

Examiners' Report
June 2013

GCSE Biology 5BI1F 01

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Introduction

This paper was aimed to test candidates in a number of manners. Question topics ranged from human thermoregulation to taxonomic classification and from human reactions to drugs to ecosystem interactions; a wide array of syllabus areas to stretch and challenge. The question styles also aimed to allow candidates to feel comfortable in their answers yet challenge some of the more able in terms of the Quality of Written Communication (QWC) in the longer style answers.

The Question Paper was drawn up in order to gain a sense of in-depth knowledge from candidates yet also allow candidates who lacked the knowledge to score marks and attempt the majority of question areas.

Questions contained a range of command words including, 'explain', 'describe', 'calculate' and 'suggest'. It was pleasing to see that many candidates have grasped how to answer these questions.

Question 1 (a)

This question invited candidates to look at the stimulus diagram of a section of skin with a sweat gland labelled and explain how the sweat gland helped cool the body. Many candidates recognised the need to state that the sweat gland produced a liquid called sweat. The evaporation of this sweat was also credit-worthy but was seen rarely. This was disappointing as this is a popular topic area for questions on the foundation tier papers.

There was also credit for stating that the sweat rose to the surface of the skin, thus candidates had analysed the diagram with detail.

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

(2)

The sweat gland produces the sweat, which comes through tiny holes in the skin and evaporates on the surface of the skin.



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Examiner Comments

This candidate has scored 2 marks here for stating that sweat is produced and that it will evaporate.

It is important to note here that candidates must attempt to communicate on a logical and literate manner with clear handwriting.

Question 1 (b)

This question invited candidates to link a keyword with its definition. The definition 'maintenance of a stable internal environment' should have been linked to the keyword 'homeostasis'.

(b) Draw **one** straight line from the definition to the keyword. (1)

definition	keyword
maintenance of a stable internal environment	homeostasis
	cystic fibrosis
	photosynthesis
	diabetes



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Candidates must remember that only one line should be drawn from each box from left to right. Too many candidates continue to draw more lines than is asked for in the questions.

This candidate has answered the question correctly for one mark.

Question 1 (c) (ii)

This question invited candidates to explain how shivering aided thermoregulation. Candidates were expected to state that shivering is a process of muscle contraction (emphasis made on the word contraction) and that this produced heat and subsequently warmed the body.

Few candidates recognised this. Many stated that shivering allowed hairs to be raised on the skin; this is simply untrue. Many also stated that blood was permitted to travel around the body quicker and therefore warming the body; again no credit was given for these ideas.

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

(2)

Shivering is a movement which therefore makes the body use energy which creates heat which therefore helps the body get warmer which helps regulate body temperature when you are cold.



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Examiner Comments

This is a simple response with the candidate being awarded 2 marks for stating that shivering creates heat and this warms the body. "Shivering is a movement" did not score any marks as muscle contraction was specified in the mark scheme.

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

(2)

When you shiver your muscles are contracting so when they shiver it's warming your muscles, to warm up your body.



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Examiner Comments

Muscle contraction was credited here which was pleasing, yet rarely seen. Warming the body was also worthy.

Question 1 (c) (iii)

This question invited candidates to describe how body hair helped thermoregulation in the human body. Many candidates successfully recognised that hairs were raised; but once again, as in previous series, candidates failed to convey the principle of air being trapped and acting as an insulator. The mark scheme also included the idea of hair erector muscles contracting; although this was rarely seen.

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

(2)

The erector muscles make the hairs on our body stand up, when they are stood up they tilt slightly, this traps a layer of warm air.



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Examiner Comments

This was a pleasing response as the candidate has stated that erector muscles (mp1) allow hairs on the body to stand up (mp2). They have scored 2 marks for that alone but have gone on to state that this traps a layer of air. A very good answer.

Question 2 (a) (ii)

This question invited candidates to show how to calculate a percentage (20%) of a number (5000). If a candidate stated in their calculation the number 20% this was credited for one mark as they had extracted the correct data from the pie chart; if they then had calculated the answer 1000 this was worthy of 2 marks.

