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Examiners' Report
June 2015

IAL Biology WBI04 01

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Introduction

This paper performed in a similar fashion to previous papers. A full range of responses and marks were seen with some responses being of exceptional standard. The multiple choice questions, even those based on the AS spec content, performed well on the whole.

Question 1 (a)

This was a nice straight forward question to start the paper. The majority of candidates recognised that carbon dioxide was the gas in the atmosphere. Those candidates who did not score a mark for the form of carbon in plants were usually those who had been too vague in their response, giving sugars or carbohydrates as their answer.

Question 1 (b)

The standard of response to this question was extremely high; we read some really accurate and detailed responses. It is very evident that past mark schemes have been used to prepare students for this exam.

(b) Explain the role of light in the photosynthesis stage of this cycle.

(5)

light causes electrons present in the chlorophyll molecule in the thylakoid membrane in the light-dependent stage to be excited, and they are picked up by electron carriers, and due to a series of redox reactions, the energy level of electrons falls, and energy is released, which is used to make ATP from ADP and inorganic phosphate in the process of photophosphorylation. This ATP is used in the light ~~d~~ ~~independente~~ independent reactions, to reduce GP to ~~Ga~~ GALP. Light energy also causes the Photolysis in reaction Water molecules to split into H^+ and OH^-, where the H^+ combines with a carrier called NADP which becomes reduced NADP, and this too goes into the light-independent stage to reduce GP to GALP.

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Examiner Comments

This is an example of a good response. This response was awarded mark points 1, 2, 7, 3, 5 and 6.

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Examiner Tip

Completing past papers and using past paper mark schemes is an extremely effective way of preparing for exams.

(b) Explain the role of light in the photosynthesis stage of this cycle.

(5)

Photosynthesis is a process by ✗ which energy from the sunlight is incoorporated in plants in the form of organic matter. Light is used in the light dependent stage of photosynthesis. A photon of light hits PSI ✗ molecule and an excited e^- is released. It is taken up by the electron carrier ~~and pas~~ ~~tik~~ that is NAD which is also reduced by H^+ taken from the photolysis of water. A photon of light also hits PSII molecule exciting the e^- which is released and taken up by an electron carrier. It ~~passes~~ passes through e^- transport chain and helps in synthesis of ATP. OH^- from photolysis joins to give $4e^-$ and O_2. The e^-s are to replace PSII whose e^- was used to replace PSI. These products from light dependent reaction that is NADH and ATP is used in the Calvin cycle where CO_2 is also needed to make pollysacchasides.

ResultsPlus
Examiner Comments

This response illustrates mark point 4, which the other response above did not.

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Examiner Tip

Check through your answers carefully to make sure you have not made silly little errors like writing NADH when you know it should be NADPH (P for photosynthesis).

Question 1 (c) (ii)

In previous papers, questions asking about decomposition have been well answered. The candidates who recognised that this question was testing them on this part of the spec produced some very detailed responses that scored well.

(ii) Describe how the carbon in these polysaccharides is returned to the atmosphere.

(4)

When these plants die, they are decomposed by saphrotrophs which release digestive enzymes and break down polysaccharides to simple sugars these are reabsorbed by the saphrotrophs and used for respiration. Respiration releases Carbon dioxide into the atmosphere. The plants may ~~be~~ also be eaten by primary consumers which again digest the plant and use the ~~sug~~ sugars (eg: glucose) for respiration releasing CO_2 into the atmosphere.

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Examiner Comments

This response was awarded mark points 1, 2, 4 and 5. It is a nice and clear response.

Question 2 (a)

It was very encouraging just how many candidates appreciate that the structure of HIV is not common to all viruses. There were some very detailed and accurate responses.

(a) Describe the structure of a virus.

(3)

A virus is described as a non-living organism which is typically composed of a protein coat (capsid) which surrounds the genetic material (RNA or DNA) and some enzymes (for synthesis of viral components). It may have a membrane formed from its host and glycoproteins for binding to other cells on the surface

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Examiner Comments

This response illustrates mark points 3, 1, 4 and 5.

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Examiner Tip

It is a good idea to try and make one more statement than the number of marks allocated to the question, just in case you make a mistake or in case what you consider is credit worthy does not appear on the mark scheme.

(a) Describe the structure of a virus.

(3)

it has no nucleus, it has linear DNA or RNA. no cyto plasm, a protein coat (capsid), may have spikes. It may have enzymes. It can only reproduce in host organisms and is relatively small, next to most bacteria. No cell membrane or wall.

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Examiner Comments

Another example of an accurate and clear response, this time illustrating mark points 1, 5, 3 and 6.

(a) Describe the structure of a virus.

(3)

A virus consists of a strand of RNA, surrounded by a protein coat and in some cases a capsule made from a previous host cell.

