 12 marks)

Ecosystems

6 The diagram shows the numbers and biomass of organisms in a food chain.



organism	number	biomass / g
oak tree	1	500 000
aphids	10 000	1 000
ladybirds	200	50

(a) (i) Calculate the difference in biomass between the aphids and the ladybirds.

(2)

answer = ...

(ii) Energy is lost between each trophic level of a food chain.

Suggest how this energy is lost between each trophic level.

(2)

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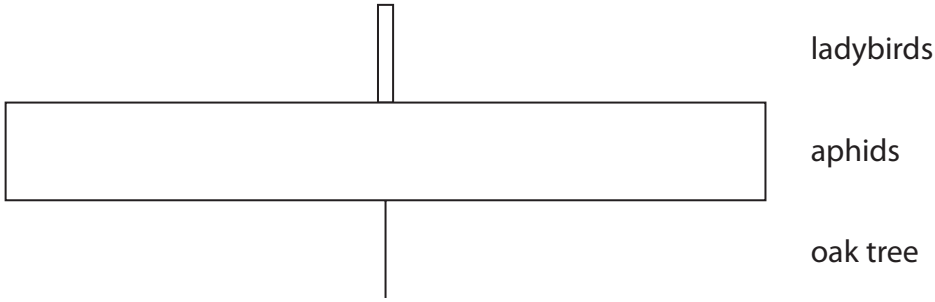
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(iii) The diagram shows a pyramid of numbers for this food chain.



In the box, draw a pyramid of biomass for this food chain.

(1)

(b) (i) Carbon can be recycled in the environment.

State the name of the process in which plants remove carbon dioxide from the atmosphere.

(1)

.....

*(ii) Explain how the recycling of paper and plastics can benefit the environment.

(6)

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(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

Summer 2013

GCSE Biology (5BI1F)
Paper 01

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General Marking Guidance

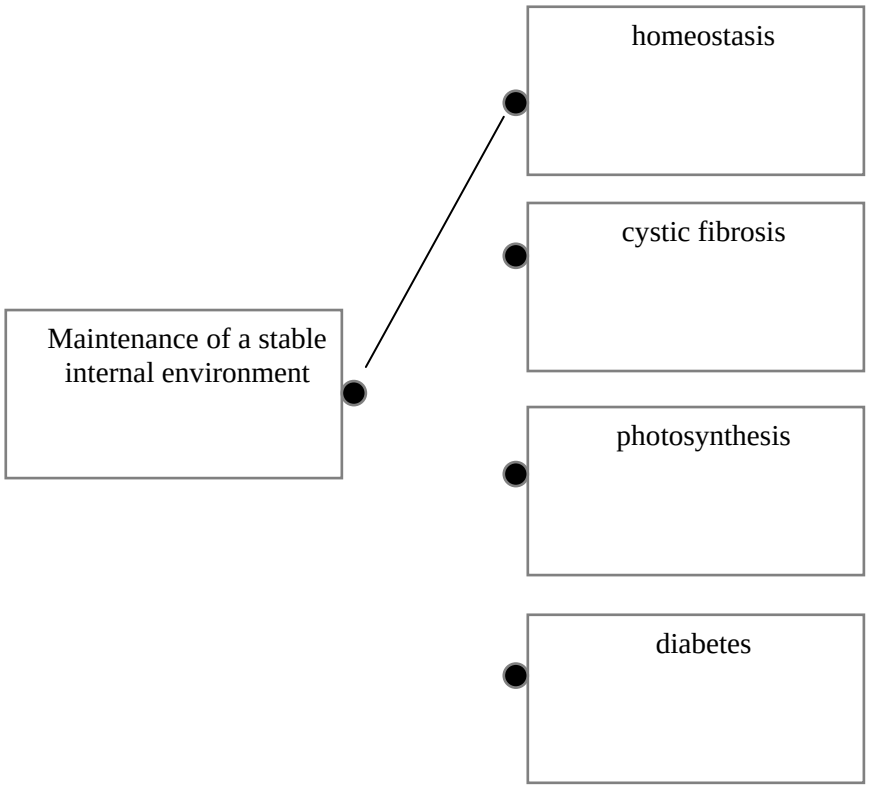
- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question Number	Answer	Acceptable answers	Mark
1a	An explanation to include two of the following points: sweat / water / fluid released (1) onto surface (of skin) (1) (sweat) <u>evaporates</u> (1)	sweat produced	(2)

Question Number	Answer	Mark
1b		(1)

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	**A** ☒ brain		(1)

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	A explanation linking two of the following points: muscles <u>contract</u> (1) producing heat (1) warming the body (1)		(2)

Question Number	Answer	Acceptable answers	Mark
1(c)(iii)	A description to include two of the following points: (hair) erector muscles contract (1) hair rises (1) traps air (1) insulates (1)	Ignore traps heat / warmth	(2)

Total for question 1 = 8 marks

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	☒ **C** cancer		(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	20(%) / ÷5 (1) 1000	Two marks for correct bald answer.	(2)

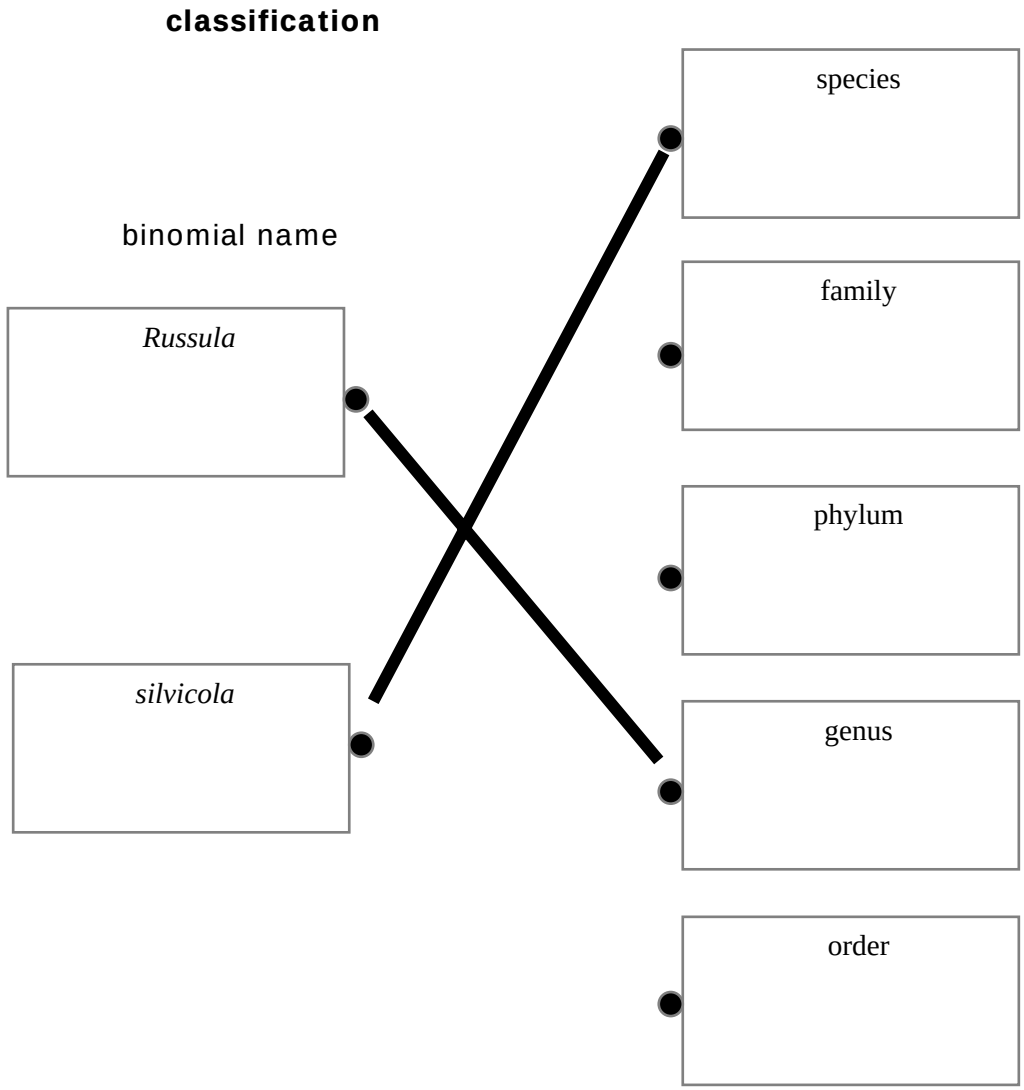
Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	An explanation including two of the following points: (tobacco contains) tar (1) (tar is a) carcinogen (1) leads to mutations (1)		(2)

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	☒ **D** stimulant		(1)

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	A description including two of the following points: affects the CNS / nerves (1) reactions speed up / decrease reaction times (1) reference to synapse / neurotransmitters (1)	caffeine keeps you awake / alert	(2)

Total for question 2 = 8 marks

Question Number	Answer	Acceptable answers	Mark
3a(i)	**B** ☒ Fungi		(1)

Question Number	Answer	Mark
3a(ii)		(2)

Question Number	Answer	Acceptable answers	Mark

3(b)	Any two of the following photosynthesise (1) they feed autotrophically (1) have chlorophyll (1) have cell walls (containing cellulose) (1) multicellular (1)	 makes own food have chloroplasts	 (2)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	Chordata (1) backbone (1)	Answers must be in this order	 (2)

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	lungs (1) gills (1) skin (1)		 (3)

Total for question 3 = 10 marks

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	bacteria		(1)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	☒ **D** in water		(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	The spread of cholera around the world has increased / more cases recorded		(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	A suggestion to include two of the following: (more) world travel / migration (1) no access to clean water (1) resistant bacteria (1)	 drought / famine / natural disaster	 (2)

Question Number	Answer	Acceptable answers	Mark
4(c)	An explanation to include three of the following: skin prevents the entry (1) scab formation on skin prevents entry into wound (1) cilia traps pathogens / waft pathogens upwards (1) mucus traps pathogens (1)	not just is a barrier accept nasal hairs traps pathogens (1)	(3)

Question Number	Answer	Acceptable answers	Mark
4(d)	Any two of the following names: antibiotics (1) antifungals (1) antibacterial (1) antiseptic (1) accept named chemicals eg bleach / alcohol	hydrochloric acid (in stomach) lysozymes (in tears)	(2)

Total for question 4 = 10 marks

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	A description to include the following: increases **and** decreases (1) reference to blood glucose concentration (1)		(2)

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	350 **and** 100 (1) 250 (mg per dm^3)	2 marks for correct bald answer with no working	(2)

Question Number	Answer	Acceptable answers	Mark
5(a)(iii)	**A** ☒ 0 – 2 hours		(1)

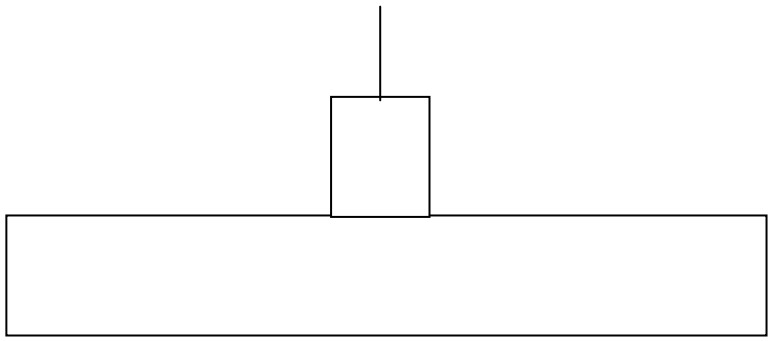
Question Number	Answer	Acceptable answers	Mark
5(b)	pancreas		(1)

Question Number		Indicative Content	Mark
QWC	***5(c)**	A explanation to include some of the following • responding to a stimulus • auxin / gibberellin is a plant growth hormone • phototropism happens in shoots • is a response to light • auxins produced in shoot tip • auxins moves to shaded side of shoot tip • cell elongation on shaded side • shoot bends towards the light • this is positive phototropism • more efficient photosynthesis • gravitropism / geotropism happens in roots • is a response to gravity • auxins produced in root tip • auxins moves to lower side of root tip • cell elongation stops on lower side • root bends downwards • this is positive gravitropism • more access to water / anchorage improved	(6)
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation including one correct statement of either phototropism **or** gravitropism • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation of phototropism **and** gravitropism OR a detailed explanation of one type of tropism • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation of both types of tropism including the role of auxins / gibberellins • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 5 = 12 marks

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	1000 and 50 (1) 950 (g)	2 marks for correct bald answer with no working	(2)

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	A suggestion to include two of the following: excretion (1) not all of organism eaten / some of organism is indigestible (1) respiration (1) movement (1) temperature regulation (1)	 faeces / waste lost as heat (energy) hunting / catching prey / flying	(2)

Question Number	Answer	Mark
6(a)(iii)	If labels are used they must be correct 	(1)

Question Number	Answer	Acceptable answers	Mark
6(b)(i)	photosynthesis		(1)

Question Number		Indicative Content	Mark
QWC	***6(b)(ii)**	An explanation including some of the following: • paper can be recycled which will reduce the need for cutting down trees • more trees will be left growing removing carbon dioxide • habitats for animals not destroyed • less space needed for landfill • less pollution relating to burning of waste / machinery cutting down of trees • plastic can be recycled which will reduce the demand for fossil fuels • more fossil fuels available for other uses • less space needed for landfill • less pollution relating to burning of waste • plastic is slow to decompose • less energy used in recycling compared to making new products • the more products that are recycled the less pollution in the atmosphere and in the water supply	(6)
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation including one correct statement of how recycling can benefit the environment. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation of paper **and** plastic recycling OR a detailed explanation of one type of recycling • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation of both types of recycling • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 6 = 12 marks

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Write your name here

Surname	Other names

Centre Number | Candidate Number

Edexcel GCSE

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Friday 1 March 2013 – Morning
Time: 1 hour

Paper Reference
5BI1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
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Information

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Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Disease

1 Cholera is a disease that can be caused by drinking contaminated water.

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

Cholera is caused by a

(1)

- ☒ **A** bacterium
- ☒ **B** fungus
- ☒ **C** housefly
- ☒ **D** mosquito

(ii) Infectious diseases are caused by pathogens.

Use words from the box to complete the following sentences.

(2)

viruses	mosquitoes	fleas	food	antiseptics

The *Salmonella* bacterium is a pathogen which can be spread by contaminated ..... .

Influenza is caused by ..... in the air.

(iii) Describe how pathogens are prevented from entering the human body.

(2)

.....

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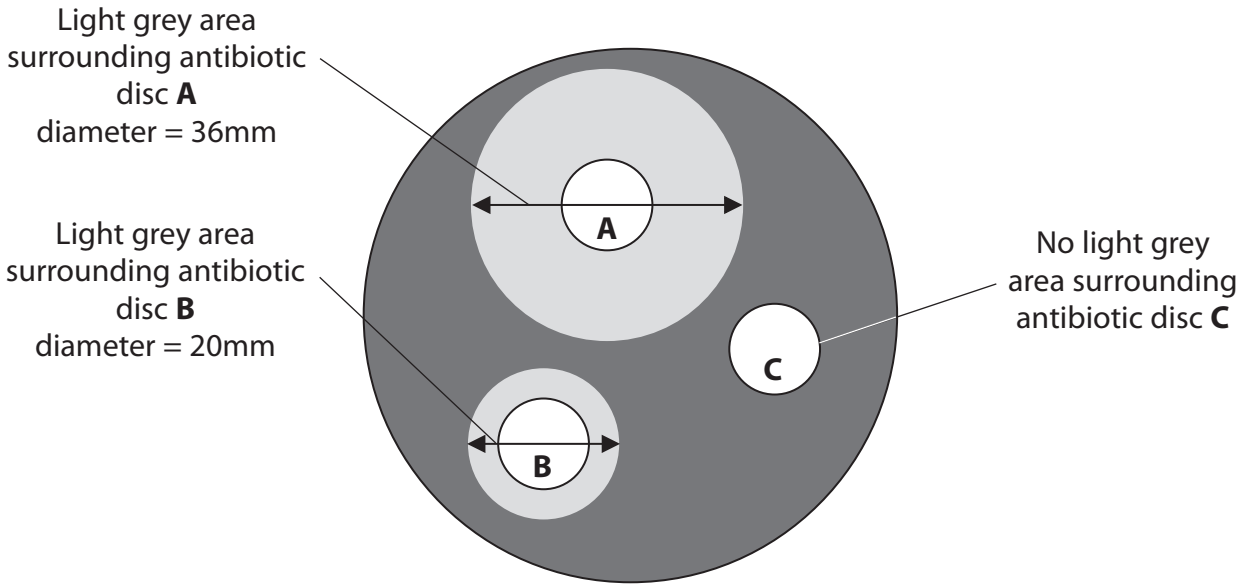
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(b) The diagram shows the results of an investigation testing the effect of three antibiotic discs, **A**, **B** and **C** on bacterial growth.