Even if the candidate had not used any workings yet placed the answer 1000 on the answer line they would still have scored 2 marks.

(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.

$$5000 \div 20$$

(2)

answer = 280 people



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Examiner Comments

This candidate scored one mark as they had extracted the correct data from the pie chart but conducted the incorrect calculation to end up with the incorrect answer.

Question 2 (a) (iii)

This question invited candidates to explain how smoking tobacco can cause cancer. Examiners were expecting to see answers that suggested that tobacco contained tar and that this tar was a carcinogen that could cause mutations in the human body.

Pleasingly, many candidates stated that tobacco contains tar; however the majority of candidates failed to take this one step further for the additional mark available.

(iii) Explain how smoking tobacco can cause cancer.

(2)

tobacco has a carcinogen called tar inside of it and tar blocks the arteries therefore causing cancer.



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Examiner Comments

This candidate has stated that tar is a carcinogen for early credit in their answer. The incorrect information later in their answer was ignored.

Question 2 (b) (ii)

This question invited candidates to describe how caffeine can affect the human body. Many candidates stated that caffeine allowed individuals to remain awake or alert; this was an extremely basic answer that was credit-worthy. More technical answers required candidates to state that the brain was affected or the CNS affected together with the idea that reaction times were reduced somehow. Few candidates made reference to the fact that synapses were stimulated which was disappointing.

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

(2)

It speeds up reactions between synapses and causes your reaction times to ~~exist~~ quicken and your heart beat to speed up.



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Examiner Comments

A very good response here which scores many of the mark scheme points. The candidate has stated that reactions speed up, they have also made reference to the idea of synapses. The heart beat increasing was ignored.


Question 3 (a) (ii)

This question invited candidates to draw two lines, one from each part of the binomial name, to the correct classification description.

Not too many candidates drew more than two lines, but many candidates failed to recognise that 'Russula' is the genus and 'silvicola' is the species classification.

Draw **one** straight line from each part of the binomial name to its classification. (2)

binomial name		classification	
<i>Russula</i>		species	
		family	
<i>silvicola</i>		phylum	
		genus	
		order	



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Examiner Comments

Here is an example where a candidate has scored one mark. They have clearly crossed out the line they did not want marking and placed a new line in its place.

Question 3 (b)

This question invited candidates to state two characteristics of the kingdom Plantae. The five chosen features examiners were expecting to see were the fact that plants photosynthesise, they feed autotrophically (or 'make their own food'), contain chloroplasts or chlorophyll, possess cell walls or that plantae members are multicellular.

It was pleasing that many candidates stated at least two of these.

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

(2)

1. they make their own food by Photosynthesis
2. multicellular and have chlorophyll and a cell wall.



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Examiner Comments

This candidate has stated all 5 of the features that examiners were expecting to see. Although this is not advisable as the question only asks for two, this candidate scored both marks.

Question 3 (c) (i)

This question invited candidates to place two words in the spaces provided from a possibility of six words. Nearly all candidates placed the correct word 'backbone' for the second missing word; however there was some confusion from many candidates regarding the first word with only a few placing the word 'Chordata' here.

Use words from the box to complete the following sentence.

(2)

Chordata	chromosome	backbone
Prokaryote	Protoctista	cell

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



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Examiner Comments

This was pleasing to see as this candidate has placed both correct words in the spaces provided. Many suggested one of the other words for the first missing line, but pleasingly this candidate did not merely guess it would be assumed.

Question 3 (c) (ii)

This question invited candidates to state three structures that allowed vertebrate organisms to absorb oxygen from their surroundings. The three answers examiners were expecting were either 'lungs', 'gills' or 'skin'. The marks scheme did not expect candidates to link the structure with a vertebrate species, just merely state the structure. Many candidates did very well here with the majority stating that lungs were used. Gills was seen many times; however 'through the skin' was rarely credited.

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

(3)

vertebrate organisms can absorb oxygen from
lungs, gills & skin



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Examiner Comments

A very simple response that is worthy of three marks. The candidate has stated that lungs, gills and skin are all used by vertebrate organisms.