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Examiner Comments

There were a few candidates who were confusing the capsule found on *Mycobacterium tuberculosis* with the viral envelope, as is the case here.

Question 2 (b) (i)

Although we were pleased that many candidates knew that viruses have different structures, we were a little taken aback by the number of candidates who clearly think that all viruses replicate in the same way as HIV. We saw lots of references to latency, lysogenic cycle and DNA being incorporated into the host cell genome. Such a clear miss-understanding negated the marks.

(b) (i) Explain why there is a delay, following this infection, before the number of virus particles increases.

(2)

The ~~virus~~ viral genome has to be ~~is~~ being transcribed and translated inside the host cell. before new virus particles are made by protein synthesis. It takes some time for protein synthesis to occur and the new virus particles to assemble which is why there is a delay before the number of virus particles increases.

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Examiner Comments

This is an example of the type of response that we were hoping for.

(b) (i) Explain why there is a delay, following this infection, before the number of virus particles increases.

(2)

After an infection the viruses enter the cells for replication. It takes time for a virus to enter the cell by endocytosis. Make its RNA transciptase to transcribe RNA to DNA. And the DNA to get integrated in the host DNA for viral protein synthesis to happen. This takes time before the infected cells busts open releasing new replicated virus.

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Examiner Comments

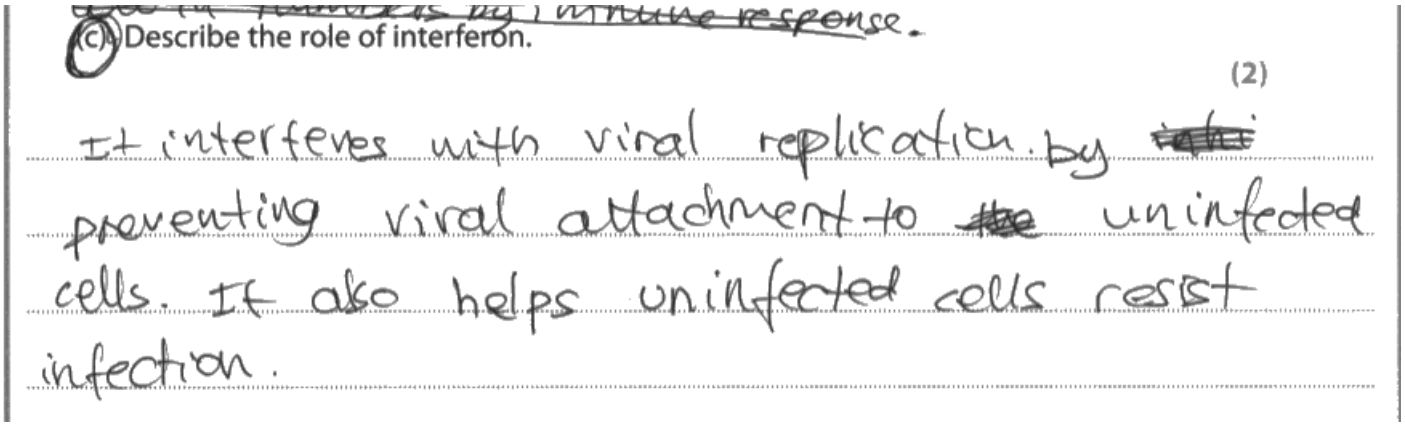
This is more typical of the responses that we did see to this question.

Question 2 (b) (ii)

We saw variable responses to this question with most candidates picking up a mark. Mark point 3 was awarded least frequently.

Question 2 (c)

The majority of candidates knew that interferons inhibit viral replication, but few were clear on the mechanism of this inhibition.


(c) Describe the role of interferon.

(2)

It interferes with viral replication by preventing viral attachment to uninfected cells. It also helps uninfected cells resist infection.

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Examiner Comments

This response demonstrates all three of our mark points.

Question 2 (d)

Candidates sitting this IAL paper always seem to do well on the extended recall immunology-based questions. It is clear that past paper mark schemes have helped them prepare for these questions. However this question caught out the candidates who simply wrote everything that they knew about the humoral response and did not look carefully at the question to identify the emphasis of the question. We really wanted to know about the delay and a candidate's response had to address this to access all four marks.

(d) Explain why there is a delay before the level of antibodies starts to rise.

(4)

The specific immune response takes ~~a~~ time to get activated. The T-helper cells need to activate the B-cells to undergo clonal selection and produce ~~plasma~~ effector cells, which then differentiate into plasma cells. These plasma cells then produce antibodies which clump the viruses together. However, the time it takes for the T-helper cell to identify the antigen and activate the B-cell to produce corresponding antibodies for ~~that~~ the antigen causes the delay before the antibody levels rise.