The dark grey area shows bacterial growth.

The light grey area shows where the bacteria **did not** grow.



(i) Calculate the difference in diameter of the light grey areas surrounding disc **A** and disc **B**.

(1)

..... mm

(ii) Explain which antibiotic disc, **A**, **B** or **C**, has controlled bacterial growth most effectively.

(2)

.....

.....

.....

.....

(Total for Question 1 = 8 marks)

Inheritance of eye colour

2 Jane has blue eyes and Keith has brown eyes.

They have a daughter Sue who has blue eyes.

The allele for brown eyes is dominant over the allele for blue eyes.

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

Sue has the genotype

(1)

☒ **A** BB

☒ **B** Bb

☒ **C** bB

☒ **D** bb

(ii) Keith has the genotype Bb.

State the genetic term used to describe an individual with two different alleles for the same gene.

(1)

.....

(iii) Complete the Punnett square for Jane and Keith.

(1)

		Keith's gametes	
		B	**b**
Jane's gametes	**b**		
	b		

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(iv) State the percentage chance that their offspring will have brown eyes.

(1)

.....

(b) (i) Sue has cystic fibrosis (CF).

Her parents, Jane and Keith showed no symptoms of this disorder.

CF is a genetic disorder caused by recessive alleles.

Explain how Sue inherited CF.

(2)

.....

.....

.....

.....

(ii) Describe why CF may cause Sue to have breathing problems.

(2)

.....

.....

.....

.....

(Total for Question 2 = 8 marks)

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Drugs

3 A drug is a substance that can change the way the human body works.

(a) Draw **one** straight line from each type of drug to an example of that type of drug.

(2)

Type of drug	Example of drug
painkiller	morphine
hallucinogen	caffeine
	antibiotic
	nicotine
	LSD

(b) (i) Tar is a chemical that is found in tobacco smoke.

Tar is a carcinogen.

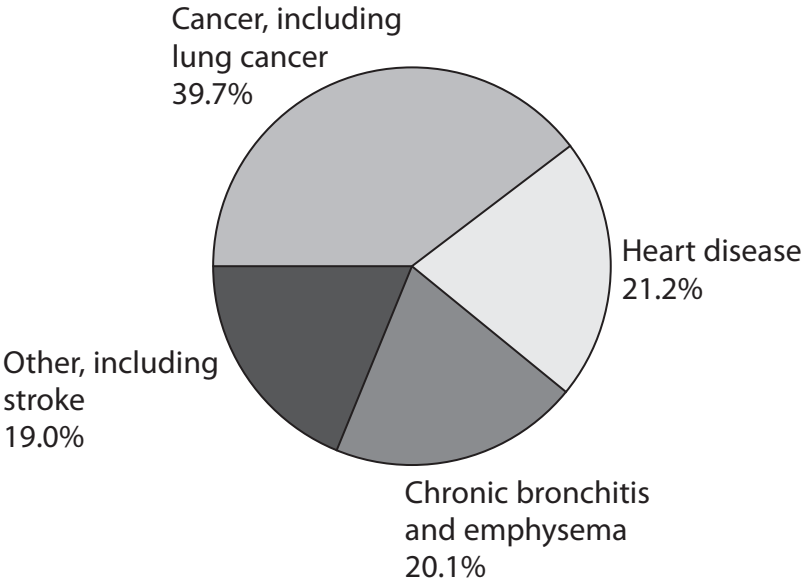
Define the term carcinogen.

(1)

.....

.....

(ii) The pie-chart shows the causes of death for people in the UK who smoke tobacco.



Calculate the total percentage of deaths from cancer and heart disease for smokers in the UK.

(2)

Answer ..... %

(iii) Explain how smoking tobacco may affect a person's ability to exercise.

(3)

.....

.....

.....

.....

.....

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(c) Alcohol abuse can have long-term effects on the human body.

Describe the long-term effects of alcohol abuse on the human body.

(2)

.....

.....

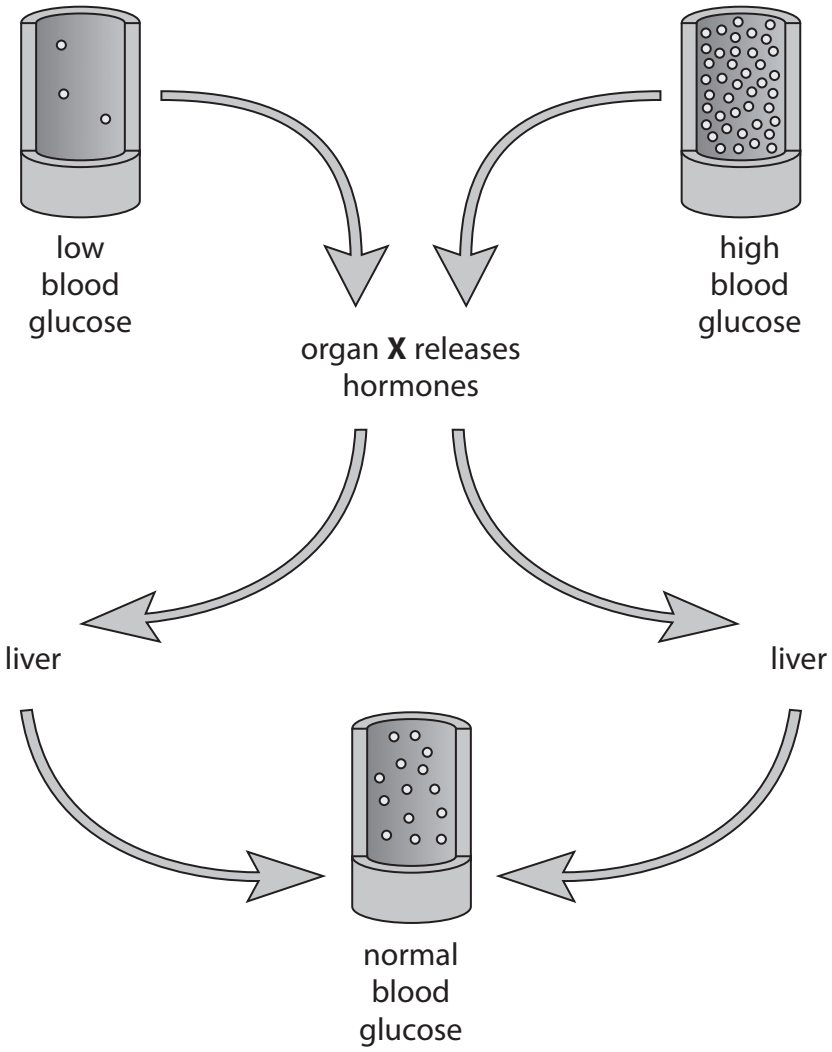
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(Total for Question 3 = 10 marks)

Regulation

4 (a) The diagram shows how glucose is regulated in the human body.



(i) What is the name of organ **X**?

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

(1)

☒ **A** brain

☒ **B** heart

☒ **C** stomach

☒ **D** pancreas

(ii) State the name of the hormone that lowers the blood glucose level.

(1)

.....

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(iii) Describe what happens in the liver to lower the blood glucose level.

(2)

(b) (i) Temperature can also be regulated in the human body.

Describe how changes in external temperature are detected by the human body.

(2)

(ii) Explain how sweat glands can help to regulate body temperature.

(2)

(iii) Explain how the hair on a person's body can act to keep the body warm.

(2)

(Total for Question 4 = 10 marks)

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Pollution

5 Lichen species grow on trees and are air quality indicators.

The table shows the sulfur dioxide concentrations in three areas (A, B and C).

Each area contained 1000 trees and the number of trees with lichen growing on them was recorded in the table.

Area	Sulfur dioxide concentration / ppm	Number of trees with lichen growing on them
A	5	204
B	1	437
C	15	14

(a) (i) Calculate the difference in the number of trees in area A and area C with lichen growing on them.

(1)

Answer .....

(ii) Describe the effect of sulfur dioxide on the number of lichen.

(2)

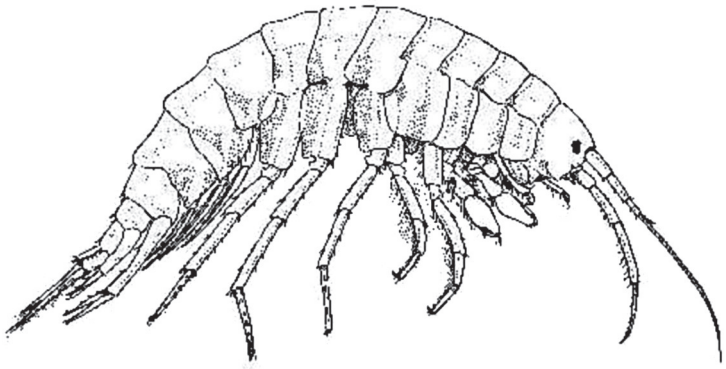
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This freshwater shrimp is an example of a clean water indicator.



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

Clean water can also be indicated by the presence of

(1)

- ☒ **A** blackspot fungi
- ☒ **B** bloodworms
- ☒ **C** sludgeworms
- ☒ **D** stoneflies

(ii) Use words from the box to complete the following sentences.

auxins	nitrates	decomposers
increases	decreases	

(2)

As the human population ..... , more food needs to be grown.

This can lead to more ..... being used which can pollute the environment.

*(iii) Explain how the process of eutrophication could occur in a stream and may lead to a reduction in the number of freshwater shrimps.

(6)

(Total for Question 5 = 12 marks)

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The axolotl

6 The axolotl is also called the mexican walking fish.

It is not a fish, it is an amphibian.



(a) (i) Suggest why scientists find it difficult to classify the axolotl.

(2)

.....

.....

.....

.....

(ii) All amphibians are vertebrates.
Which phylum do all vertebrates belong to?

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

(1)

☒ **A** chordata

☒ **B** mammalia

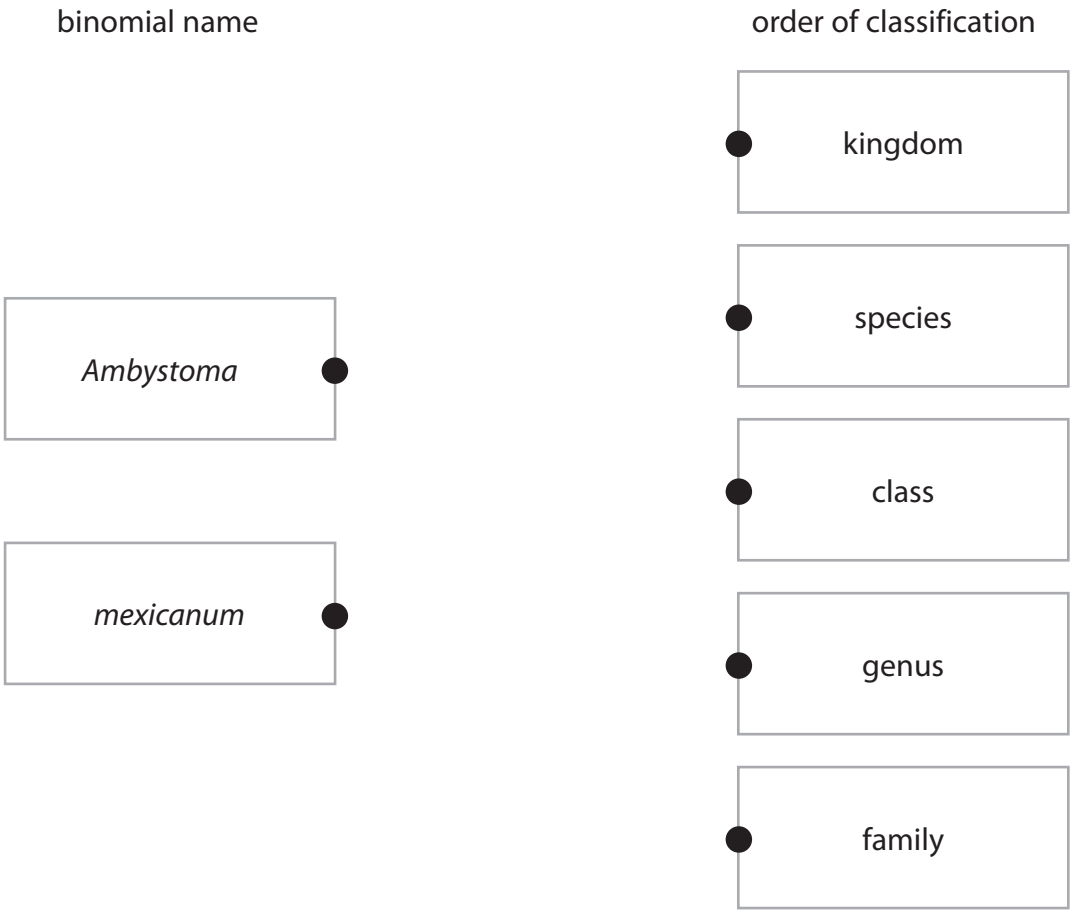
☒ **C** prokaryota

☒ **D** protoctista

(iii) The axolotl has the binomial name *Ambystoma mexicanum*.

Draw **two** straight lines to link the parts of the binomial name with the correct order of classification.

(2)



(iv) The axolotl cannot regulate its own body temperature.

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

An organism that relies on the environment to regulate its body temperature is known as

(1)

☒ **A** homeothermic

☒ **B** oviparous

☒ **C** poikilothermic

☒ **D** viviparous

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*(b) The axolotl belongs to Animalia which is one of the five kingdoms.