Question 4 (a) (i)

This question invited candidates to state the name of the pathogen that caused cholera. Simply, candidates were expected to place the word "bacteria" down; however many stated that cholera was a "water-borne pathogen" and this is not the same as the pathogen type.

4 Cholera is a disease caused by a pathogen.

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

(1)

virus



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Examiner Comments

Too many candidates answered with different pathogens such as virus, fungi or water borne, as seen here. Only bacteria was credited.

Question 4 (b) (i)

This question invited candidates to describe the trend shown in the maps in terms of the change in cholera cases that had been recorded. The answers credited included "cases had increased" "cholera has spread as the years had gone by" - or any notion to suggest that cholera was more numerous as times had got more recent. This was a simple item to answer, yet there were many variations to the correct answer.

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

(1)

As the years go by the amount of cholera recorded increased



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Examiner Comments

This candidate has conveyed their answer extremely clearly and therefore this was simple to mark. The number of cases of cholera recorded had increased as the years "go by". A pleasing answer.

Question 4 (b) (ii)

This question invited candidates to suggest two reasons why the numbers of recorded cases had increased. This, being a 'suggest' question, allowed many ideas or concepts. These included the idea that more travel was occurring / migration had increased in the recent times or that the access to clean water was restricted in the area (this could have been due to drought or famine or a natural disaster). Candidates could have also suggested that cholera bacteria had become more resistant in recent times. All worthy of credit; however, this question was relatively poorly answered.

(ii) Suggest **two** reasons for this trend. (2)

1. People who are infected travelling
2. Diseases is becoming immune to antibiotics.



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Examiner Comments

This candidate has scored both marks for suggesting that people who are infected will travel and thus pass on their disease. The candidate has also stated that the disease has become "immune" to antibiotics and therefore it was felt that this was enough to award the "resistant" marking point from the mark scheme.

Question 4 (c)

This question invited candidates to explain how physical barriers can help the body prevent infection. The mark scheme expected candidates to state the barrier and how it prevented the infection from entering the human body. The skin was one barrier; yet the mark scheme expected candidates to state that it prevented entry as it had many layers or it was a boundary between the blood and the external environment. Scab formation was also credit worthy as well as cilia and mucus having the ability to trap pathogens before they entered the human body.

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

(3)

Your eyes have liquid that stops pathogens entering. Your lungs are lined with mucus and hairs. You when you get a cut blood clots to stop pathogens getting in. The mucus and hairs in lungs trap pathogens in them. Your skin stops pathogens entering the blood.



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Examiner Comments

An extremely pleasing response which places emphasis on many of the mark scheme points. The candidate has stated that blood can clot to stop pathogen entry, mucus will trap pathogens and that the skin will also stop pathogen entry.

Question 4 (d)

This question invited candidates to state the names of two chemicals that are used to control infection. The mark scheme was generous here as it allowed candidates to state any chemical that did in fact control infections ranging from 'alcohol' and 'antiseptics' to 'antibiotics'. Antibiotics was clearly the most popular answer for this question.

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

(2)

1. Lysozyme
2. antibiotics



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Examiner Comments

This candidate has stated a chemical that is inside the human body and this was acceptable. Lysozymes in tears and hydrochloric acid were two credit worthy responses.

As seen here also, antibiotics was a popular response amongst candidates.

Question 5 (a) (i)

This question invited candidates to provide an answer that went beyond merely stating that the blood glucose increased and decreased over the 8 hour time period but also quantifying the increase or decrease. Figures were required from the graph to secure both marks.

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

As the person ~~eat~~ ^{with} diabetes eats the ⁽²⁾ meal the blood glucose concentration goes up very high to around 360mg and then deduces very slowly.



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Examiner Comments

This candidate has quantified their answer with the number 360mg of blood glucose and also stated that the blood glucose rises and decreases also. A well articulated answer worthy of both marks.

Question 5 (a) (ii)

This question invited candidates to calculate the difference in blood glucose between the person with diabetes and the person without two hours after consuming the meal. The majority of candidates merely stated the answer 250 for two marks automatically.