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Examiner Comments

This candidate has identified the emphasis of the question and addresses it immediately. The account is clear and accurate and full marks can be awarded.

ResultsPlus
Examiner Tip

When describing the humoral response always make it clear that the B cells differentiate into plasma cells and that is the plasma cells that are producing the antibodies.

(d) Explain why there is a delay before the level of antibodies starts to rise.

(4)

When an antigen ~~the~~ enter the body, it ~~binds~~ is engulfed by macrophages, by phagocytosis. The antigen combines with MHC to form an APC which has to be recognised by the complimentary T-helper cells. The Thelper cells need to be activated when it binds to APC which will then release cytokines. These cytokines have to activate B cells ~~with~~ which are binded to that specific antigen which will then divide to form B effector cells. These B effector cells will differentiate to form plasma cells which secreate antibodies. ~~All th~~ This process requires time for all these involve specific receptor which bind to specific antigens which produce specific antibodies.

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Examiner Comments

This candidate has described the humoral response first and then at the end of the account linked the events in with the delay. Full marks awarded.

(d) Explain why there is a delay before the level of antibodies starts to rise.

(4)

When a virus enters the body it is engulfed by macrophages which digest the cell virus & the antigen on the virus combines with MHC on the macrophage making it an antigen presenting cell (APC). T-helper cells with complementary receptors bind to the APC, are activated & divide by mitosis producing clones. The virus is also taken up by the B cells which also becomes an APC. The activated T-helper cells bind to these B cells, release cytokines & cause B cells to divide by mitosis & form clones & memory cells. The clones then differentiate into plasma cells which produce the antibodies ∴ there is a delay before the level of antibodies starts to rise.

(Total for Question 2 = 13 marks)

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Examiner Comments

This is a pretty good account which makes at least 4 of the points that are on our mark scheme. However it does not actually answer the question to explain why there is a delay so was limited to a maximum of three marks.

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Examiner Tip

Read the question carefully and make sure that you are actually answering it; do not simply write everything that you know about a topic.

Question 3 (a) (i)

Many candidates could correctly name another domain, although there were some interesting spellings. There were however some incorrect suggestions that indicated confusion between domains and kingdoms. One misconception is that eukaryotes are the same as eukaryota.

Question 3 (a) (iv)

Candidates who thought 'plants' when they read this question usually picked up one or two marks (mark points 1 and 2). Candidates who thought 'animals' wrote about the problems of fish not being able to see and scored zero.

(iv) Suggest why very green, cloudy water could be a problem for the organisms in Lake Vesijärvi.

(2)

This type of water could decrease the amount of light penetrating the water, which could lower the amount of photosynthesis plants in the water could perform. This type of water could also limit the amount of O_2 in the water which could cause species to die and other species feeding on them to die aswell.

ResultsPlus
Examiner Comments

This candidate thought 'plants' and scored two marks.

(iv) Suggest why very green, cloudy water could be a problem for the organisms in Lake Vesijärvi.

(2)

Green and cloudy water won't let light get through the water, so ~~and~~ organisms will have visibility problems and this will make their life cycle more difficult. They will find it more difficult to find food so the number of other organisms may decrease.

ResultsPlus
Examiner Comments

This candidate thought 'animals' and did not score anything for their account.

Question 3 (b)

The majority of candidates worked out the food chain that was being described and attempted this question with the right approach. Candidates who went on to describe the food chain generally only scored one mark (mark point 4), whereas those who thought about the question and realised that this was an A2 paper produced far more relevant responses and scored well.

(b) Scientists can alter the abundance of organisms in a habitat by removing or introducing organisms. This is called biomanipulation.

The effect of the pollution in Lake Vesijärvi was reversed by removing 80% of the roach from the lake. Other fish that eat roach were introduced into Lake Vesijärvi.

Roach are fish that eat zooplankton. Zooplankton eat cyanobacteria.

Roach → 2 → C

As a result of this biomanipulation, the water in Lake Vesijärvi became clear.

Explain why the water became clear.

(4)

80% of the roach fish were removed. Roaches are predators of zooplankton. A decrease in predator numbers means less zooplankton is eaten and killed. This would result in an increase in the population of zooplankton (the prey) as birth rate exceeds death rate. An increase in zooplankton which are consumers of cyanobacteria means more cyanobacteria are eaten. The population of cyanobacteria falls. Thus water is not made as green and cloudy since ~~they can't~~ less producers are available

(Total for Question 3 = 9 marks)

ResultsPlus
Examiner Comments

This is an example of a response that scored full marks (mark points 1, 3, 4 and 5). The candidate has clearly thought about the question and explained the changes in terms of the changes to the numbers of predators and therefore the changes to how many organisms are being eaten.