Describe the main characteristics of the five kingdoms of organisms.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

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GCSE Biology
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Question Number	Answer	Acceptable answers	Mark
1a(i)	**A** ☒ bacterium		**(1)**

Question Number	Answer	Acceptable answers	Mark
1a(ii)	food (1) viruses (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
1a(iii)	A statement to include any two of the following mucus (1) cilia (1) skin (1) (hydrochloric)stomach acid (1) lysozymes / tears (1) OR a detailed description of how one of the above prevents the pathogen entering (2)	scab formation nasal hairs (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	16 (mm) (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	An explanation including the following points • A (1) • there is a larger / largest area where the bacteria have not grown (1)	largest light grey area	**(2)**

Total for question 1 = 8 marks

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	☒ **D** bb		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	Heterozygous		**(1)**

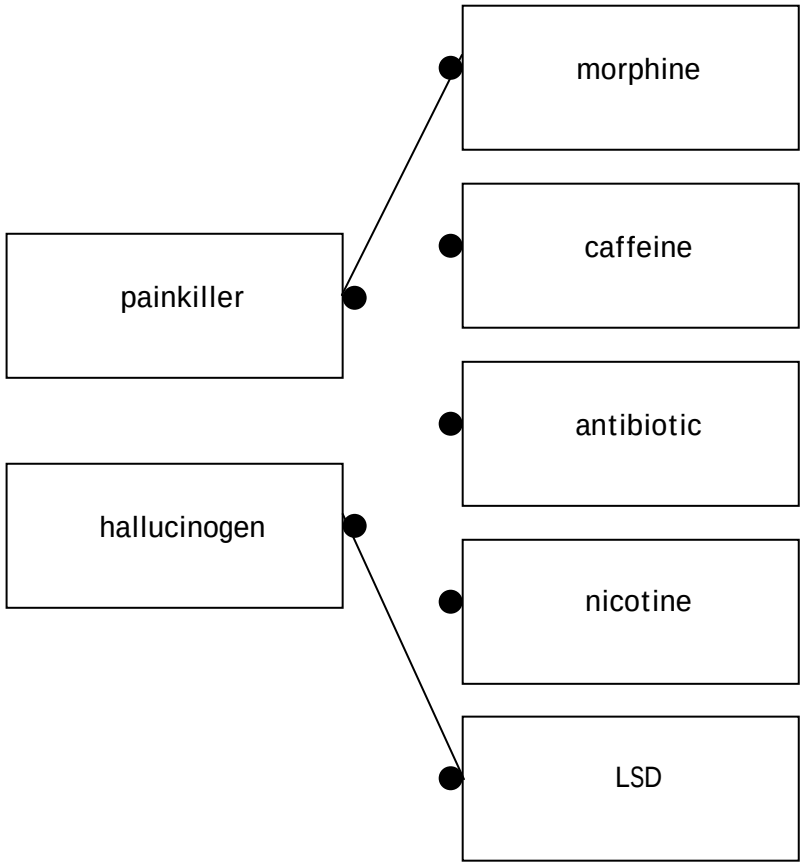
Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	A correctly completed Punnett square: B: b b: Bb, bb b: Bb, bb		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(iv)	50%		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	An explanation linking the following points: • parents were carriers (1) • Sue inherited a recessive allele from each parent / Sue has 2 recessive alleles (1)	heterozygous / both parents have a recessive allele accept gene	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	An description linking the following points: • build-up of / excess mucus • causing restriction in the lungs • oxygen diffusion is difficult	 thick / sticky mucus absorption / taking in / uptake	**(2)**

Total for Question 2 = 8 marks

Question Number	Answer	Acceptable answers	Mark
3a		1 mark for each correct line If more than 1 line drawn from either box on the left then 0 marks for that box	**(2)**

Question Number	Answer	Acceptable answers	Mark
3b(i)	a cancer causing substance		**(1)**

Question Number	Answer	Acceptable answers	Mark
3b(ii)	39.7 and 21.2 (1) 60.9(%)	Two marks for correct answer ECF for correct working of two wrong numbers chosen (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3b(iii)	an explanation to include three of the following points • effect on the lungs (1) • breathing problems (1) • effect on oxygen levels (in blood)(1) • reduction (1)	CO being transported in place of oxygen / carrying capacity any idea of less exercise carried out / harder to exercise	**(3)**

Question Number	Answer	Acceptable answers	Mark
3c	A description including any two of the following • cirrhosis of liver (1) • brain damage (1) • kidney damage (1)	Do not accept any failure / disease of an organ liver damage	**(2)**

Total for question 3 = 10 marks

Question Number	Answer	Acceptable answers	Mark
4a(i)	☒ **D** pancreas		**(1)**

Question Number	Answer	Acceptable answers	Mark
4a(ii)	insulin		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	A description linking two of the following: • glucose converted (1) • into glycogen (1) • (glycogen) is stored (1)	Ignore glucose removal do not accept "glucose being stored in liver" (unless it is "stored **as** glycogen")	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	A description linking the following: • receptors (1) • in the skin (1) • messages sent to the hypothalamus (1)	accept brain/CNS do not accept spinal cord on its own	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	An explanation linking the following: • sweat released (1) • evaporated (1) • body temperature reduced (1)	"when we sweat" cools body	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)(iii)	An explanation linking the following: • erector muscles (1) • raise the hair (1) • to trap a layer of air / insulate (1)	not trapping warmth /heat	**(2)**

Total for question 4 = 10 marks

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	190		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	A description including any two of the following points • an increase in sulfur dioxide will decrease the lichen (1) • comparison / manipulation of figures from at least two areas (1)	ORA	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	**D** ☒ stoneflies		**(1)**

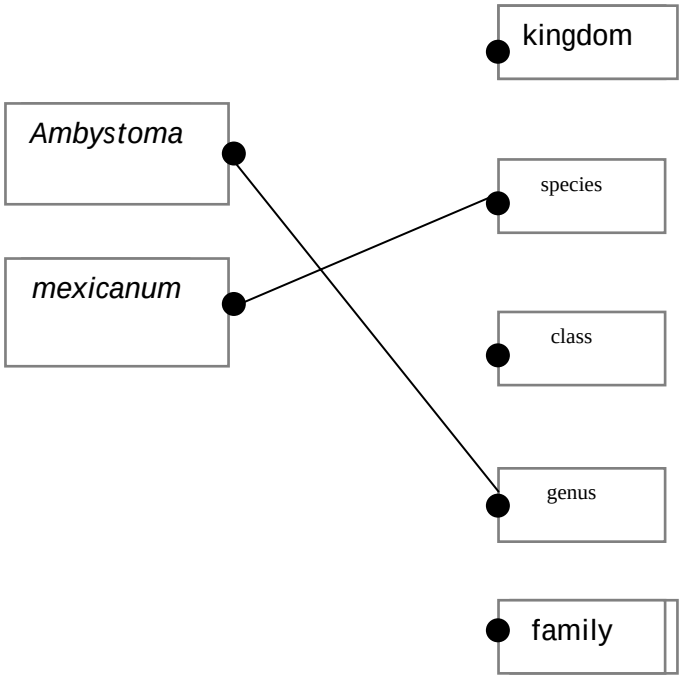
Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	increases (1) nitrates (1)	Answers must be in that order	**(2)**

Question Number		Indicative Content	Mark
QWC	***5(b)(iii)**	A explanation to include some of the following points • (over) use of nitrates / fertilisers • nitrates leach out of soil (by rain water) • nitrates dissolved in the rain water move into the stream • algae grow (rapidly) / algal bloom / blocking sunlight • plants underneath the surface cannot grow (photosynthesise) • these underwater plants will die and no oxygen will be produced • bacteria (microbes/microorganisms) break down (decompose / respire) the dead material • the bacteria use up all of the oxygen • oxygen concentration decreases • freshwater shrimp / living organisms cannot survive in anaerobic conditions (lack of oxygen) and will die (reduce in numbers)	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation of one stage of eutrophication. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation of two or three stages of how eutrophication can lead to a reduction in the number of living organisms. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation of four or more stages of how eutrophication can lead to a reduction in the number of living organisms. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 5 = 12 marks

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	A suggestion to include two of the following: • it has features of both (a fish and amphibian) (1) • it has gills (1) • it has legs / feet (1)		**(2)**

Question Number	Answer	Acceptable answers	**Mark**
6(a)(ii)	☒ **A** chordata		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(iii)		1 mark for each correct line If more than 1 line drawn from either box on the left then 0 marks for that box	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(a)(iv)	☒ **C** poikilothermic		**(1)**

Question Number		Indicative Content	Mark
QWC	***6(b)**	A description including some of the following points: • Animalia are multicellular • Animalia do not have cell walls/chlorophyll • Animalia feed heterotrophically / consume / eat • Plantae have cell walls • Plantae have chlorophyll • Plantae feed autotrophically / photosynthesise / makes own food • Plantae are multicellular • Fungi are multicellular / unicellular • Fungi feed saprophytically / lives on / decays • Fungi have cell walls • Fungi do not chlorophyll • Protoctista are unicellular • Protoctista have a nucleus • Prokaryotes are unicellular • Prokaryotes have no nucleus	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description of at least **one** kingdom • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description of **two** or more kingdoms with at least two different features commented in one of them • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description of at least **four** kingdoms • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 6 = 12 marks

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Centre Number	Candidate Number

Biology/Science

Unit B1: Influences on Life

Foundation Tier

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Answer ALL questions.

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Classification

1 The photograph shows a single-celled bacterium.



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

Bacteria are classified into the kingdom

(1)

☒ **A** animalia

☒ **B** plantae

☒ **C** fungi

☒ **D** prokaryota

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

Bacteria do **not** contain

(1)

☒ **A** a cell membrane

☒ **B** a cell wall

☒ **C** a nucleus

☒ **D** chromosomes

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(b) Viruses are not classified into any kingdom.

Describe what a virus does after it has entered its host.

(2)

.....

.....

.....

.....

(c) All vertebrates have a backbone and are classified into groups.

(i) Use words from the box to complete the sentences about one method of classification.

(2)

chordates		oviparous
viviparous	hybrids	consumers

Once fertilisation has occurred some vertebrates lay eggs.

Vertebrates that lay eggs are known as .....

Vertebrates that give birth to live young are known as .....

(ii) Describe **two** other methods scientists can use to place vertebrates into groups.

(2)

.....

.....

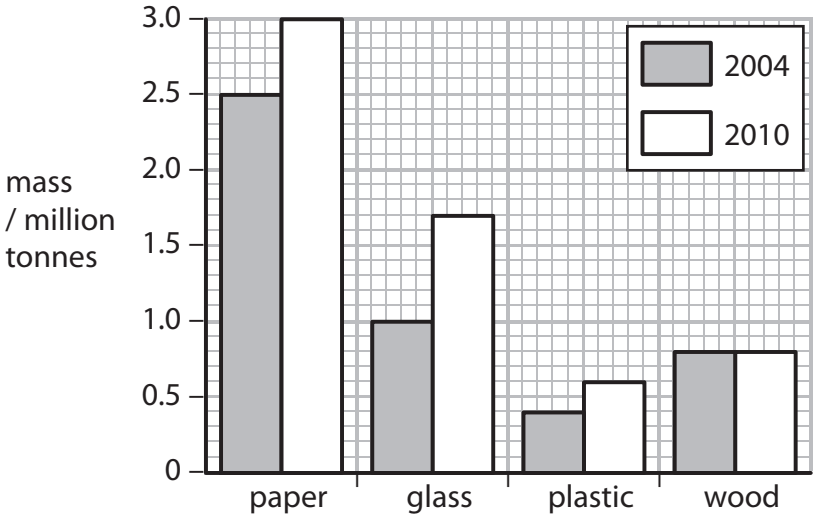
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(Total for Question 1 = 8 marks)

Recycling

2 (a) The graph shows some materials recycled in 2004 and 2010.



(i) Calculate the increase in the mass of paper recycled between 2004 and 2010.

(2)

answer = ... million tonnes

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

From the graph, the material that is recycled the least is

(1)

☒ **A** glass

☒ **B** paper

☒ **C** plastic

☒ **D** wood

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(iii) Suggest **one** reason why a large mass of paper is recycled.

(1)

.....

.....

(b) Composting is a method used to recycle waste from the garden and kitchen.

Explain how composting increases carbon dioxide concentration in the air.

(2)

.....

.....

.....

.....

(c) Explain how **one** other human activity contributes to an increase in carbon dioxide concentration in the air.

(2)

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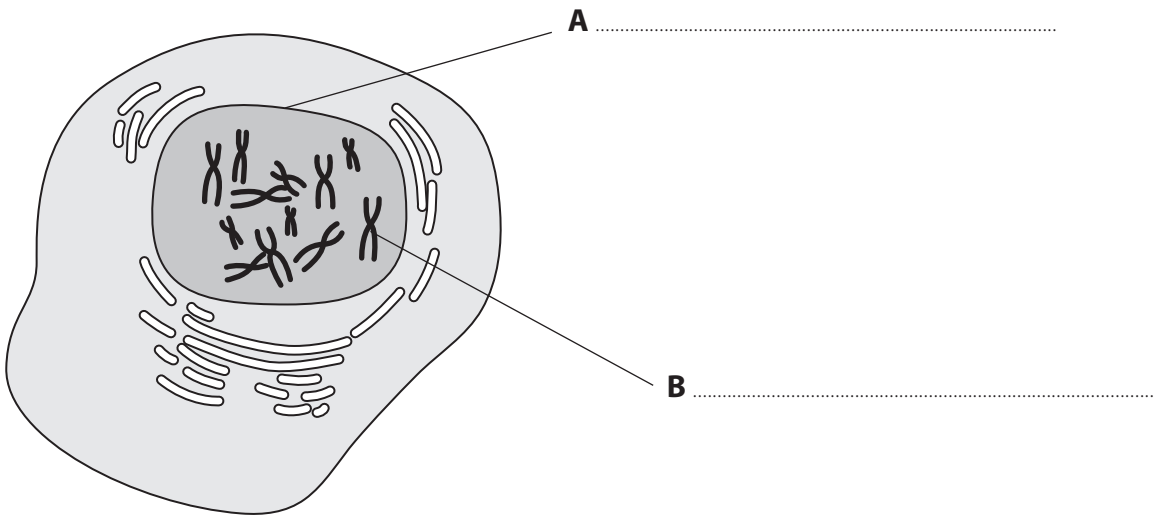
(Total for Question 2 = 8 marks)

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3 (a) The diagram shows a human body cell.

Name the structures labelled **A** and **B**.

(2)



(b) Genes code for the characteristics of an individual.

Different forms of the same gene are called alleles.

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

The term used to describe an individual with two identical alleles is

(1)

☒ **A** heterozygous

☒ **B** homozygous

☒ **C** dominant

☒ **D** recessive

(ii) Blue eyes are an example of a person's physical characteristics.

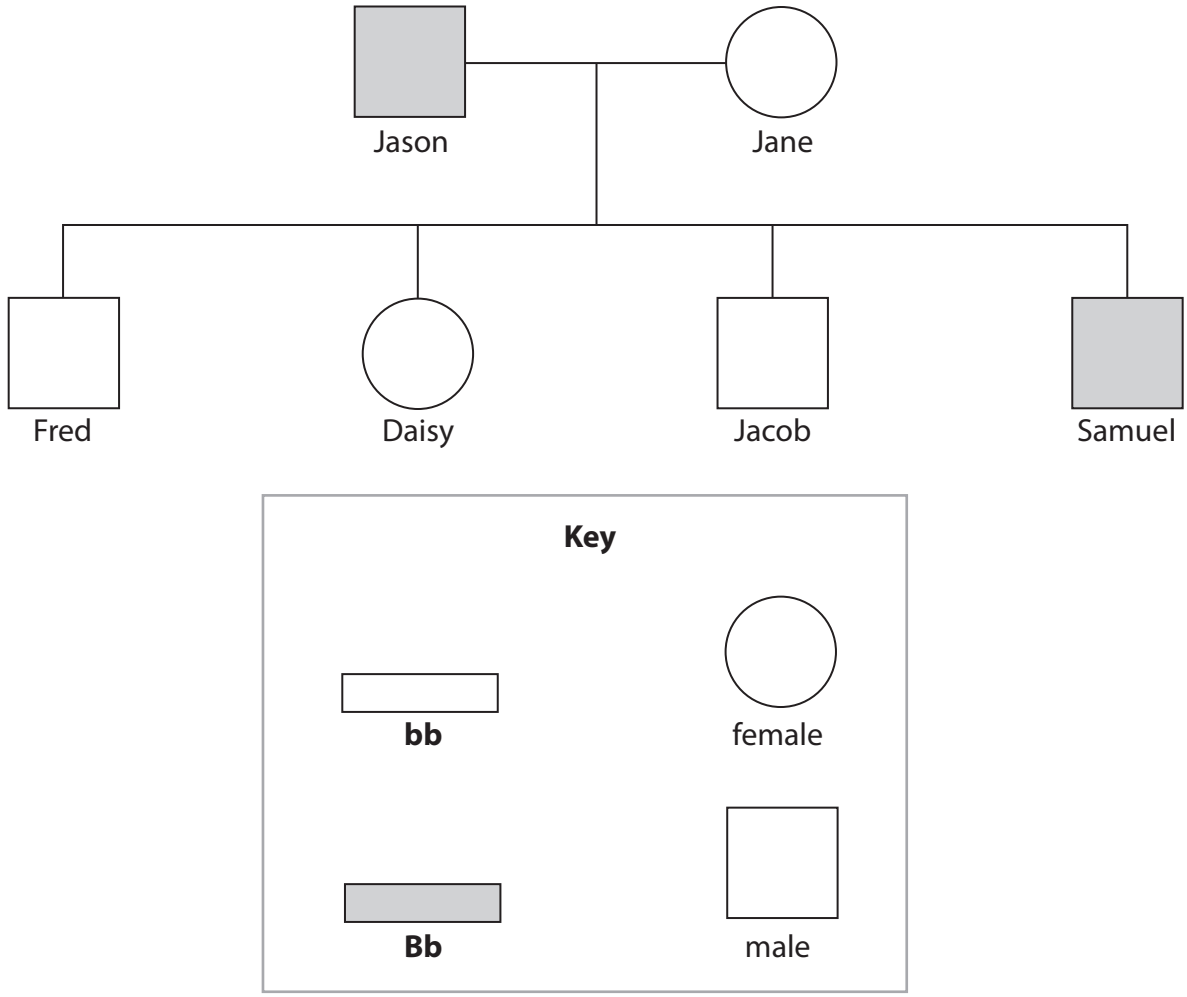
State the genetic term for a person's physical characteristics.