Some, more pleasingly, provided working calculations to show that $350 - 100$ is in fact 250.

If a candidate had stated anything other than 250 then any working calculations were viewed and if their answer was correct in terms numbers between 100 and 350 then credit was given (but only one mark maximum).

Question 5 (b)

This question invited candidates to name the organ that released insulin into the body in order to regulate blood glucose concentrations. Many candidates stated the organ 'pancreas' which was very pleasing; however, some candidates also became confused by stating the organ 'liver'. This was deemed an easy error to make on this question.

Question 5 (c)

This question invited candidates to give some in-depth knowledge to the topic base of tropisms in plants in regards to growth hormones. Many candidates were able to recognise that plant growth direction will be stimulated by auxin and that shoots will bend towards any light source being used. This would have allowed candidates to secure Level 1 scoring band with 2 marks associated with this. Any candidates who also stated a second growth tropism process (gravitropism) was able to raise their marks into Level 2 (thus 4 marks). If a candidate was able to comment in detail about phototropism and gravitropism (with comments of auxin use and elongation) then this was sufficient to raise their marks into Level 3 (thus 6 marks maximum).

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

Explain how growth hormones cause phototropism and gravitropism in plants.

(6)

Auxin is a plants growth hormones. It is in roots and shoots of plants. Hormone in roots causes gravitropisms (plants grow down, through the soil) and hormone in shoots causes phototropism (plant grows towards the Sun). In ^{roots} ~~shoots~~ side which is at the bottom grows slowly because there is more hormones, then sides at the top grows faster and ^{roots} ~~shoots~~ grow ^{to} down. In shoots auxin make growing faster and it is on darker side of a plant. That makes ~~the~~ that darker side grow faster and plants grows toward the Sun. Gibberlin is a second plant growth hormone which makes that plants' shoots and flowers grow faster.



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Examiner Comments

This response was awarded 6 marks as the candidate has stated that phototropism is a growth response in which shoots grow towards the light and that roots will grow down through the soil in a process called gravitropism. The candidate has also gone into detail about how each of these responses occurs with auxin being responsible for elongation on shaded shoots.

This is a very pleasing and detailed response.

Question 6 (a) (i)

This question invited candidates to calculate the difference in biomass between two species in the food chain with figures provided in the table. Candidates scored 2 marks automatically if they had correctly answered 950g.

If candidates had stated anything different to this then as long as the two numbers had been lifted from the table, one mark could be awarded, if the answer was obviously correct for the numbers they had lifted.

(a) (i) Calculate the difference in biomass between the aphids and the ladybirds. (2)

1000
50
answer = 20



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One mark was awarded here as the candidate had extracted the correct figures from the table, yet the calculation was unfortunately wrong.

Question 6 (a) (ii)

This question invited candidates to suggest how energy is lost through a food chain. Many answers could be credited such as energy loss from excretion, digestibility, respiration, movement or thermoregulation. Many candidates stated that movement was the main reason for energy losses. Any other answer was rarely seen.

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

Suggest how this energy is lost between each trophic level.

(2)
not all of the energy in each organism is consumed by its predator because they differ in size, capacity and preferences



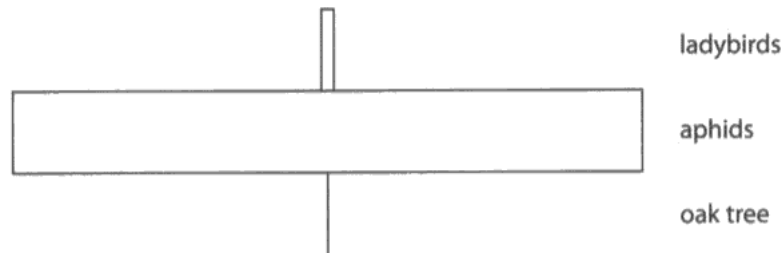
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Examiner Comments

Not all of the organisms is consumed is a variation on "not all of the organisms is eaten / digestibility" marking point. It has to be remembered that many different candidates will state very many different variations on the mark scheme.