(b) Scientists can alter the abundance of organisms in a habitat by removing or introducing organisms. This is called biomanipulation.

The effect of the pollution in Lake Vesijärvi was reversed by removing 80% of the roach from the lake. Other fish that eat roach were introduced into Lake Vesijärvi.

Roach are fish that eat zooplankton. Zooplankton eat cyanobacteria.

As a result of this biomanipulation, the water in Lake Vesijärvi became clear.

Explain why the water became clear.

(4)

As the roach eat zooplankton a decreave of 80% in the number of roach in the lake would mean that the number of zooplankton would increase. As the number of zooplankton increase by alot the number of cyanobacteria would decrease by alot, as the zooplankton eat the cyanobacteria. The number of cyanobacteria drops so the water will become less grean and cloudy as the cyanobacteria are no longer present.

ResultsPlus
Examiner Comments

This candidate has not made comparative points about the changes in numbers of organisms and therefore changes in numbers of organisms being eaten, scoring mark point 4 only.

ResultsPlus
Examiner Tip

Remember that this is an A2 paper and make sure that your answer reflects this, even if a question seems straight forward. If changes are mentioned in the question then your answer must also refer to changes.

Question 4 (a) (iii)

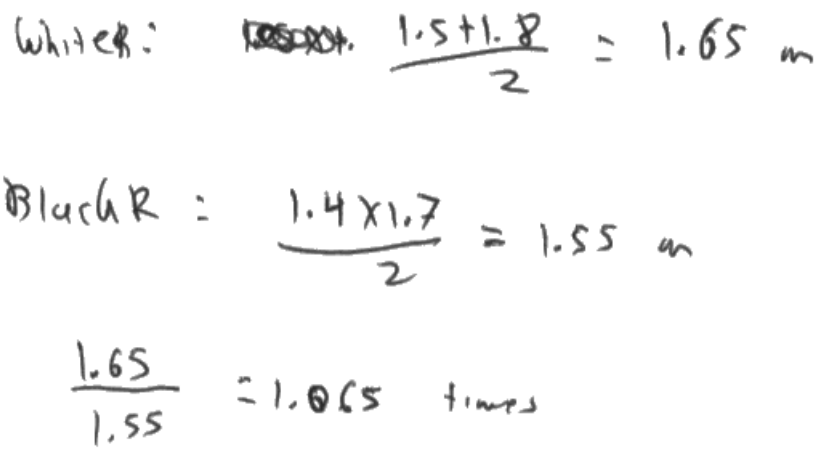
Several candidates scored all three marks; no pattern was identified in the responses of those who did not.

Question 4 (b) (i)

This question did not work as originally intended. We had hoped that the candidates would work out the smallest difference in height and the largest difference in height to gain the range. Candidates who picked up that there would be no one value calculated the average; this approach scored them full marks. Candidates who just calculated one difference scored one mark.

(i) Calculate how many times bigger the white rhinoceros is than the black rhinoceros.

(2)



Answer 1.065 times

ResultsPlus
Examiner Comments

This candidate has gone down the route of working out the average. Unfortunately an unrealistic number of decimal places have been given in their final answer.

ResultsPlus
Examiner Tip

Always think about the number of decimal places to give in your final answer. As a rule it is safest to give the same number of decimal places as the data that you are manipulating. If your values are relating to whole organisms then they will need rounding up or truncating to a whole number.

Question 4 (b) (ii)

This was disappointing as very few candidates expressed their answer in the context of the question, writing generic responses instead.

(ii) Suggest how these two species of rhinoceros evolved from their common ancestor.
(4)

The 2 species were once one speaes. But because of a natural barrier which could be an earthquake or fire etc., the species was devided. There was no gene flow between the 2 species since one couldn't reach the other. The 2 species were exposed to different selection pressures and through natural selection, the individuals that had advantageous alleles were selected for, survived, grew and reproduced passing their advantageous alleles to the next generation. The individuals that didn't have an advantageous allele were selected against and died out. Over the years the allele frequency changed and when the 2 species were put back together, they couldn't reproduce to produce a fertile offspring. Hence they were two different species.

ResultsPlus
Examiner Comments

This is a fairly typical response and could only be awarded the general mark points.

ResultsPlus
Examiner Tip

A characteristic of a unit 4 paper is that questions are set in contexts and the expectation is that the answers are also in the context. We did not want a generic account of evolution, we wanted to know about the evolution of these rhinoceros.

Remember to get your genes and your alleles sorted.

Question 4 (b) (iii)

Variable responses seen here. Some vague responses just referring to no competition without linking it into the context of the question. Rare to see both marks awarded.