(1)

.....

(c) The diagram shows the inheritance of eye colour in a family.

The allele for brown eyes is **B** and the allele for blue eyes is **b**.



(i) How many offspring have blue eyes?

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

(1)

☒ **A** 1

☒ **B** 2

☒ **C** 3

☒ **D** 4

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(ii) Explain why none of the children of Jason and Jane have the genotype **BB**.

(2)

(iii) Fred has an identical twin.

Explain which of the other children is Fred's identical twin.

(3)

(Total for Question 3 = 10 marks)

Bees and the environment

4 The photograph shows a bee collecting nectar from a flower.



(a) Nectar is made from glucose produced by plants.

Name the process that plants use to make glucose.

(1)

.....

(b) (i) When the bee collects nectar from the flower, the plant benefits because the pollen sticks to the bee and is carried to another flower.

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

The relationship between the bee and the plant is an example of

(1)

☒ **A** decomposing

☒ **B** eutrophication

☒ **C** mutualism

☒ **D** parasitism

(ii) Some bees have evolved a new method of collecting nectar from flowers.

They drill a small hole in the base of the flower and collect the nectar through the hole.

This means the pollen does not stick to the bee.

Suggest why this is an advantage to the bees.

(2)

.....

.....

.....

.....

(c) Bees can sting people.

State the physical barrier of the human body that would have to be broken by the bee sting.

(1)

.....

(d) Honey produced by bees is a natural antiseptic.

Describe how antiseptics can be used, during food preparation, to prevent the spread of infections.

(2)

.....

.....

.....

.....

(e) Explain how the human body uses chemical defences to prevent infections.

(3)

(Total for Question 4 = 10 marks)

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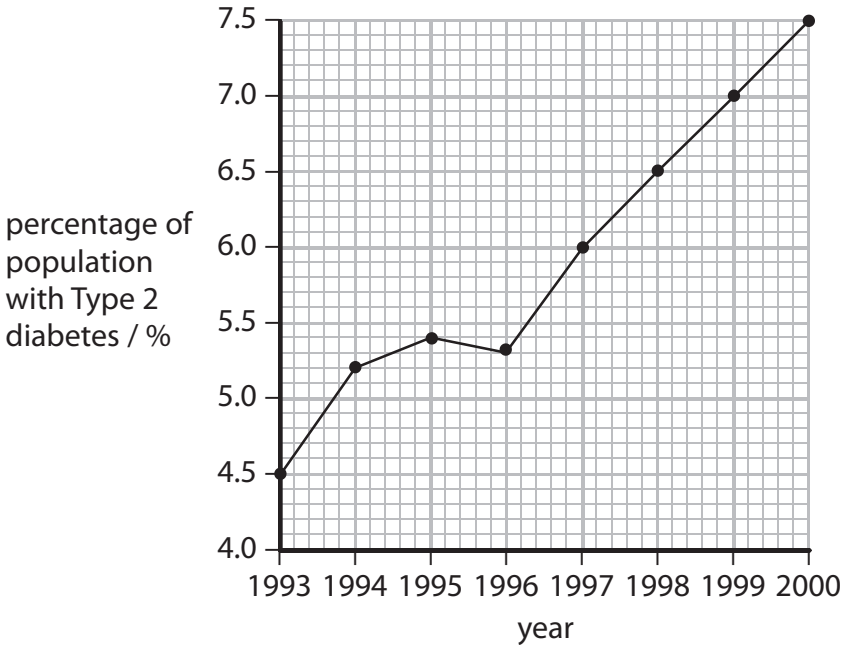
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Turn over for Question 5

Blood glucose regulation

5 People with diabetes have difficulties regulating their blood glucose concentration.

The graph shows the percentage of the population with Type 2 diabetes between 1993 and 2000.



(a) (i) Describe the overall trend shown in the graph.

(1)

.....

.....

(ii) Calculate the change in the percentage of the population with Type 2 diabetes between 1993 and 2000.

(2)

answer = ...%

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(b) People who are obese can develop Type 2 diabetes.

(i) Body Mass Index (BMI) can be used to indicate obesity.

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

BMI is calculated using

(1)

☒ **A** mass only

☒ **B** height only

☒ **C** mass and height

☒ **D** mass and blood glucose

(ii) Suggest why people with a high BMI may develop Type 2 diabetes.

(2)

*(c) Describe the different methods that people with Type 1 diabetes and Type 2 diabetes use to regulate their blood glucose concentrations.

(6)

(Total for Question 5 = 12 marks)

Drugs

6 Drugs can affect a person's nervous system.

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

Alcohol is classed as a

(1)

☒ **A** depressant

☒ **B** hallucinogen

☒ **C** painkiller

☒ **D** stimulant

(ii) State the effect alcohol has on the time taken to respond to a stimulus.

(1)

.....

(iii) Drinking excess alcohol over a long period of time can result in alcoholism.

Suggest **two** long-term effects of alcoholism in the human body.

(2)

.....

.....

.....

.....

(b) Some people drink coffee containing caffeine after drinking alcohol.

Describe the effects of caffeine on the nervous system.

(2)

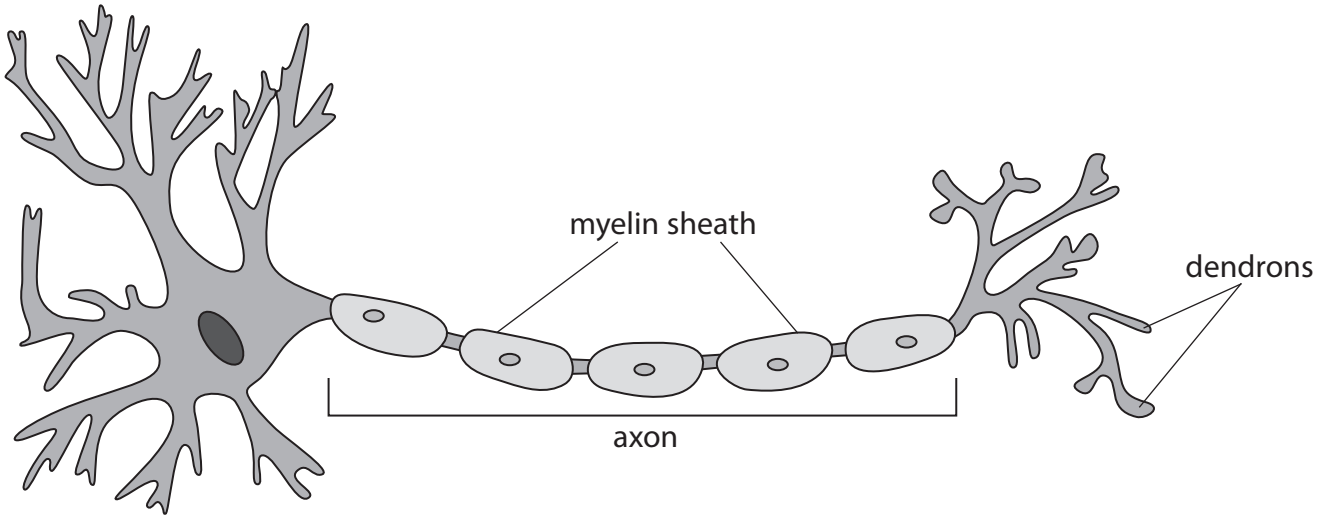
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*(c) The diagram shows the structure of a motor neurone.



Explain how the structure of the motor neurone relates to its function in carrying messages through the nervous system.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

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GCSE Biology
5BI1F/01

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GCSE Biology 5BI1F/01 Mark Scheme – November 2012

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	D - prokaryota		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	C – a nucleus		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)	A description to include two of the following points • It enters / attaches to a <u>cell</u> (1) • causes / spreads disease / infection (1) • makes copies of itself (1) • changes the way the cell works / changes the (cell) DNA (1)	 allow named cells allow “takes over the cell” Ignore “illness” multiplies / reproduces	**(2)**

Question Number	Answer	Acceptable answers	Mark
1 (c) (i)	• oviparous (1) • viviparous (1) Answers MUST be in this order		**(2)**

Question Number	Answer	Acceptable answers	Mark
1 (c) (ii)	A description to include any two of the following points • oxygen absorption (1) • reproduction (1) • thermoregulation (1)	 gill use / lung use / skin use internal / external homeothermic / poikilothermic / cold blooded / warm blooded	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	Reading off graph 3.0, 2.5 (1) 0.5 (million tonnes) (1)	Accept for 2 marks correct answer without workings	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	C -plastic		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	A suggestion from: • paper is easy to <u>recycle</u> (1) • people use more paper than other materials (1) • more places/recycling bins/recycling centres for paper (1) • cheaper to recycle paper (1) • reduce deforestation / less trees destroyed (1)	Accept paper used everyday Ignore: “Save trees” without deforestation / cutting down ref	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	A explanation to include two of the following: • carbon compounds broken down (1) • by microorganisms / detritivores /fungi (1) • <u>respiration</u> (1)	compost breaks down / decomposes / decays Accept: worms / maggots for detritivores	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)	A explanation linking **2** of the following: • combustion / burning (1) • (fossil) fuels / named fuel (1) OR • humans respire (1) • breathe (out carbon dioxide) (1) OR • humans are cutting down trees /deforestation (1) • less carbon dioxide being removed by photosynthesis (1)	Ignore: car driving petrol Ignore “CO2 increase”	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)	A – nucleus (1) B – chromosome (1) Answers MUST be in this order	A - nuclear membrane B – chromatid	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	B - Homozygous		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	phenotype		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	C - 3		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	An explanation linking the following points • Jane is homozygous recessive / bb (1) • children inherit one allele from each parent (1)	children can only inherit recessive allele /gene from mother ORA regarding Jason Accept gene Ignore unqualified Punnett squares	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)(iii)	An explanation that links the correct child with the following: • Jacob (1) • same sex (1) • the same genotype / alleles / bb / both homozygous (1)	Ignore “same eye colour” Accept gene If candidate has mentioned another child they can still obtain mp2 and mp3. These are stand alone marks	**(3)**

Question Number	Answer	Acceptable answers	Mark
4(a)	photosynthesis (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	**C -** mutualism		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	A suggestion including two of the following: • bees do not have the burden of carrying pollen (1) • bees use less energy (1) • bee able to fly / move more easily / aerodynamic / quicker (1) • <u>more</u> nectar collected (1) • avoiding predators (1)	Ignore non specific references to 'survival of the fittest' Accept "bees are lighter" Ignore: "pollen does not stick to the bee"	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)	skin (1)	dermis / epidermis	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(d)	A description including two of the following: • can be used to wash hands (1) • can be used for cleaning surfaces (1) • to kill / destroy the pathogens / bacteria (1)	Accept: cleaning equipment Ignore "get rid of bacteria" "wipes away bacteria" "prevent the spread of infections"	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(e)	A explanation including three of the following: • acid (1) • (in the) stomach (1) • lysozymes (1) • (in) tears / eyes (1) • kill / destroy microorganisms / pathogens (1)	**2 marks max for listing the chemical defence method and site (mp1 – 4)** Ignore "get rid of bacteria"	**(3)**

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	Increases	Accept positive correlation	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	Reading off graph 7.5%, 4.5% (1) Evaluation: 3 (%) (1)	give 2 marks for correct answer, no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	C – mass and height		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	A suggestion including • eat poor diet / too much sugar in diet (1) • little exercise (1) • become insulin resistant (1)	 Accept “unhealthy” / idea of an unhealthy diet Unresponsive to insulin	**(2)**

Question Number	Indicative Content	Mark
5(c)	An description linking the following points: • Type 1 diabetics do not produce the hormone insulin • insulin can be injected • into subcutaneous fat layer • insulin tablets • Type 2 diabetics are resistant to insulin • Type 2 diabetics should undertake more physical activity / exercise • this will use blood glucose and reduce it • Type 2 diabetics need a controlled diet • lower intake of carbohydrates so less digested into glucose	**(6)**

Level	0	No rewardable content
1	1-2	• a limited explanation of one type of diabetes and it's method of control • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3-4	• a simple explanation of both types of diabetes and their methods of control • the answer communicates ideas showing some evidence of clarity and organisation and mostly uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5-6	• a more detailed explanation of both types of diabetes and their methods of control • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	**A -** depressant		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	Increased (time)	Takes longer ORA Accept “reactions are slower”	**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(iii)	A suggestion including two of the following • <u>cirrhosis</u> of the liver (1) • brain damage (1) • kidney damage (1)	Ignore “damage” / “cancer” Ignore failure	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(b)	A description linking **2** of the following: • Caffeine is a stimulant (1) • Stimulants speed up reactions / decrease reaction time (1) • impulses / messages / signals sent faster (1)	Ignore “more alert” or “more awake” Accept speeds up reaction time	**(2)**

Question Number	Indicative Content	Mark
6c	An explanation with the following points: • impulses / messages / signals are passed along the axon • the (electrical) signals are insulated • by the myelin sheath which surrounds the axon • this speeds up the signal along the neurone / axon • the dendrons at the end of the axon / neurone • allows signals to be carried onto other neurone(s) • across the synapses • motor neurones connect to other neurones • neurotransmission across • motor neurones lead to effectors	**(6)**

Level	0	No rewardable content
1	1-2	• a limited explanation of how one structure of the motor neurone relates to its function • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3-4	• a simple explanation of how two structures of the motor neurone relate to their functions • the answer communicates ideas showing some evidence of clarity and organisation and mostly uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5-6	• a detailed explanation of how three structures of the motor neurone relate to their function • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

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Centre Number	Candidate Number

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Tuesday 15 May 2012 – Morning **Time: 1 hour**	Paper Reference **5BI1F/01**

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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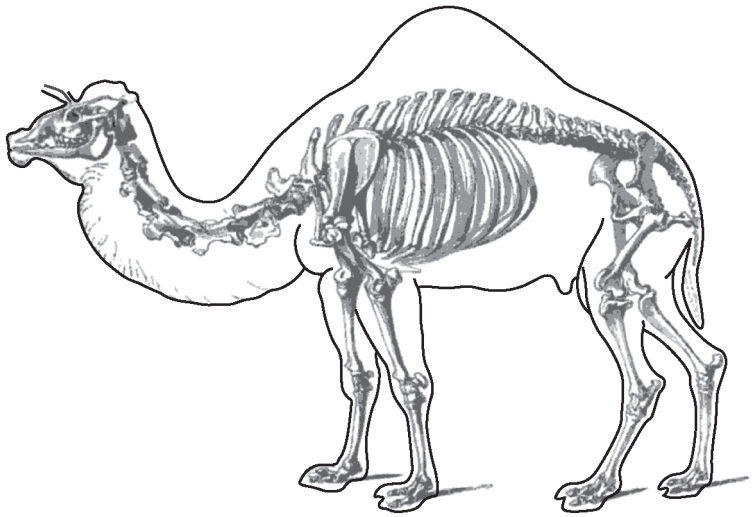
Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Classification

1 (a) Camels belong to the phylum Chordata.