Question 6 (a) (iii)

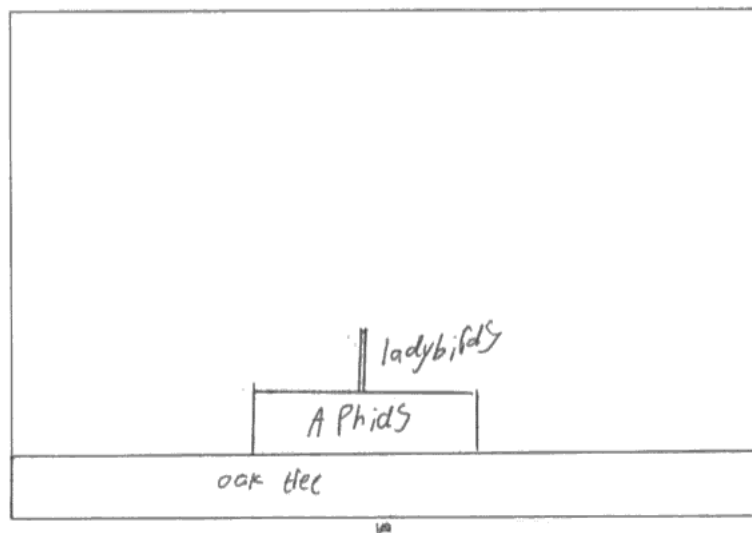
This question invited candidates to draw a pyramid of biomass for the organisms in question. The pyramid of number was provided above; however, this was still a complex item for candidates to secure full marks. The mark scheme expected candidates to draw a pyramid where each block was less than half the block below in size. Unfortunately, this was rarely seen. Many candidates could have secured the mark if it wasn't for incorrect labels assigned to each block.

(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)



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This was pleasing to see. The blocks may not be to scale, yet each block is well less than half of the block preceding it. Therefore the mark was awarded.

Question 6 (b) (i)

This question invited candidates to state the process in which plants remove carbon dioxide from the atmosphere. There is only one answer that can be credited here which was 'photosynthesis'. The spelling of photosynthesis varies enormously in the responses seen throughout the marking period and as long as the spelling / word was recognisable to the word 'photosynthesis' then the mark was awarded.

Question 6 (b) (ii)

This question invited candidates to explain how recycling can benefit the environment. The recycling of paper and plastics were highlighted in the question. Candidates scored well here with an average of 2-4 marks. To score 2 marks candidates were expected to make a limited explanation of one type of recycling, be it paper or plastic. The majority of candidates mentioned deforestation as the main issue due to a lack of paper recycling. To secure 4 marks the candidates were expected to make a detailed explanation of one type of recycling or a simple explanation of both paper and plastic. The majority of 4 mark responses concentrated on both paper and plastic recycling. 6 marks were rarely seen however, it was expected that a detailed response of both types of recycling would be credited at Level 3, 6 marks.

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

(6)

if you recycle paper and plastic you are helping to not fill land fill sites so quickly. If you were to burn them you would be sending CO₂ gasses into the air along with other green house gasses causing pollution. By recycling you are also conserving the worlds resources which we are running out of fast. Further more you are saving energy. If we do not recycle paper ~~to~~ Deforestation will happen which means less oxygen because trees use photosynthese to give us oxygen.

(Total for Question 6 = 12 marks)



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Examiner Comments

A very detailed commentary on both paper and plastic recycling which focusses upon landfill site issues, the burning of paper and plastic releasing emissions into the air, resource conservation, energy saving and deforestation.

The quality of written communication (QWC) is important to remember for candidates also. Any answer that can be read easily with few errors in spelling / grammar and punctuation will be awarded the higher mark of the marking Level.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- Always provide calculations with any mathematical item. If the answer is incorrect then the calculation may be worthy of credit.
- Understand the meaning of the command words. A describe item will always be marked as this; likewise an explanation item will always be marked as this.
- Always note how many marks are available for the question. If there are two marks available, then the likelihood is that two separate points are expected.

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