

Examiners' Report
June 2016

GCSE Biology 5BI1F 01

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Introduction

This paper is the tenth paper in this series for the Science Specification for first teaching 2011. The paper assesses a variety of different Biological aspects from Adaptation to Genetics and from the Nervous System to Disease.

Overall, it is pleasing to state that candidates have performed well on the areas of the syllabus that have been assessed in previous examination series; thus reading and learning from the previous examiners reports. This is especially true for the BMI calculations and the complex genetic explanations for cystic fibrosis inheritance. However, it must also be stressed that candidates do make simple errors on the calculations and they lack appreciation for showing how they calculated their answers - which inevitably loses them marks. These issues have been highlighted in this report.

It is also pleasing to witness many candidates scoring higher marks on the 6 mark extended open response questions on the physical and chemical barriers to infection and drug classification. It is obvious that candidates have learnt from previous series and practiced these questions during their revision in preparation for the Bi1F examination.

This examiners report aims to highlight any areas where candidates were more successful, main areas where candidates may need to reflect upon and points of advice for future examinations.

Question 1 (b) (ii)

This question asked candidates to state the process by which plants made their own food. The required answer for autotrophs that do this process is photosynthesis. Recognisable spellings were accepted here, however it must be remembered that the need for accuracy with literacy is imperative in examinations.

An item which highlights that correct spelling really is key.

(ii) Plants also produce their own food.

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

(1)

PhotoSimporsis.



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Examiner Comments

This answer sees an unrecognisable spelling and below the lowest form of the answer that would be acceptable for this item.



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Examiner Tip

Try to find the keywords for a particular topic and write them out a few times to check your spelling.

(ii) Plants also produce their own food.

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

(1)

Photosynthesis



ResultsPlus
Examiner Comments

This candidate clearly has learned from Key Stage Three the important keywords to memorise. This response has excellent recognisable spelling and it is legible for ease of viewing.

An excellent example of the correct answer.

Question 1 (c) (i)

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

(1)

42-80



ResultsPlus

Examiner Comments

This candidate has clearly stated the correct range from the graph by using a dash to indicate this. Candidates could have also written the number 38 as the difference between the highest and lowest temperatures of the range.

Question 1 (c) (ii)

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

(1)

68°C



ResultsPlus

Examiner Comments

An example where the candidate has used the units in the correct manner as well as communicating the correct answer. Any answers between 66 and 70 degrees would have been acceptable here.

Question 1 (c) (iii)

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

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

(3)

The conditions in a deep-sea hydrothermal vent are that it's very hot due to it being close to the core of the earth. Very dark as it's really deep. Also high pressure.



ResultsPlus

Examiner Comments

This response sees three marks awarded as the candidate has clearly stated three individual conditions of a deep-sea hydrothermal vent.

The response states that hydrothermal vents are very hot, very dark and highly pressurised.

Further answers could have been sulphurous or saline.

Question 2 (a) (i)

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

(1)

50%



ResultsPlus Examiner Comments

A response where the candidate has understood the need for calculating the probability from the pedigree chart shown and understanding the key provided.

The key shows the male and female symbols for the pedigree chart and so understanding this first is vital for item success.

Question 2 (a) (ii)

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

(2)

Chris homozygus resessive

Megan homozygus dominant



ResultsPlus Examiner Comments

An excellently communicated response with legibility the main feature here.

Despite the incorrect spelling of the genetic word homozygous this does not detract from it scoring two marks.

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

(2)

Chris ff

Megan FF



ResultsPlus Examiner Comments

This candidate has clearly understood the rationale behind genotype and provided the correct answer for both offspring here.

It is important to remember that ensuring your answer is communicated well is key. Some letters can appear similar in lower and upper casing.

Question 2 (a) (iii)

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

(2)

They can have an offspring with cystic fibrosis because they both were carriers and their offspring had two recessive alleles which were expressed.



ResultsPlus

Examiner Comments

An excellent answer here recognising that both Selina and Matthew were carriers of the disease and that in order for their offspring to inherit cystic fibrosis they would need to possess two recessive alleles.

The genetic term "expressed" has also been used here correctly.

Question 2 (b)

(b) Describe the symptoms of cystic fibrosis.

(3)

Breathing problems - Thick mucus builds up in the lungs, reducing the amount of oxygen.

Weight loss - mucus blocks the access enzymes travel to through the small intestines. Lack of enzymes result in weight loss.

(Total for Question 2 = 8 marks)



ResultsPlus

Examiner Comments

This candidate has clearly been able to access the examiner's report from 2 years ago and has taken on board the advice provided about cystic fibrosis symptoms.

Breathing problems scored here as well as stating that there was thick mucus present.