The drawing shows a dromedary camel that has the binomial name *Camelus dromedaries*.



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

The second part of the binomial name, *dromedaries,* refers to the

(1)

☒ **A** class

☒ **B** genus

☒ **C** order

☒ **D** species

(ii) State **one** feature that all members of the phylum Chordata have in common.

(1)

.....

.....

(iii) Members of the phylum Chordata can be further classified by how they regulate their body temperature.

Reptiles are poikilothermic and mammals are homeothermic.
Explain how reptiles and mammals regulate their body temperature.

(2)

.....

.....

.....

.....

(b) Scientists classify organisms into five different kingdoms.

Draw **one** straight line from each description to its correct kingdom.

(2)

description	**kingdom**
unicellular with nucleus present	Animalia
	Plantae
	Fungi
	Protoctista
multicellular and photosynthetic	Prokaryotes

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(c) Viruses are not classified into any of the five kingdoms.

Suggest reasons for this.

(2)

.....

.....

.....

.....

(Total for Question 1 = 8 marks)

Reaction times

2 (a) The reaction times of some athletes were measured at the Beijing Olympics in the final of the 100 metres sprint.

athlete	reaction time / s	overall race time / s
Bolt: Usain	0.165	9.69
Burns: Marc	0.145	10.01
Dix: Walter	0.133	9.91
Frater: Michael	0.147	9.97
Martina: Churandy	0.169	9.93
Patton: Darvis	0.142	10.03
Powell: Asafa	0.134	9.95
Thompson: Richard	0.133	9.89

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

The athlete with the slowest reaction time is

(1)

☒ **A** Bolt: Usain

☒ **B** Martina: Churandy

☒ **C** Patton: Darvis

☒ **D** Thompson: Richard

(ii) Name the athlete who finished the 100 metres sprint in the fastest time.

(1)

.....

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(iii) Calculate the difference between the overall race time of the fastest athlete and slowest athlete.

(2)

answer = ... s

(b) The athlete starts to run when a gun is fired.

(i) State the athlete's sense organ that detects this stimulus.

(1)

.....

(ii) Describe the nerve pathway a nerve impulse will take from where it is received to where it will cause a response to take place.

(3)

.....

.....

.....

.....

.....

.....

(Total for Question 2 = 8 marks)

Mistletoe plants

3 The photograph shows a mistletoe plant growing on a tree.
The mistletoe plant uses nutrients from the tree.
This can cause the tree to die.



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

The relationship between the mistletoe plant and the tree is an example of

(1)

☒ **A** mutualism

☒ **B** parasitism

☒ **C** phototropism

☒ **D** symbiosis

(ii) The mistletoe plant also gains energy from sunlight to produce glucose.

State the name of this process.

(1)

.....

(b) The mistletoe plant produces fruit that contains seeds.
The Mistle Thrush is a bird that spreads these mistletoe seeds to other trees.

(i) Suggest how the Mistle Thrush spreads the mistletoe seeds to other trees.

(2)

.....

.....

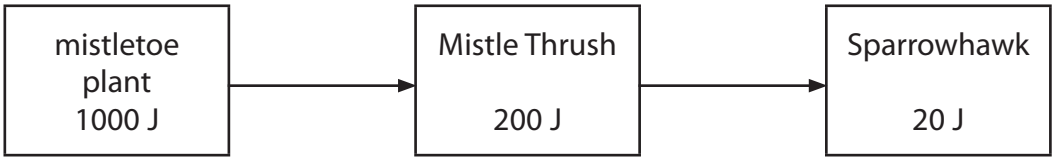
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(ii) Sparrowhawks are birds that are predators of the Mistle Thrush.

The diagram shows the energy values in the food chain for these organisms.



Calculate the percentage of energy that was passed from the mistletoe plant to the Mistle Thrush.

(2)

answer = ... %

(iii) Draw a pyramid of energy for this food chain.

(2)

(iv) Suggest **two** ways in that energy is lost from this food chain.

(2)

1 .....

.....

2 .....

.....

(Total for Question 3 = 10 marks)

Homeostasis

4 If a person is to survive, the internal environment of their body must be controlled.

(a) The volume of water in the blood can be controlled.

This is called osmoregulation.

The table shows the volume of urine produced by six different people on a hot day and on a cold day.

person	volume of urine produced / cm^3	
	hot day	cold day
1	430	890
2	350	1060
3	270	930
4	560	1280
5	400	680
6	390	1160
mean		1000

(i) Calculate the mean volume of urine produced on the hot day.

(1)

answer = ... cm^3

(ii) State the difference between the mean volume of urine produced on the hot day and the mean volume of urine produced on the cold day.

(1)

.....

.....

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(iii) Explain why, on a hot day, less water is lost from the body as urine.

(2)

(b) The glucose content of human blood also needs to be controlled.

After a meal, high in carbohydrates, the glucose content of the blood will rise.

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

The hormone that lowers the glucose content of the blood is

(1)

☒ **A** auxin

☒ **B** glycogen

☒ **C** insulin

☒ **D** pancreas

(ii) Explain how the glucose content of the blood can be decreased by this hormone.

(2)

(iii) People with Type 1 diabetes cannot produce the hormone needed to control the glucose content of the blood.

Explain how a Type 1 diabetic can control the glucose content of the blood.

(3)

.....

.....

.....

.....

.....

.....

(Total for Question 4 = 10 marks)

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Sickle cell disease

5 (a) The diagram shows a chromosome.



(i) Use words from the box to complete the sentences.

(2)

alleles		DNA
	gene	
phenotype		genotypes

Chromosomes have sections which code for specific characteristics.

Each characteristic is coded for by a ..... . These exist in alternative forms called ..... .

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

In a human body cell, chromosomes are found in the

(1)

☒ **A** cell membrane

☒ **B** cytoplasm

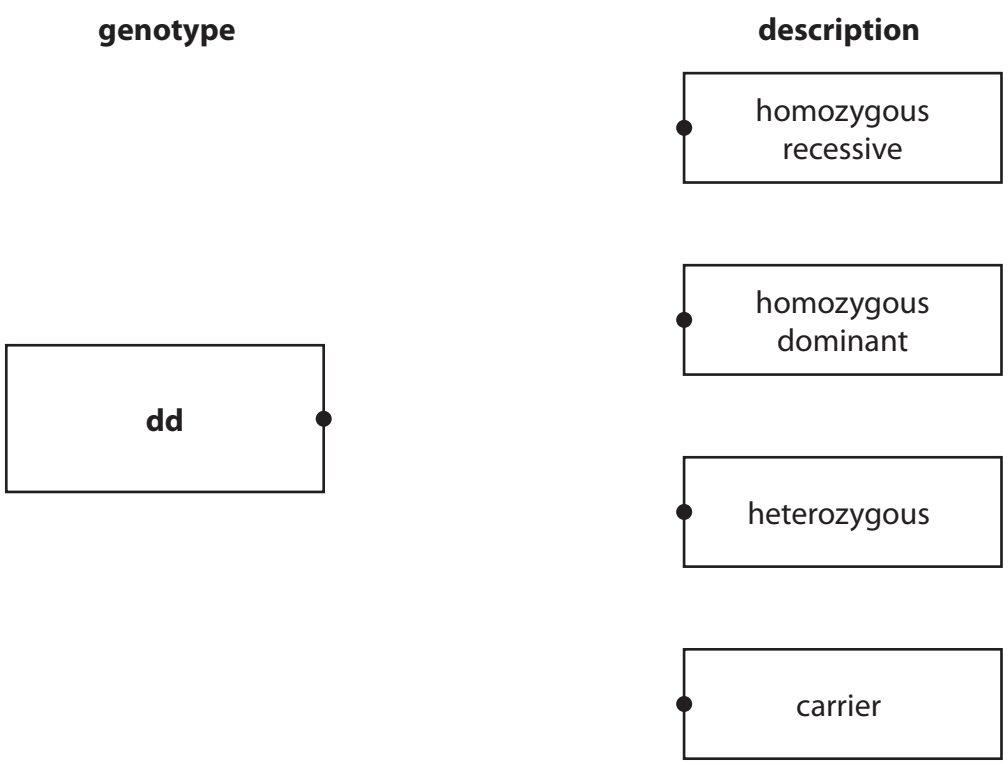
☒ **C** DNA

☒ **D** nucleus

(b) Sickle cell disease is a genetic disorder that affects human red blood cells. Individuals with sickle cell disease have the genotype **dd**.

(i) Draw **one** straight line from the genotype to the correct description.

(1)



(ii) Describe the symptoms of sickle cell disease.

(2)

.....

.....

.....

.....

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*(iii) A father with the genotype **DD** and a mother with the genotype **dd** for sickle cell disease had a number of children.

Explain why none of their children will have sickle cell disease.
Use a Punnett square or genetic diagram to help your explanation.

(6)

(Total for Question 5 = 12 marks)

Pollution

6 (a) As the human population increases, more fossil fuels are burned.
The burning of coal is one of the main contributors to acid rain.

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

The gas produced when coal burns that can lead to acid rain formation is

(1)

☒ **A** carbon monoxide

☒ **B** methane

☒ **C** oxygen

☒ **D** sulfur dioxide

(ii) Describe how acid rain is formed.

(2)

(iii) Suggest **one** effect acid rain has on the environment.

(1)

(b) Explain how the quality of a river can be monitored by studying the organisms present in the water.

(2)

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*(c) Eutrophication can cause problems in an aquatic environment such as a lake.

Explain how eutrophication occurs and the problems it can cause in an aquatic environment.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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GCSE Biology
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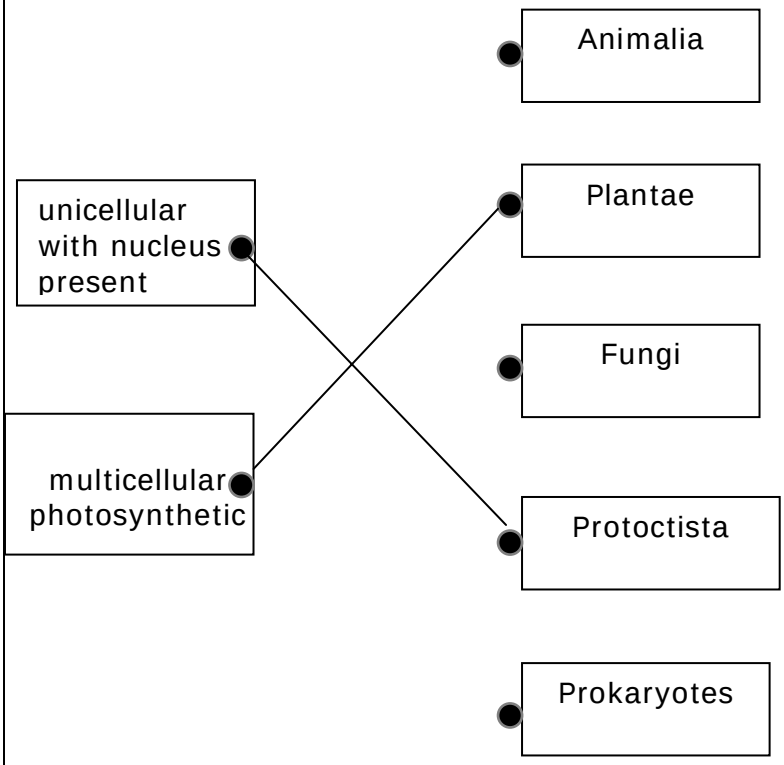
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GCSE Biology 5BI1F/01 Mark Scheme – Summer 2012

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	**D** species		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	Any **one** from the following points • supporting rod (1) • notochord (1) • spinal cord (1)	backbone / vertebrae / spine they are all vertebrates	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	An explanation to include two of the following points • reptiles use their environment (1) • mammals maintain body temperature from within (1) • reptiles are cold blooded (cannot control) AND mammals are warm blooded (can control) (1)	use the sun / shade thermoregulatory mechanism / named thermoregulatory mechanism e.g. sweat / shiver / insulation from fur	**(2)**

Question Number	Answer	Acceptable answers	Mark
1 (b)	 One mark for each correct line drawn from each left hand box Deduct each mark if more than one line is drawn from the left hand box		**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)	An explanation linking **two** of the following points • viruses are non-living (1) • viruses are not made up of cells (1) • viruses do not possess any cell organelles (1) • viruses rely upon a host to exist (1)	viruses are not alive do not have cells a named process relying on host dependence	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	**B** Martina: Churandy		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	Bolt: Usain		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	correct values selected (1) 10.03 and 9.69 evaluation (1) 0.34 (s)	 ECF give full marks for correct answer, no working	 **(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	ear		**(1)**

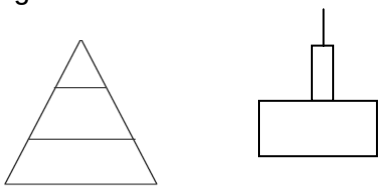
Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	An explanation linking **three** of the following points • (impulse travels along) sensory neurone (1) • to the brain (1) • along relay neurone (1) • (impulse travels along) motor neurone (1) • to the muscle / effector (1) • reference to synapses (1)	 sensory / affector nerve to the spinal cord / CNS motor / effector nerve ignore reference to leg	 **(3)**

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	**B** parasitism		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	photosynthesis		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	A suggestion linking the following **collection** • the Mistle Thrush eats the seeds of the mistletoe plant / seeds stick to the Mistle Thrush (1) **transfer** • these are then egested / regurgitated / seeds deposited (onto the new trees) (1)	gathering nesting material excreted	**(2)**

Question Number	Answer	Acceptable answers	Mark
3 (b)(ii)	Substitution (200) ÷ (1000) (1) evaluation (answer X 100) = 20(%)(1)	If working shows division of any numbers from chain (1) give full marks for correct answer, no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
3 (b)(iii)	• a pyramid which is pyramid shaped (1) • correct widths and same heights for each of the trophic levels (1)	ignore labels  correct area	**(2)**

Question Number	Answer	Acceptable answers	Mark
3 (b)(iv)	Any **two** of the following points • movement (1) • heat production (1) • excretion (1) • not all of the matter is digestible /egestion (1) • not all of the organism is eaten (1)	 flying respiration urine faeces	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	400 (cm^3)		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	Any **one** of the following points • more urine produced on a cold day / ORA (1)	600 (cm^3)	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	An explanation linking **two** of the following points • water lost via sweating (1) • we sweat **<u>more</u>** (1) • maintain water levels of the body (1)	liquid / fluid lots of sweat dehydration reference / to keep hydrated	**(2)**