(iii) Suggest why both species of rhinoceros can be found in the same region in Africa.
(2)

Both species of rhinoceros occupy different niche within the habitat.
This ensures there is not any competition between the two. White rhino feeds on grass meanwhile black rhino consumes leaves of shrubs.

ResultsPlus
Examiner Comments

This was one of the better responses that we saw.

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Examiner Tip

If there are two marks then you must write two statements.

Question 5 (a) (i)

Infection is a term that appears in the spec and is frequently used in questions, however few candidates could actually define it.

(a) (i) Explain the meaning of the term **infection**.

(2)

Infection is when a pathogen is able to break through the bodies primary defence, and cause a non specific responce in the body.

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Examiner Comments

This is an example of one of the better responses that we saw.

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Examiner Tip

A pathogen has to actually be inside a cell or tissue before we can say that we are infected.

Question 5 (a) (ii)

Candidates had a reasonable idea of the role of the gut flora, but there were some clear misconceptions: many thought that the gut flora were responsible for producing hydrochloric acid or lysozyme.

(ii) Explain how gut flora protect the body from infection.

(3)

Gut flora just like the skin flora can compete with the bacteria for space and nutrients. They also may secrete enzymes that destroy the bacteria thus they prevent the infection by killing/outcompeting the harmful pathogens.

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Examiner Comments

This is a nice clear response that illustrates all three of our mark points.

(ii) Explain how gut flora protect the body from infection.

(3)

Gut flora compete with the pathogens over resources. Gut flora live in the stomach, which is acidic, and ~~are a cure eats result~~ are able to adapt ~~of~~ to the extreme conditions in the stomach, while other pathogens will get affected by the pH (the gut flora outcompete the pathogen).

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Examiner Comments

Although this candidate has the right idea it is too vague; we want to know what the competition is for.

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Examiner Tip

Always be as specific as you can in your answers.

Question 5 (b) (i)

The majority of candidates knew that antibiotics killed or prevented the growth of bacteria but did not appreciate what they were or where they came from. There was confusion between the terms pathogen, infection and disease.

(i) Explain the meaning of the term **antibiotic**.

(2)

An antibiotic is a chemical usually produced by a fungus or a microorganism that kills bacteria or inhibits their growth (replication). They are used to treat bacterial infections in humans.

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Examiner Comments

This illustrates the standard of response that we were hoping for.

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Examiner Tip

Remember, two marks two statements.

(i) Explain the meaning of the term **antibiotic**.

(2)

Medicinal treatments against bacterial infections.

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Examiner Comments

This answer is far too vague.

ResultsPlus
Examiner Tip

This is the sort of definition you would expect anyone to be able to give; you have been studying A level Biology for two years now so your definition should be of a higher standard than someone who has not.

(i) Explain the meaning of the term **antibiotic**.

(2)

An antibiotic is a chemical that either breaks down the cell wall, or stop protein synthesis, in bacteria.

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Examiner Comments

This candidate has tried to show some detailed knowledge but unfortunately the response implies that these are the only two mechanisms which is not true.

ResultsPlus
Examiner Tip

If you are describing what something does try and explain it in general terms and then give an example.

Question 5 (b) (ii)

There was a lot of data in this graph, but the candidates who read the question carefully did quite well.

*(ii) Using the information in the graph, describe the effect of this course of antibiotics on the diversity of gut flora. Suggest explanations for this effect.

(6)

Initially there was a large variety of bacteria in the gut flora before the antibiotic was taken. After the course of taking the antibiotic for a period of 7 days only G was present in the gut flora. This is because the antibiotic used killed all other bacteria except for G which had the resistant allele. Till 9 months only G was present in the body gut flora, but by 12 months 3 more types of bacteria have formed. This is because H, I & J have developed a/and a resistant allele to the antibiotic used ∴ the % of G in the gut flora decreases. H ba is the most abundant species with a % of 40. By 18 months only the same 4 types of bacteria are present but the % of G & I have both increased, with G having the greatest %, because they have a greater rate of reproduction than H & J ∴ are present in larger numbers.

(Total for Question 5 = 13 marks)

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Examiner Comments

This is a very clear response and can be awarded mark points 1, 2, 4, 5, 8 and 9.

ResultsPlus
Examiner Tip

Always read the question very carefully. Just because you see a graph do not assume what you are going to be asked to do.

*(ii) Using the information in the graph, describe the effect of this course of antibiotics on the diversity of gut flora. Suggest explanations for this effect.