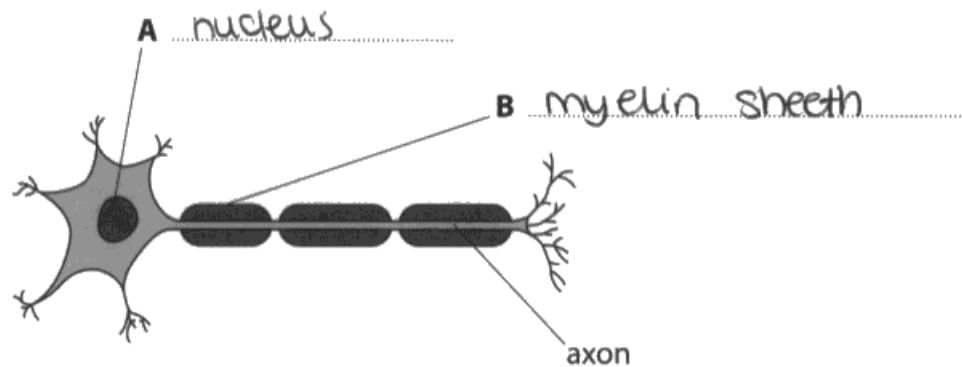
Weight loss and the blocking of enzymes was also credit worthy.

Infertility and fatigue were also rewardable.

Question 3 (a) (i)

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

(2)



ResultsPlus

Examiner Comments

This candidate has scored two marks here as both of the structures labelled are correct despite the word "sheath" being spelled as "sheeth".

This amount of inaccuracy does not discredit the candidate but it must be remembered that there is a fine line between what can and cannot be accepted in terms of spelling errors.

Question 3 (a) (ii)

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

(2)

Insulates the axon and speeds
up the electrical impulse.



ResultsPlus

Examiner Comments

An excellent answer here that is both clear and concise.

The mark scheme was specifically looking for the word "insulates" for the first area of a fully creditable response. Many candidates simply wrote "protects" the axon which is not detailed enough for credit.

The fact that the conductance of the electrical impulse is increased was the second area of a fully creditable response as seen in this example. Many candidates were able to score this mark by stating this fact in a number of different manners.

Question 3 (c) (i)

- (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 cm³ and a driver with a blood alcohol concentration of 0.21 g per 100 cm³.

(2)

$$30 - 1 =$$

..... 29 %



ResultsPlus Examiner Comments

This item asked candidates to extract two pieces of information from the graph and process a subtraction calculation. The answer that was credit worthy was 29% as seen in this example.

Some candidates scored one mark for correctly extracting the data but then applied the wrong calculation to the numbers 30 and 1.

Question 3 (c) (ii)

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

(2)

The more alcohol that is in someones system, the slower their reaction time is and their vision goes blurry.
Alcohol is a depressant.



ResultsPlus Examiner Comments

An excellent clear and concise answer where the candidate has stated that alcohol is a depressant and as a result, reaction time becomes slower.

The other biological effects such as slurred speech and blurry vision were not credit worthy but not negatively marked.

Question 3 (d)

(d) A reflex arc allows a person to respond rapidly to a stimulus.

Explain how a reflex arc produces a rapid response.

It produces a rapid response⁽²⁾ as it happens without using your brain. If your brain is too slow to react to a stimulus then a reflex arc will automatically respond.



ResultsPlus
Examiner Comments

An excellently conveyed answer here as an example of good practice.

This response shows that the candidate has clearly understood the biological need for a reflex arc as they have stated that this response occurs automatically for half of the credit and also that the brain is not used for the second mark.

Question 4 (a)

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

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

$$1.50^2 = 2.25$$

$$90 \div 2.25 = 40$$

(2)

40



ResultsPlus Examiner Comments

An excellent example of what is expected on calculation and mathematical questions.

This candidate has clearly processed their calculation of 1.5 squared to show 2.25 and although writing 40 on the answer line without any calculation would score 2 marks automatically, it is always advised to show the steps to the answer.

Question 4 (b) (i)

(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)

insulin



ResultsPlus Examiner Comments

Another example of where an incorrect spelling does not negate the mark being awarded as this is recognisable spelling and could not be confused with any other biological molecule or substance.

Candidates should be reminded however, to check their work and more importantly the spelling of biological literacy to be confident of mark awarding.

Question 4 (b) (iii)

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

(2)

They can eat healthier foods with less sugars and do more exercise.



ResultsPlus Examiner Comments

An excellently communicated answer with both elements present for the two marks.

The idea of a controlled diet in terms of less sugars consumed has been stated and also the need for a regular pattern of exercise has also been communicated.

Many candidates here were stating merely that type 2 diabetics should consume a "healthier" diet, which was not considered as detailed enough for credit.

Question 4 (c) (i)

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

(2)

Answer Type 1 is when the pancreas produces little or no insulin so to control this people can inject insulin, usually at meal times, into the subcutaneous tissue which is the fatty tissue under the skin.



ResultsPlus Examiner Comments

This candidate has communicated the 2 mark item answer very efficiently by stating that insulin needs to be administered by an injection. This is the marking point that most candidates scored on this item with only a minority of candidates securing the second point that this injection should be administered into the subcutaneous fat layer.

Question 5 (a) (ii)

(ii) Explain why scientists do not classify viruses into any of the five kingdoms. (2)

It's non-living and shows
none of the 7 life processes



ResultsPlus

Examiner Comments

A very concise answer worthy of two marks where the candidate has stated that viruses are non-living and that they do not show any of the seven life processes that denote a living organism.