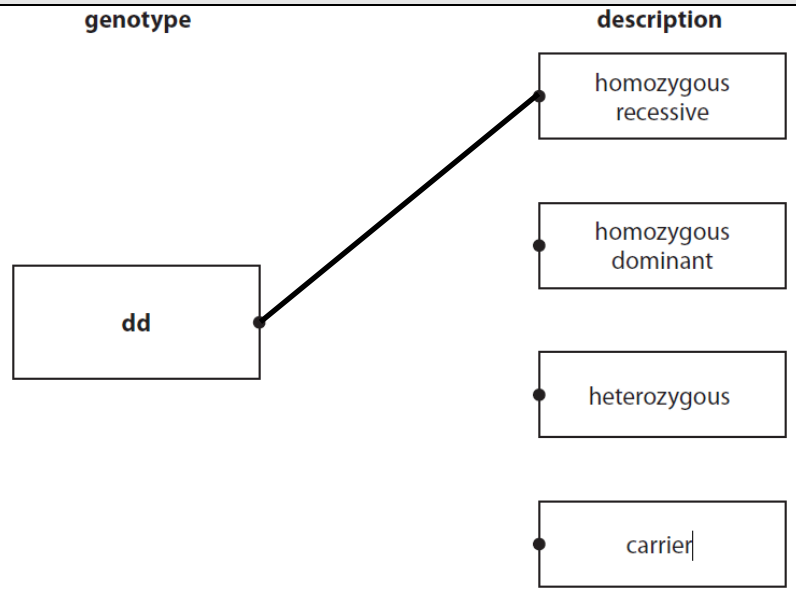
Question Number	Answer	Acceptable answers	Mark
4(b)(i)	**C** insulin		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	An explanation linking the following points • (glucose) converted into / stored as glycogen (1) • Liver / target cells (1)	 muscle / kidney / brain	 **(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)(iii)	An explanation including **three** of the following points • injecting insulin (1) • into fat (1) • exercising (to use up excess blood glucose) (1) • controlling diet / control carbohydrate intake (1)	 insulin tablets / take insulin any named exercise glucose tablets	 **(3)**

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	gene (1) alleles (1) Note: these MUST be in the correct order		**(2)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	**D** nucleus		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	 one mark for correct line		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	A description including **two** of the following symptoms • will become tired (1) • shortness of breath (1) • painful joints (1)	weak (muscles) / tiredness / exhaustion breathing problems	**(2)**

<table>
<tr><th colspan="2">Question Number</th><th>Indicative Content</th><th>Mark</th></tr>
<tr><td>QWC</td><td>*5 (b) (iii)</td><td>
Punnett square showing the following gametes and offspring
Father gametes
<table>
<tr><td></td><td>D</td><td>D</td></tr>
<tr><td>d</td><td>Dd</td><td>Dd</td></tr>
<tr><td>d</td><td>Dd</td><td>Dd</td></tr>
</table>
Mother gametes
An explanation of the inheritance based on the Punnett square

parents will give one allele to the offspring
father can only give the dominant/D allele
mother will only give the recessive/d allele
a dominant and recessive allele will result in heterozygous offspring
offspring are all heterozygous
0% chance of offspring showing sickle cell disease phenotype
because the allele for no sickle cell disease is dominant over the recessive allele for sickle cell disease
all offspring are carriers for sickle cell disease
sickle cell disease is caused by 2 recessive alleles

</td><td>(6)</td></tr>
<tr><td>Level</td><td>0</td><td colspan="2">No rewardable content</td></tr>
<tr><td>1</td><td>1 - 2</td><td colspan="2">

one piece of correct information shown either in any genetic diagram or a written explanation e.g. “father has two dominant alleles”, “offspring are carriers”
the answer communicates ideas using simple language and uses limited scientific terminology
spelling, punctuation and grammar are used with limited accuracy

</td></tr>
<tr><td>2</td><td>3 - 4</td><td colspan="2">

correct genotype of offspring identified either in any genetic diagram or a written explanation
the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately
spelling, punctuation and grammar are used with some accuracy

</td></tr>
<tr><td>3</td><td>5 - 6</td><td colspan="2">

a correct written explanation, which may include a genetic diagram, of why none of the children will have sickle cell disease
the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately
spelling, punctuation and grammar are used with few errors

</td></tr>
</table>

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	**D** sulfur dioxide		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	A description including **two** of the following points • pollutant (1) • released into atmosphere (1) • dissolves with rain / water / water vapour (1) • forming sulfuric acid (1)	sulfur dioxide / nitrogen oxides / carbon dioxide cloud / air reacts / forms / mixes nitrogen oxides / nitrous acid / carbonic acid	**(2)**

Question Number	Answer	Acceptable answers	Mark
6 (a)(iii)	Any **one** from the following points • damage to aquatic environment • damage to soil environment • damage / erosion to buildings / statues / rocks / metals	damage / kills any named aquatic organism damage / kills plants / trees	**(1)**

Question Number	Answer	Acceptable answers	Mark
6 (b)	An explanation linking two of the following • reference to indicator species / organisms (1) • {bloodworm / red worm / sludgeworm} in polluted / dirty water (1) • {stonefly / mayfly / (freshwater) shrimp} in unpolluted /clean water (1)		**(2)**

Question Number		Indicative Content	Mark
QWC	***6 (c)**	An explanation of how eutrophication can cause problems in an aquatic environment including Occurs: • an overuse of nitrate fertiliser • leach / run into the aquatic environment • eutrophication is a build up of nitrates in an environment Problems: • this can cause an algal bloom • the algae will block the sunlight from the plants at the bottom of the lake/river • the plants at the bottom cannot photosynthesise • the plants on the bottom die and start to decompose • decomposers respire while decomposing the dead plants • the decomposers use the oxygen in the water • the water becomes anoxic • aquatic organisms such as fish will die • due to lack of oxygen	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation including one statement of how eutrophication occurs or the problems of eutrophication • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation including two or more statements of how eutrophication occurs or the problems of eutrophication • some of the steps will be missing and not in a sequential order • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation including three or more statements of how eutrophication occurs **and** some of the problems of eutrophication • the steps are identified and most are in a sequential order • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

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Edexcel GCSE

Centre Number	Candidate Number

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Thursday 1 March 2012 – Morning **Time: 1 hour**	Paper Reference **5BI1F/01**

You must have: Calculator, ruler	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 4 0 1 9 5 A 0 1 1 6

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Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Sickle cell disease

1 Sickle cell disease is a genetic disorder caused by recessive alleles.

(a) (i) State the meaning of the word **allele**.

(1)

.....

.....

(ii) Human characteristics are coded for by genes.

Describe where genes are found inside a human cell.

(2)

.....

.....

.....

.....

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

Sickle cell disease causes a change in the shape of the

(1)

☒ **A** lungs

☒ **B** pancreas

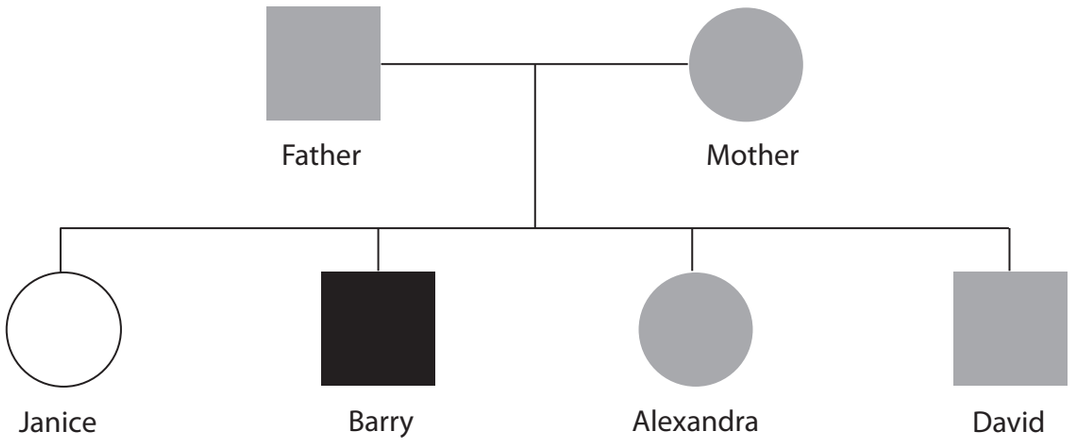
☒ **C** red blood cells

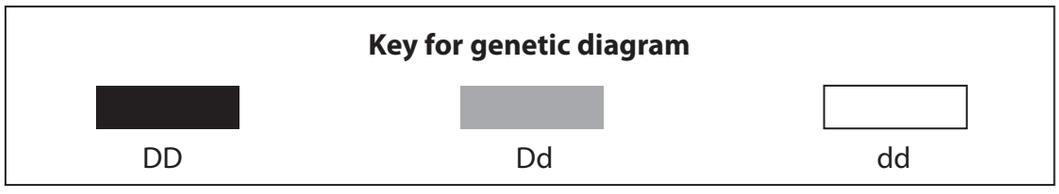
☒ **D** white blood cells

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(b) The diagram shows a family pedigree for the inheritance of sickle cell disease.

The recessive allele for sickle cell disease is **(d)** and the dominant allele is **(D)**.





(i) Explain why David and Alexandra do **not** show the symptoms of sickle cell disease.

(2)

.....

.....

.....

.....

(ii) Explain why there would be no children with sickle cell disease if one of the parents had the genotype DD.

(2)

.....

.....

.....

.....

(Total for Question 1 = 8 marks)

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Disease

2 (a) The female mosquito can carry the *Plasmodium* protoctist.
This protoctist causes malaria in humans.
When the female mosquito breaks the skin of a person the *Plasmodium* is transferred into the blood of that person.



(i) State the name of this type of disease transmission.

(1)

.....

(ii) The survival of the *Plasmodium* is dependent on living in the blood of another species.

This relationship is an example of

(1)

.....

(iii) *Plasmodium* causes an infectious disease.

What is the name given to any disease causing organism?

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

(1)

☒ **A** bacterium

☒ **B** lysozyme

☒ **C** pathogen

☒ **D** virus

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(b) The housefly can also carry disease causing organisms.

Describe how the housefly spreads disease.

(2)

.....

.....

.....

.....

(c) (i) State **one** physical barrier, in the human body, that helps prevent disease.

(1)

.....

.....

(ii) Describe **one** chemical barrier, in the human body, that helps prevent disease.

(2)

.....

.....

.....

.....

(Total for Question 2 = 8 marks)

Variation

3 (a) Scientists investigated one aspect of diet on the growth of six people.
When the six people were babies, they had different masses of calcium in their diets.
The height of each person was recorded when they were 10 and 18 years old.

The results are shown in the table.

person	mass of calcium in each baby's diet / mg per day	height / cm	
		10 years	18 years
1	100	96	156
2	300	99	161
3	500	99	163
4	700	100	175
5	900	98	180
6	1100	99	194

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

The person with the most growth between 10 and 18 years had a daily diet containing

(1)

☒ **A** 300 mg calcium per day

☒ **B** 700 mg calcium per day

☒ **C** 900 mg calcium per day

☒ **D** 1100 mg calcium per day

(ii) Calculate the average rate of growth per year between the age of 10 and 18 for person 3.

(2)

answer = ... cm per year

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(iii) Describe the effect of the mass of calcium in the diet of a baby on their height at the age of 10 and 18.

(3)

.....

.....

.....

.....

.....

.....

(iv) Height can be illustrated by a normal distribution curve.

Give the name of this type of variation.

(1)

.....

(b) Height can be due to environmental and genetic variations.

State **two** causes of genetic variation.

(2)

1 .....

.....

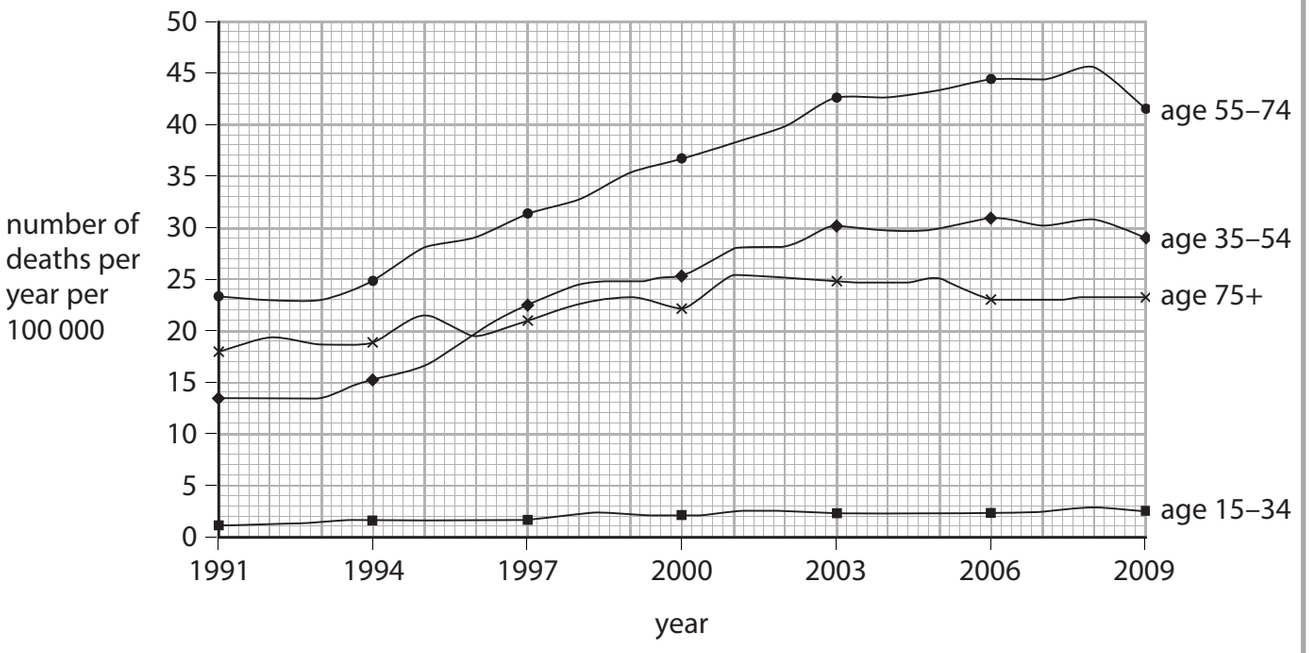
2 .....

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(Total for Question 3 = 9 marks)

Drugs

4 (a) The graph shows the number of alcohol-related deaths in Britain in four age ranges.



(i) Which age range has the highest number of alcohol-related deaths in Britain?

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

(1)

☒ **A** 15–34

☒ **B** 35–54

☒ **C** 55–74

☒ **D** 75+

(ii) Describe the trend shown for alcohol-related deaths in the age range 35–54 years.

(2)

.....

.....

.....

.....

P 4 0 1 9 5 A 0 8 1 6

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(iii) Suggest **one** reason for the reduction in alcohol-related deaths between 2008 and 2009 for 55–74 year olds.

(1)

.....

.....

(b) State the **two** organs in the body most affected by long term alcohol abuse.

(2)

1 .....

2 .....

(c) Explain the effect that alcohol has on the speed of reactions.

(2)

.....

.....

.....

.....

(d) A drug has been developed which blocks the 'feel good' effects of drinking alcohol.

Suggest why this may be beneficial to people with alcoholism.

(2)

.....

.....

.....

.....

(e) Suggest **one** reason why some people disagree with alcoholics being given organ transplants.

(1)

.....

.....