(6)

7 days after giving the antibiotic, bacteria A, B, C, D, E, F, H, and I are not present. This could be because these bacteria types are ~~resistant~~ sensitive to the antibiotic and are killed off. Bacteria G are resistant to the antibiotic and are not killed. So they occupy ~~remain~~ 100% of the ~~9 mon for 9 months~~ gut for 9 months. At the 12th month, resistant strains of Bacteria H, I, and J start multiplying so these increase in number. Bacteria G have to compete with these for food (interspecific competition) In 18 months, the Bacteria H, I and J are ~~overw~~ ~~he~~ ~~er~~ overwhelmed by the antibiotic. (too much antibiotic)

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Examiner Comments

This response starts off well scoring mark points 1, 3, 2 and 4. The response gets a bit muddled in the middle and after reading the response through a couple of times we did not award any further marks as this question was also assessing QWC, focussing on clarity of expression.

Question 6 (a) (ii)

Candidates identified this as a question on succession and wrote some pretty good responses. Only the candidates that had used the photographs to help them with their answers ended their accounts at the arrival of the bushes, the others talked about trees and therefore could not be awarded mark point 5. Very few responses were awarded mark point 2.

(ii) Using the information in the photographs and the graph, explain the changes in the number of different plant species in the Mount St. Helens area.

(4)

From 1975 to 1980

Before the eruption, there were large trees in Mount St. Helens which was home to many different species of animals and plants. There was a large biodiversity.

After the eruption, ~~all~~ trees had been destroyed and ~~animals~~ there were no plant species present. Only soil was left behind.

In 1982 ~~As the years progressed~~, small shrubs and grasses began to grow on the soil which increased its water content and allowed more smaller plants to grow as the mineral content of the soil. The biodiversity and number of different plant species started gradually increasing by 50. In the year 1994 the number of different plants species was 150, which increased by 100 from mid 1983 to 1994.

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Examiner Comments

This response was awarded mark points 5, 3 and 6, once the candidate got around to answering the question.

Question 6 (a) (iii)

Candidates recognised that this question was about further changes during succession. Not many realised that the trees only really become established when the soil gets deeper.

(iii) Suggest how further changes in the Mount St. Helens area could lead to the development of a climax community.

(3)

As the soil becomes more rich in nutrient and more deeper with the ability to retain more water, larger trees and plants may start to grow and ~~aa~~ bigger animals start to come and live there. Different habitats would form as the ~~the~~ number of large trees would increase and finally reach a balance equilibrium. This would be the climax community which would stay stable for a long time if there in no ~~more~~ drastic climate change or human influence. The biodivergity would be great and number of different plant species would be as the same as it was before the eruption.

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Examiner Comments

This is a good example of the type of response that we were hoping for. We could award these mark points 1, 2, 6 and 5.

(iii) Suggest how further changes in the Mount St. Helens area could lead to the development of a climax community.

(3)

Then ferns and grasses that have established itself will make the soil more favourable for growth of other plants. After the soil is made more suitabe the ~~climax~~ new community will settle in the region and grow and will competitively exclude other plants and establish itself as the Climax community.

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Examiner Comments

Although this candidate has got the right idea it is very vague and did not meet the requirements of any of our mark points.

Question 7 (a)

This was one of our synoptic questions, applying unit 1 content to a novel scenario. The weaker candidates could tell us that the membrane was fluid whereas the more able candidates tried to link their response into the formation of the yeast bud. Very few candidates actually tried to make enough points to be awarded all three marks, although all our mark points were regularly seen.

(a) Suggest how the properties of the cell membrane enable the yeast cell to form a bud.
(3)

The cell membrane consists of a phospholipid bilayer which have hydrophylic head, pointing outward, and hydrophobic taile pointing inwards. It is fluid. Therefore it can be pinched off and reform ~~itself~~ the membrane

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Examiner Comments

Mark point 1 and 3 demonstrated here.

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Examiner Tip

If you look at this response they have only made two relevant points and therefore will never be awarded more than two marks.

(a) Suggest how the properties of the cell membrane enable the yeast cell to form a bud.

(3)

The cell membrane is fluid as it is made up of a phospholipid bilayer so it can form a bud and does not burst and exocytosis can take place. Moreover glycoproteins are incorporated into phospholipid bilayer so that ion can enter by facilitated diffusion and active transport and be used to form DNA for the new yeast cell (the bud). Moreover it is partially permeable allowing substance to move in by diffusion and be used for metabolic reaction eg. water.

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Examiner Comments

Mark points 1 and 4 have been awarded for this response.

(a) Suggest how the properties of the cell membrane enable the yeast cell to form a bud.

(3)

The cell membrane is composed of a phospholipid bilayer which consists of proteins. The cell membrane is very fluid and can change shape and extend so budding can occur. B: ~~Partially~~ membrane

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Examiner Comments

Mark points 1 and 2 are evident this time.