Many candidates only stated that viruses were not considered as living without then going on to state that they also do not carry out the life processes expected. Candidates must remember that if there is more than one mark associated to an item then an extended answer is required to score full marks.

Question 5 (a) (iii)

(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)

HIV



ResultsPlus

Examiner Comments

Many answers were acceptable here including most sexually transmitted diseases of which the most common response was HIV or AIDs (both acceptable).

Unfortunately, many answers conveyed diseases such as "colds", "flu" or "swine flu" which are not considered to be transmitted by body fluids.

Question 5 (b)

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

and viruses (2)

Antiseptics kill harmful bacteria[^] on skin or surfaces to prevent them from reproducing, spreading or becoming harmful.



ResultsPlus

Examiner Comments

The two marks here were credited to a response that stated that the antiseptics were used to kill pathogens/bacteria/microorganisms and the location that this action occurred, such as on the surface of a location or the skin. Candidates were also credited if they stated that antiseptics were used externally and thus outside of or on the surface of the human body.

This candidate has clearly stated that antiseptics kill bacteria and that these are found on certain surfaces or on the skin.

Question 5 (c)

*(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)

Physical barriers that we have on our body to stop organisms coming in are ~~barriers~~ skin and cilia and mucus. Skin doesn't allow organisms in and if we cut ourselves blood clots form to make a scab. This stops anything entering. Cilia and mucus ~~catch~~ catch any dust/bacteria, it sticks to the mucus and the cilia brushes it back up into our nose. Chemical barriers are hydrochloric acid in the stomach this kills any bacteria in our food. Also lyzomes in tears this kills bacteria that tries to get in through our eyes.



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Examiner Comments

This candidate has scored full marks on this item for clearly stating that we have numerous physical barriers to prevent organism entry. Namely, the skin, blood clots if the skin is compromised and the trapping and moving properties of mucus and cilia.

The answer is then lifted into the higher marking boundary by this candidate stating hydrochloric acid as a chemical barrier and that the acid kills bacteria. They have also mentioned that our tears have lyzomes (incorrect spelling but recognisable) that kill bacteria attempting to enter through the eyes.

An excellently conveyed and communicated answer.

Question 6 (a) (i)

(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)

~~500~~ $50 + 50 + 5 = 105$

21% of 500
10% = 50 1% = 5
10% = 50

..... 105 people



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Examiner Comments

An excellently conveyed answer which shows both the calculation steps and the final correct answer. It is not essential to show the calculation steps but it is always advisable to do so, as there are allowances for one mark (should the question be out of two) for correct calculations (even if the final answer is incorrect).

Question 6 (a) (ii)

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

(2)

Because tobacco has a carcinogen inside it called tar. ^{Tar} causes ~~this is the~~ cancer.



ResultsPlus

Examiner Comments

An answer that has communicated both marking points clearly and concisely with the idea conveyed that tobacco contains a carcinogenic agent and that this agent is called tar.

Many candidates recognised that tobacco smoke contained tar - yet they did not link this to the idea that the tar is carcinogenic as this candidate has done so.

Question 6 (a) (iii)

(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)

They won't be able to exercise for as long because the carbon monoxide sticks to the red blood cells so you can't carry as much ~~oxygen~~ oxygen.



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Examiner Comments

A question that asked candidates to state that tobacco smoke contained carbon monoxide and that this blocks the red blood cells from transporting oxygen and thus reducing the ability of the smoker to exercise for long periods of time.

This candidate has stated that carbon monoxide is present and that this "sticks" to red blood cells and so not much oxygen can be carried. Although this is slightly clumsy in communication, it is worthy of credit for both marks.

Question 6 (b)

*(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)

Stimulants are drugs like caffeine and nicotine. They decrease the reaction time which means that they get quicker.

There are also depressants. These are drugs like alcohol and increase the reaction times making them longer.

Hallucogens change the way your brain works causing you to see things that aren't there. Cannabis and LSD are examples of this.

Performance Enhancers are a drug which can help build muscle quicker like steroids.

Medication is also a drug which helps to prevent disease and illnesses and painkillers block the impulses to reduce the pain.



An excellent response for this second six mark question on the paper where candidates were asked to describe the effects of 4 groups of drugs including stimulants.

The other drugs in question were hallucinogens, depressants and painkillers. To score full marks the drug groups needed to be described in terms of their effects on the nervous system.

Simply stating the names of the drugs groups would see candidates rewarded into Level 1 of the indicative mark scheme. If these were then provided with an example then candidates were awarded Level 2 and finally, as stated above, the effects of the drug groups on the nervous system would gain full marks.

This candidate has stated three groups of drugs in detail with examples and the effects seen on the nervous system.

Paper Summary

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

- Always convey your calculations and process steps to be awarded at least one mark, even if the incorrect final answer is communicated.
- Never use bullet points for your six-mark answers. The Quality of Written Communication is included into the final mark for that item so be mindful of this.
- The need for legible communication is key. Far too many candidates are not reaching their full potential owing to poor or illegible handwriting.
- Revise the whole specification of topics, it is clear that some are more favoured than others.
- Ensure that the spelling of each biological keyword is practised before the examination.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

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