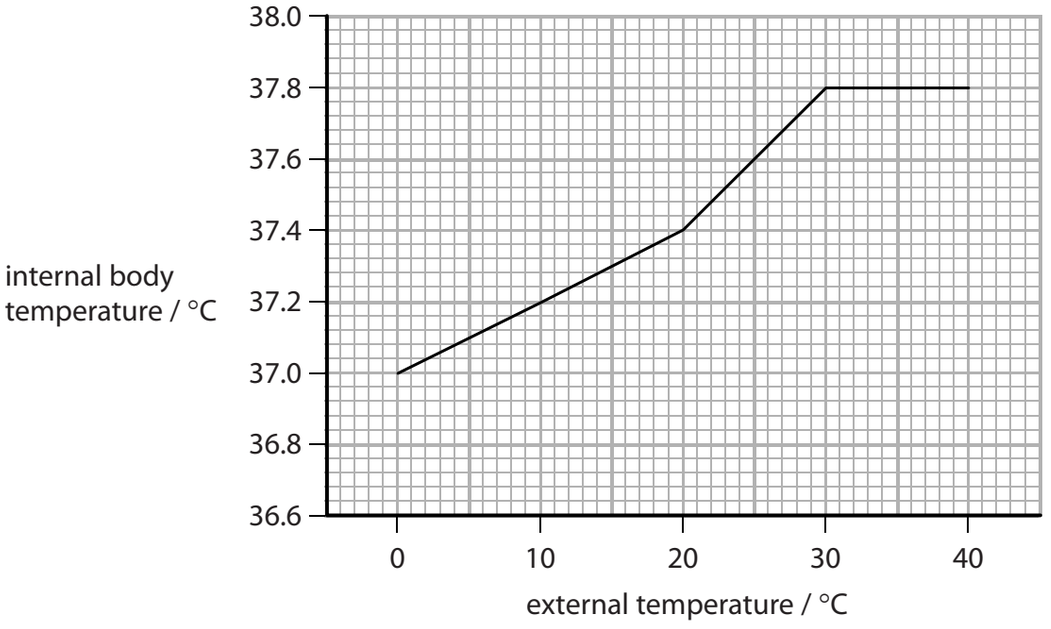
(Total for Question 4 = 11 marks)

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Body temperature

5 A scientist investigated the effect of changes in external temperature on a person's internal body temperature.

The graph shows the results of this investigation.



(a) (i) Calculate the difference in internal body temperature between an external temperature of 20 °C and 40 °C.

(1)

answer = ... °C

(ii) Explain why it is important that body temperature does not rise above 40 °C.

(2)

.....

.....

.....

.....

P 4 0 1 9 5 A 0 1 0 1 6

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

The maintenance of body temperature is an example of

(1)

- ☒ **A** conservation
- ☒ **B** homeostasis
- ☒ **C** hybridisation
- ☒ **D** mutualism

(c) Explain how hair on the skin helps to maintain body temperature in a cold environment.

(2)

*(d) Blood glucose levels also need to be controlled.

Describe how type 1 diabetes and type 2 diabetes are controlled.

(6)

(Total for Question 5 = 12 marks)

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Survival

6 (a) The photograph shows a crocodile holding its mouth open to allow a crocodile bird to feed.



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

This type of symbiotic relationship between two organisms is known as

(1)

☒ **A** eutrophication

☒ **B** mutualism

☒ **C** parasitism

☒ **D** tropism

(ii) Suggest why this relationship is beneficial to the crocodile.

(2)

.....

.....

.....

.....

(b) (i) The crocodile and crocodile bird are members of food chains in a habitat.

State the type of organism that is found at the start of most food chains.

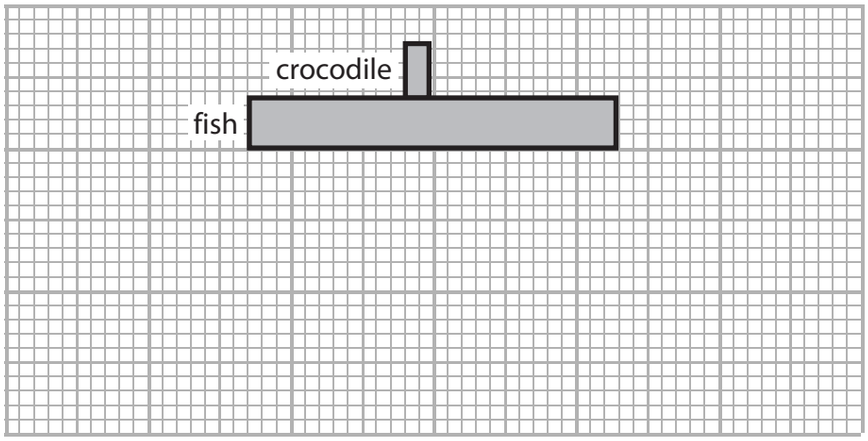
(1)

.....

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(ii) A crocodile can feed on fish.

The diagram shows a pyramid of numbers for this feeding relationship.



Draw, on the grid above, a pyramid of biomass for this feeding relationship.

(2)

*(c) Using examples, explain how the survival of parasites depends on the presence of other species.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

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GCSE Biology
5BI1F/01

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5BI1F/01 Mark Scheme
March 2012

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	a different form of the (same) gene	alternative / varied / type example such as Gg	**(1)**

Question Number	Answer	Acceptable answers	Mark
1 (a) (ii)	a description including the following points • located on / in chromosomes (1) • in the nucleus (1)	on / in DNA	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(a) (iii)	C		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b) (i)	an explanation linking **two** of the following • David and Alexandra are heterozygous / have one dominant and one recessive allele (1) • therefore they are carriers (1) • Sickle cell disease is caused by having two recessive alleles / homozygous recessive / dd (1)	they / both are / Dd they have one dominant allele / D	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	an explanation linking **two** of the following • one parent will not have a recessive allele / d (1) • (therefore) no child can inherit two recessive alleles (1) • child could only be DD or Dd / the children will always have a dominant allele / D (1)	sickle cell disease is caused by **two** recessive alleles / dd	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	(animal) vector	vector borne vector transmission	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	parasitism / parasitic	parasite(s)	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	C		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	A description including **two** of the following points • housefly picks up {organisms from contaminated source / dysentery organisms / disease} (1) • the housefly lands on food / vomits on the food / contaminates surface /skin(1) • which people then eat /touch (1)	fly lands on faeces eq defaecate eq on food / surface	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)(i)	Any **one** of the following points • skin / scab (1) • cilia (1) • mucus(1)	nasal hair eye lids / lashes	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	A description linking **two** of the following points • (hydrochloric) acid (1) • in the stomach (1) **OR** • lysozyme (1) • in tears (1)	saliva	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	D		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a) (ii)	substitution (1) (163 – 99)= 64 evaluation (1) (64) ÷ 8 = 8	give two marks for bald answer	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a) (iii)	A description including **three** of the following points • at age 10 as the mass of calcium increased there is little variation in height (1) • at age 18 / when older / later in life as the mass of calcium increased height increases (1) • the effect of calcium appears to be between 10-18 (rather than at a younger age) (1) • correct manipulation of data (1)	‘as calcium increases, height increases’ give 1 mark	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(a)(iv)	continuous (variation)	(Allow ‘continues’ as spelling error)	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)	Any of the following points • mutations (in genes) / changes in the DNA / genes (1) • sexual reproduction / inherit (genes) from both parents (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	C		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	A description including **two** of the following points • no increase between 1991 to 1993 (1) • a steady increase from 1993/4 to 2003 (1) • levelling off from 2003 to 2008(1) • decrease from 2008 (1)	other correct statement to a given date or range. 'it increases / goes up' = 1mark	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	Any **one** of the following points • health campaigns by the government / more aware (of dangers) (1) • reduction in advertising of alcohol (1) • increase in prices of alcohol (1) • healthcare has improved (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)	• brain (1) • liver (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)	An explanation linking **two** of the following points • alcohol slows speed of reaction / increases reaction times (1) • by reducing the speed at which impulses / messages can be sent (1) • acts as a depressant (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
4(d)	Any **two** of the following • (with no 'feel good' effects there will be) less desire to drink alcohol (1) • alcoholics will drink less (alcohol) (1) • alcoholism will be reduced / reduced need for organ transplants (1) • less physical and emotional damage (1)	Allow "people won't want to drink alcohol anymore"	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(e)	Any **one** of the following points • new organ is likely to be damaged if lifestyle is continued (1) • (not enough donors so) priority should be given to non self inflicted damage (1) • It is an alcoholic's fault that they have a damaged liver (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	0.4 (^{o}C)		**(1)**

Question Number	Answer	Acceptable answers	Mark
5 (a)(ii)	An explanation linking **two** of the following points • body temperature should be at 37 ^{o}C (1) • enzymes work best at optimum temperature (37 ^{o}C) (1) • higher temperatures will denature the enzymes / enzymes won't function / won't work (1) • (therefore) chemical reactions will stop / decrease (1)	Increased risk of dehydration	**(2)**

Question Number	Answer	Acceptable answers	Mark
5 (b)	B		**(1)**

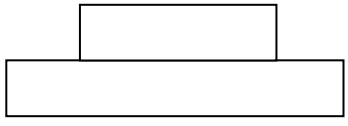
Question Number	Answer	Acceptable answers	Mark
5(c)	An explanation linking **two** of the following points • hair erector muscles contracted / hairs were raised (1) • trapping a layer of (insulating) air (1) • reducing heat loss (by conduction) (1)	**Ignore:** trapping heat	**(2)**

Question Number		Indicative Content	Mark
QWC	***5(d)**	A description including some of the following points • insulin is produced and secreted by endocrine gland (pancreas) **Type 1 diabetes** • type 1 diabetes is caused by a lack of insulin production • type 1 diabetes can be controlled by injecting insulin • into subcutaneous fat **Type 2 diabetes** • type 2 diabetes caused by a resistance to insulin • type 2 diabetes is controlled by balancing physical exercise • and careful consideration of diet • use of medication / drugs to control	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description of one type of diabetes and its' method of control • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description of both types of diabetes with their methods of control • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description of both types of diabetes with their methods of control • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	B		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	a suggestion including the following points • the crocodile gets the food removed from its teeth / teeth cleaned / mouth cleaned (1) • (so) less chance of tooth decay, gum disease or dental caries / infection (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
6(b)(i)	(green)plant / producer / plantae	any named plant	**(1)**

Question Number	Answer	Acceptable answers	Mark
6(b)(ii)	a drawing including the following points • crocodile pyramid of biomass block larger than pyramid of number block (1) • both pyramid of biomass blocks (fish and crocodile) must be the same height (+/- 1 small box) (1)	(crocodile must be on the top level)  **Ignore:** triangle shape	**(2)**

Question Number		Indicative Content	Mark
QWC	***6(c)**	An explanation including some of the following • a parasite is an organism which depends on a host for its survival • without the host benefiting • fleas and headlice • these feed on the blood of other organisms • tapeworms • their action on the human alimentary canal • mistletoe • with its parasitic effect on the trees it inhabits • how parasitic behaviour can result in the destruction of the organism they prey upon • parasite numbers depend on numbers of host	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation of parasitism with no example provided or an example with no explanation • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation of parasitism with at least one example provided • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation of parasitism with at least two example provided • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

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Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Biology/Science

Unit B1: Influences on Life

Foundation Tier

Tuesday 8 November 2011 – Afternoon **Time: 1 hour**	Paper Reference **5BI1F/01**

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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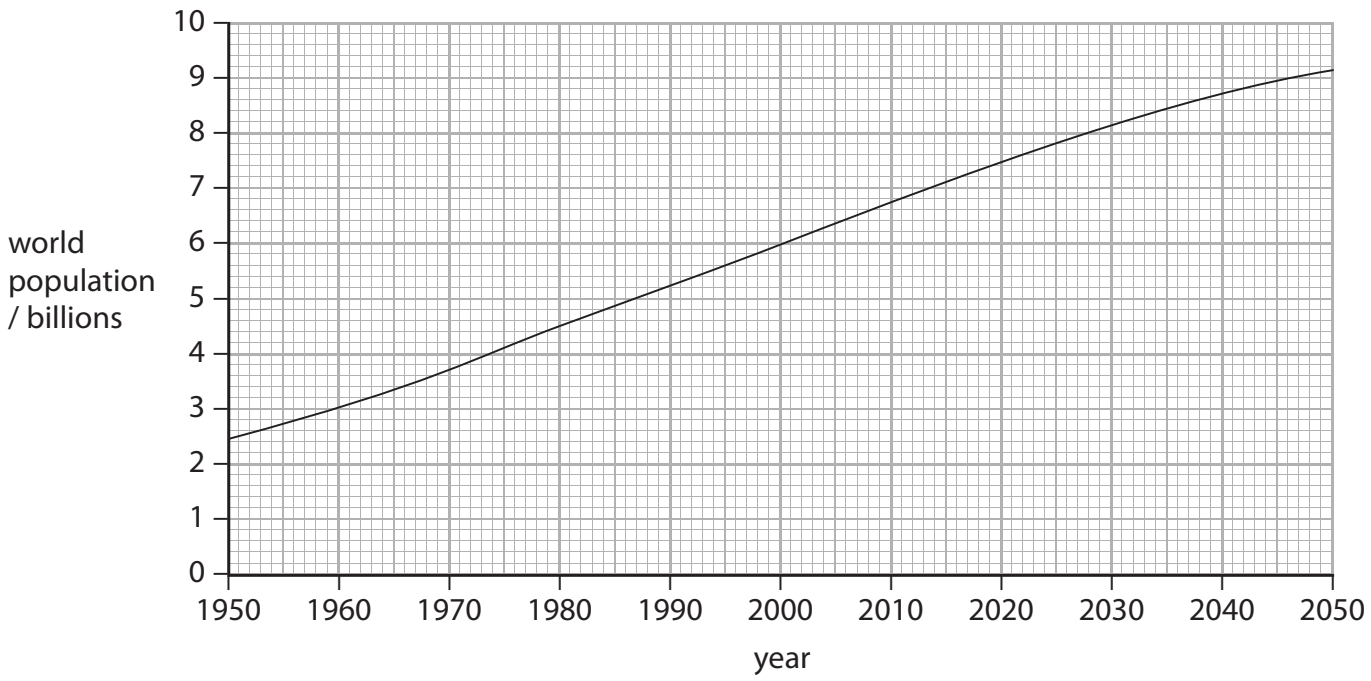
Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Population change

1 (a) The population of the world is changing.

The graph shows this change between 1950 and 2010. An estimate of the changes between 2010 and 2050 is also shown.



(i) State the general trend shown in the graph between 1980 and 2000.

(1)

.....

.....

(ii) Calculate the difference in world population between 1980 and 2000.

(2)

answer = ... billion

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

An increasing population will create an increasing demand for fossil fuels.

The burning of fossil fuels can pollute the environment by releasing more

(1)

☒ **A** nitrogen

☒ **B** oxygen

☒ **C** sulphur dioxide

☒ **D** water

(b) The concentration of carbon dioxide in two areas of a rainforest was measured. Each measurement was taken three times.

Area A was full of large trees and area B was an area where most of the trees had been removed.

area	carbon dioxide concentration (%)			
	1	2	3	Mean
area A	0.025	0.028	0.022	0.025
area B	0.036	0.031	0.032	

(i) Calculate the mean carbon dioxide concentration in area B.

(2)

mean carbon dioxide concentration = ... %

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(ii) Explain why all the carbon dioxide concentration readings for area B are higher than for area A.

(2)

.....

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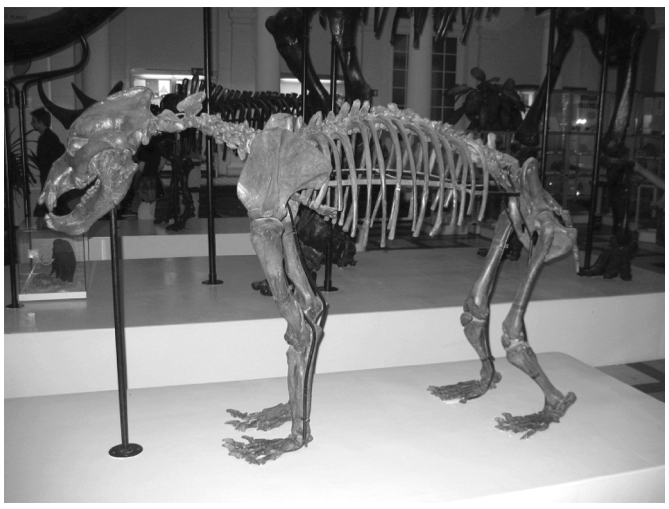
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(Total for Question 1 = 8 marks)

Classification

2 Fossils of the Cave Bear, shown in the photograph, have been found in Devon.
The Cave Bear was an omnivore. It ate animals, grass and berries.
The Cave Bear is classified as a member of the family Ursidae.