Question 7 (b)

This was one of the most challenging questions on the paper and really tested the candidate's ability to apply the spec content to a new scenario. Very few blanks were seen as most candidates did attempt the question. It was very obvious that candidates know about different events that occur in the cell cycle but do not appreciate which order they occur in. There are a large number of candidates who do not appreciate that mitosis is nuclear division and cytokinesis is cell division.

(b) Explain the role of the cell cycle in yeast budding.

(4)

The cell cycle is the well organised pattern of events in the life of a cell, allowing it to grow and reproduce asexually, by mitosis. During the ~~G1~~ growth phase, the cell grows and new organelles are formed, with intense biochemical activity in the cytoplasm. DNA replication takes place during the S-phase, by mitosis. Identical DNA from the parent cell is passed on to the daughter cell. During cytokinesis, cell budding occurs, with the new organelles being separated into the parent and daughter cell and the chitin cell wall being formed, separating the organelles and DNA into 2 different cells.

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Examiner Comments

This response illustrates that this question was accessible and could be answered from the spec content. We awarded mark points 6, 1, 3 and 4.

ResultsPlus
Examiner Tip

Do not give up even if the question seems totally unfamiliar. Identify which part of the spec is being tested, think about what you have been taught and then try and apply it to the information that you have been given. Do not forget to think about the AS spec content as well when you are doing this paper.

(b) Explain the role of the cell cycle in yeast budding.

(4)

Initially in the cell cycle, during interphase all the organelles are replicated, In the S-phase of interphase DNA replication of yeast takes place producing another identical copy of it's DNA. Then mitosis takes place where now another copy of nucleus produced. Initially during prophase, chromatids form as the DNA coils, where 2 chromatids are joined together at the centromere. During metaphase, they line up at the equator of the cell where spindle fibers attach to these chromatids. During anaphase these spindle fibers contract pulling these chromatids apart, and eventually in prophase they decoil again forming the copy of nucleus. Then during cytokinesis, the new cell formed, with all it's organelles and nucleus, buds off from the original cell, dividing it into 2 cells.

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Examiner Comments

A slightly more long-winded account but did score full marks eventually: mark points 6, 1, 2 and then 4 at the end.

(b) Explain the role of the cell cycle in yeast budding.

(4)

~~In the~~ The interphase period would be larger than mitotis. In ~~G1~~ phase the ~~DNA~~ organelis on the ~~yeast~~ ~~nucleus~~ cell ~~would~~ ~~increase~~ ~~in~~ ~~number~~.

A sexual reproduction happens due to mitosis. offspring would have same genetic material as the parent cell. No crossing over or Independant assortment happens in ~~the~~ mitosis. ~~The~~ In prophase all the chromosomes would ~~d~~ condense & the nuclear membrane would disappear. & the spindle fibers would form. In ~~Anaphase~~ Metaphase the chromosomes allign at the equator. In Anaphase the chromosomes split in to 2 chromatids & move towards the ~~opper~~ oppersite poles by contracting spindle.

In Telophase the nuclear membrane & nucleiolus reapper. chromosomes decondense & spindle fiber disappears.

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Examiner Comments

This candidate did what a number of them did, which was to describe mitosis. Mark point 3 was awarded.

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Examiner Tip

The cell cycle includes cytokinesis and interphase as well as mitosis. Even an amazing account of mitosis is not going to score full marks when there are other processes to write about as well.

Question 7 (c)

This question was answered very well; even the weaker candidates picked up a couple of marks. Some candidates lost mark point 2 for stating unrealistic temperatures such as 0°C. Others lost mark point 8 for referring to amounts of water or mineral ions. Few candidates attempted to explain how the rate could be calculated so mark point 7 was awarded infrequently.

*(c) Temperature affects the rate of asexual reproduction in yeast.

Suggest an investigation that could be carried out to study the effects of temperature on the rate of asexual reproduction in yeast.

(5)

Place 50 yeast cells in a culture in a petri dish containing all nutrients needed for growth. Culture with be an agar. Prepare 5 petri dishes and incubate each one in different temperature which is controlled by an incubator Temperatures used: 10°C, 20°C, 30°C, 40°C, 50°C After ~~leave~~ 7 days remove them and count the number of yeast cells in each dish. The number of yeast is directly proportional to rate of asexual reproduction. ~~Repeat~~ Repeat 3 times and find mean in each temperature. Plot a graph of number of yeasts cells against temperature.

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Examiner Comments

This is a typical example of a high quality response. This was awarded mark points 1, 3, 2, 4, 5 and 6.

Question 8 (a) (iii)

This caused few problems to the candidates; many picked up two marks and there were not many who scored zero.

(iii) The actual numbers of these patients who are HIV positive may be higher than the numbers in the table. Suggest **two** reasons for this.

(2)

One reason might be that some patients lied because they didn't want people to know they had HIV. Others might just not know because they have not been tested for HIV.