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

All organisms in the family Ursidae belong to the kingdom

(1)

☒ **A** Animalia

☒ **B** Plantae

☒ **C** Prokaryotae

☒ **D** Protoctista

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(b) The Cave Bear was assigned the binomial name *Ursus spelaeus*.

Use words from the box to complete the sentence about the classification of the Cave Bear.

(2)

genus	family	species
order	phylum	

Ursus refers to the ..... that the Cave Bear belongs to and

spelaeus indicates the ..... of the Cave Bear.

(c) All organisms from the family Ursidae are vertebrates.

Using the information in the photograph, explain why scientists classified the Cave Bear as a vertebrate.

(2)

.....

.....

.....

.....

(d) It is thought that the Cave Bear may have become extinct due to human activities.

Suggest how natural selection can result in the extinction of a species.

(3)

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(Total for Question 2 = 8 marks)

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Plant growth hormones

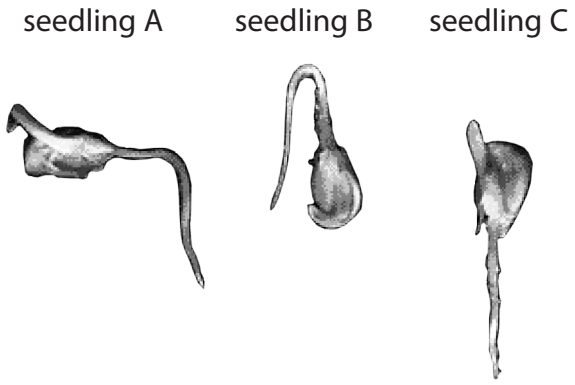
3 The photograph shows the results of an experiment in which seedlings A, B and C were left to grow for one week.

The roots of seedlings A, B and C all began to grow downwards.
The seedlings were then rearranged.

Seedling A was placed horizontally.

Seedling B was placed vertically upwards.

Seedling C was left to grow pointing downwards.



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

The change in direction of the growth of the roots is due to

(1)

☒ **A** gravitropism

☒ **B** germination

☒ **C** phototropism

☒ **D** pollination

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(ii) Compare the direction of growth of the roots in the seedlings.

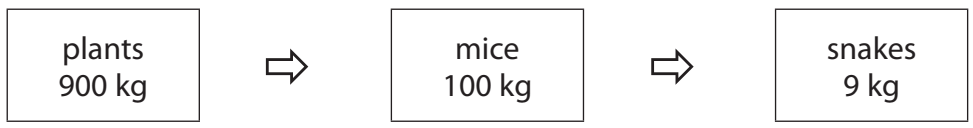
(2)

(iii) Explain what happened to the cells in the root of seedling A to cause the change in direction of growth.

(3)

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(b) The plants developing from these seedlings are part of a food chain.
The diagram shows the biomass of the organisms in this food chain.



(i) Using the data in the food chain, draw a pyramid of biomass for this food chain.

(2)

(ii) Explain why all the biomass in the plants does not get passed to the snake.

(2)

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(Total for Question 3 = 10 marks)

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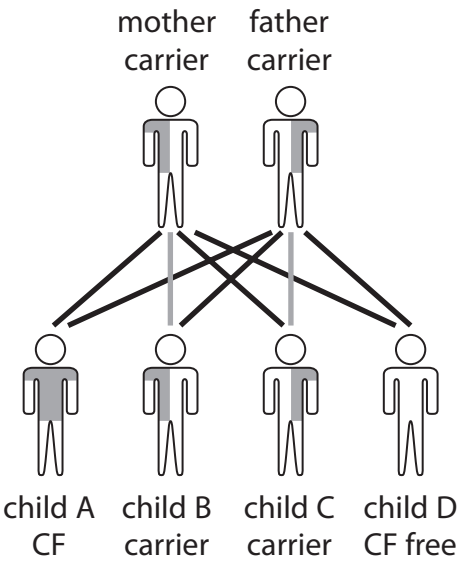
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Turn over for Question 4

Inheritance

4 The diagram shows the genetic inheritance of cystic fibrosis (CF) in a family.

Cystic fibrosis is a genetic disorder caused by the CF recessive allele.



(a) (i) What is an allele?

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

(1)

☒ **A** a change in a chromosome

☒ **B** a characteristic caused by a gene

☒ **C** an alternative form of a different gene

☒ **D** an alternative form of the same gene

(ii) Both parents are carriers of the CF allele.

State the term used to describe an individual who is a carrier and has both a dominant and a recessive allele.

(1)

.....

.....

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(b) Use words from the box to complete the following sentences.

(2)

nucleus	cytoplasm	alleles
chromosomes	cell wall	DNA

Genes are found on structures called ..... .

These are found in the ..... of a cell.

(c) (i) Complete the Punnett square to show how cystic fibrosis is inherited if both parents are carriers (Bb).

(2)

		Mother	
		B	b
Father			

(ii) Give the percentage chance of a child being a carrier of CF when both parents are carriers of CF.

(1)

.....

(d) Describe how cystic fibrosis can cause problems with the absorption of food and oxygen in a person with this disorder.

(3)

.....

.....

.....

.....

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(Total for Question 4 = 10 marks)

Reaction time

5 (a) The effect of caffeine on reaction time was investigated.
A person was given a drink and then their reaction time was measured.

drink	reaction time/ms
cola with caffeine	198
cola without caffeine	250
water	254

(i) State the effect of caffeine on reaction time.

(1)

(ii) Explain the effect of caffeine on reaction time.

(2)

(iii) Explain why water was one of the drinks used in this investigation.

(2)

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

Alcohol is another substance that can affect reaction time.

(i) Alcohol is an example of a

(1)

☒ **A** depressant

☒ **B** hallucinogen

☒ **C** painkiller

☒ **D** stimulant

***(ii)** Describe the short term and the long term effects of alcohol abuse.

(6)

(Total for Question 5 = 12 marks)

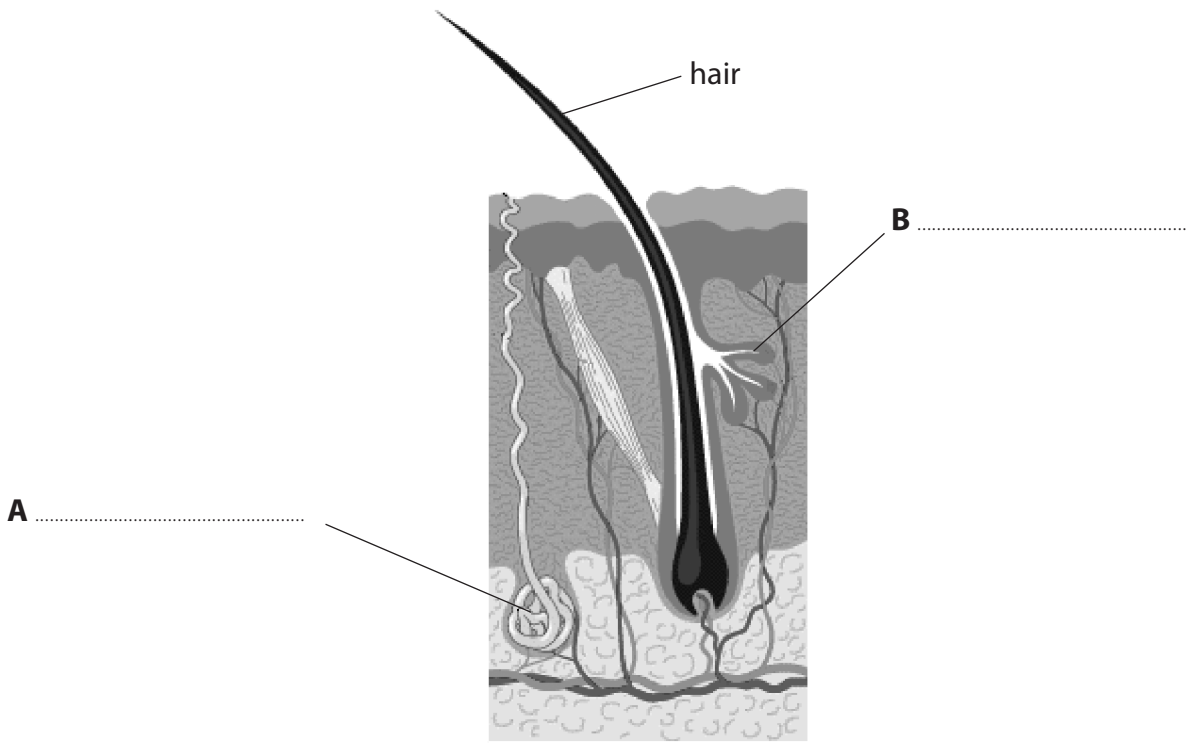
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Skin

6 (a) (i) The diagram shows a cross section of the skin.

Name the parts labelled **A** and **B** on the diagram.

(2)



(ii) Explain the role of the part labelled **A** in regulating body temperature.

(2)

.....

.....

.....

.....

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

Human body temperature is controlled by the

(1)

☒ **A** brain

☒ **B** heart

☒ **C** lungs

☒ **D** stomach

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(c) Temperature regulation is one way in which humans keep a constant internal environment.

State the term used to describe the maintenance of a constant internal environment.

(1)

.....

*(d) If a person is badly burnt the hairs on the skin are lost and blisters can cover the surface of the skin.

Explain how burns to the skin affect temperature regulation in the human body.

(6)

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(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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Mark Scheme (Results)

November 2011

GCSE Biology
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5BI1F/01 Mark Scheme
November 2011

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	increase (in world population)	**Ignore** bald numbers	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	(2000) 6.0 (1980) 4.5 (1) = 1.5 (billion)	Range of 5.9 to 6.1 (for 2000) Range of 4.4 to 4.6 (for 1980) Give full marks for correct answer of 1.5 (billion). If any other answer is provided, within above ranges, it must have calculation shown e.g. 1.7 (billion)	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	C		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	(0.036 + 0.031 + 0.032) = 0.099 (1) $\frac{0.099}{3}$ = 0.033(%)	Give full marks for correct answer with no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	An explanation linking **two** of the following points: • fewer trees in area B (than in area A)(1) • less photosynthesis occurring in area B (than in area A) (1) • less CO_2 removed from atmosphere in area B (than in area A) (1)	**Ignore** no trees	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)	A		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	• genus (1) • species (1)		**(2)**

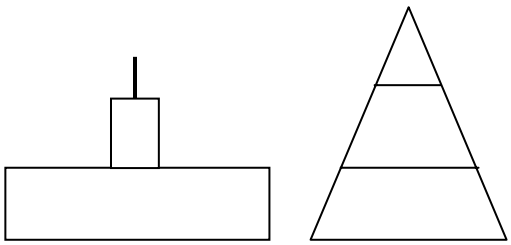
Question Number	Answer	Acceptable answers	Mark
2(c)	An explanation including the following points: • the Cave Bear has a backbone (1) • this is characteristic of vertebrates (1)	Accept vertebrae / spine / supporting rod for backbone **Ignore** spinal cord Accept member of chordata	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(d)	An explanation including the following points: • competition for resources (such as food / shelter) / other organisms were better at competing for resources (1) • increased number of predators(1) • if there was environmental change the species may not have been able to adapt (1)	Accept humans used caves eq Accept humans as predator/hunter Accept humans changing the environment and other species unable to adapt	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	A		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	A comparative statement linking the following points: • the root of seedlings A and B changed direction in order to grow downwards / towards gravity(1) • the root of seedling C continued to grow downwards (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)(iii)	An explanation linking three of the following points: • root A began to grow downwards in response to gravity (1) • this is **positive** gravitropism / geotropism (1) • due to the effect of **auxin** (1) • auxin / hormone inhibits growth on underside of the root / stimulates growth on upper surface of root / one side of root (and therefore bends downwards) (1) • by the cells on the upper surface elongating (1)	Accept gravitropism/geotropism for downwards in response to gravity **Ignore** references to light / phototropism	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	• pyramid shaped (1) • accurate proportion (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	An explanation linking two of the following points: • not all of the plant material / mouse is eaten by the mouse / snake (1) • mouse respires / movement eq (1) • mouse excretes / some plant material not digested (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	D		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	heterozygous	Accept recognisable spelling	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)	• chromosomes (1) • nucleus (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	<table><tr><td></td><td>B</td><td>b</td></tr><tr><td>B</td><td>BB</td><td>Bb</td></tr><tr><td>b</td><td>Bb</td><td>bb</td></tr></table> correct father gametes (1) correctly completed Punnett square (1)	Accept male gametes are reversed e.g. bB	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c) (ii)	50%	Accept “fifty per cent” Do not accept ratios/fractions	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(d)	A description including **three** of the following points: • cystic fibrosis causes thick / sticky mucus (in the digestive system and the lungs) (1) • this can coat the lining of the lungs (and reduce oxygen absorption across the lungs)(1) • because the surface area of the lungs are reduced (1) • (the mucus can reduce food absorption) by blocking the pancreas (where enzymes are produced) (1) • the enzymes cannot then break down the foods to be absorbed (1)	mucus builds up clog the lungs **Ignore** references to throat damage to intestine Accept other correct description of CF problem related to absorption of food and oxygen	**(3)**

Question Number	Answer	Acceptable answers	Mark
5a(i)	decreased reaction time / reaction time became quicker / increased speed of reaction (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
5a(ii)	An explanation linking the following points: • caffeine (is a drug that) acts as a stimulant (1) • speeds up (nerve) impulses (across synapse) (1)	 Accept messages, signals Neurotransmitters 'move' faster	 **(2)**

Question Number	Answer	Acceptable answers	Mark
5a(iii)	An explanation linking the following points: • water acted as a control experiment (1) • to see if the stimulant was in the cola (1)	 Accept for comparison / to show difference between Accept water does not have caffeine **Ignore** it has no sugar / water does not cause a reaction	 **(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	A		**(1)**

Question Number		Indicative Content	Mark
QWC	***5(b)(ii)**	A description including some of the following: • alcohol is a drug • alcohol changes the way that the body works • alcohol is known as a depressant **Short term:** • eyes/brain affected by blurred vision, dizziness, memory loss • lowering of inhibitions (can lead to accidents), act differently, mood change • slower reaction times (can lead to accidents) • after effects of excess e.g. hangover, headaches **Long term:** • liver damage, liver cancer, cirrhosis • (ethics of) liver transplants for alcoholics • brain damage • effects on society described e.g. crime, anti-social behaviour rates • alcoholism, addiction • implications during pregnancy	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description of either short term or long term effects of alcohol abuse • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description of both the short term and long term effects of alcohol abuse. • the answer is structured in such a way to make the short term and long term effects clear. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description of both most short term and long term effects of alcohol abuse including how alcohol affects the nervous system • the answer is structured in such a way to make clear the short term effects, long term effects and effects of alcohol on the nervous system. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	A – sweat gland B – sebaceous gland		**(2)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	Any two of the following points: • (gland) releases sweat / water (and salts) (to the skin surface) (1) • (water) evaporates, (1) • removing heat from the skin (1)	Accept cools the skin / body	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(b)	A		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(c)	homeostasis	Accept recognisable spelling	**(1)**

Question Number		Indicative Content	Mark
QWC	***6(d)**	An explanation linking some of the following: • nerve endings in the skin will not respond to hot or cold external environments • damaged or blocked sweat glands will not produce sweat to cool the body down • less evaporation of the water in sweat to remove heat • blood vessels in the skin maybe affected • unable to deliver more blood to the skin to lose heat (vasodilation does not need to be mentioned) • blood vessels unable to constrict (vasoconstriction does not need to be mentioned) to conserve heat • no hair so no layer of insulating air to conserve heat • increased chance of infection leading to fever	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation of one mechanism of temperature regulation that is affected by severe bums • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation of two of the mechanism of temperature regulation that are affected by severe bums • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation of more than two mechanisms of temperature regulation that are affected by severe bums • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

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