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A good example of the type of response that we were hoping for.

Question 8 (a) (i-ii)

Part ai, the calculation, did not cause too many problems. Part aii was not so well done as a number of candidates tried to describe the difference in the numbers of patients and not the proportion of patients; as a consequence any calculation that they did was also inappropriate.

The two questions were marked together so that if a mistake had been made in ai the consequential error rule could be applied to part aii.

8 Infection with Human Immunodeficiency Virus (HIV) increases the risk of developing tuberculosis (TB). Tuberculosis is caused by the bacterium *Mycobacterium tuberculosis*.

(a) The table below shows the results of a survey of patients who had TB in 2008 and in 2010.

It shows the number of patients with TB who believed that they were HIV negative and the number of patients who knew that they were HIV positive.

Year	Number of patients with TB × 10^3	
	HIV negative	HIV positive
2008	600	800
2010	1600	500

(i) Using the information in the table, calculate the percentage of patients with TB in 2008 who were HIV positive. Show your working.

(2)

$\frac{800}{800+600} \times 100\% = 57.1\%$

Answer 57 %

(ii) Describe how the proportion of patients who were HIV positive in 2008 compares with the proportion of patients who were HIV positive in 2010.

(2)

% HIV positive in 2010 is 23.8 % Therefore the ~~number~~ proportion of HIV positive patients decreased by 33.3 % between 2008 and 2010.

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Examiner Comments

This is an example of a response that scored full marks in both sections.

8 Infection with Human Immunodeficiency Virus (HIV) increases the risk of developing tuberculosis (TB). Tuberculosis is caused by the bacterium *Mycobacterium tuberculosis*.

(a) The table below shows the results of a survey of patients who had TB in 2008 and in 2010.

It shows the number of patients with TB who believed that they were HIV negative and the number of patients who knew that they were HIV positive.

Year	Number of patients with TB × 10^3	
	HIV negative	HIV positive
2008	600	800
2010	1600	500

23.8%

(i) Using the information in the table, calculate the percentage of patients with TB in 2008 who were HIV positive. Show your working.

(2)

Total ⇒ 600 + 800 = 1400

Infected = $\frac{800}{1400} \times 100 = 57\%$ were HIV positive

Answer 57 %

(ii) Describe how the proportion of patients who were HIV positive in 2008 compares with the proportion of patients who were HIV positive in 2010.

(2)

In 2008 there was a 57% of HIV positive patients and in 2010 only 24% of them were HIV positive. This is because in 2010 the number of people who had the test increased from 1,400 in 2008 to ~~2010~~ 2,100 in 2010. There is a difference of 700 persons so results aren't reliable.

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Examiner Comments

This candidate got the calculation correct and then did not read the question thoroughly for the second part.

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Examiner Tip

Read the question through a couple of times to double check that you know exactly what you are being asked to do.

Question 8 (b)

This question at the very end of the paper was like a breath of fresh air for some candidates and they wrote very good responses that allowed them all three marks. Marks only got lost if candidates did not mention managing the use of antibiotics or if they gave ways which were all too similar to each other to be worthy of separate credit.

(b) Treating patients with TB is a problem because *Mycobacterium tuberculosis* is resistant to a number of antibiotics.

Give **three** ways in which hospital codes of practice can reduce the rate at which antibiotic resistance is increasing.

(3)

Hospitals need to maintain hygeniz and sterile practice by encouraging washing hands with desinfectant substance correctly, also by wearing masks and gloves, even more when in ontact with patients with (airily) contageous diseases. Bedsheets and anything used by patients must be correctly disposed off or sterlesed, and incoming patients should be checked for infectious diseases and isolated to prevent contamination as much as possible. They should only prescribe antibiotics to those who really need them and ensure they finish the establish course and correct dosage.

(Total for Question 8 = 9 marks)

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A good response earning all three marks.

(b) Treating patients with TB is a problem because *Mycobacterium tuberculosis* is resistant to a number of antibiotics.

Give **three** ways in which hospital codes of practice can reduce the rate at which antibiotic resistance is increasing.

(3)

- Not prescribing broad-spectrum antibiotics and advising patients to completed the antibiotic course at the correct dosage.
- Not prescribing antibiotics for viral infections.
- Doctors should wash hands between patients using alcohol based gel and screening of patents as they come into the hospital so infected people can be isolated.

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Another good response illustrating another way to be awarded all three marks.

Paper Summary

As in previous papers, candidates lost marks for the following reasons:

- not reading the question carefully enough, simply word spotting
- not writing enough statements to match the number of marks allocated to the question
- not being sufficiently prepared for questions assessing the AS content
- not paying enough care and attention to the words that they choose to use in their responses
- using the word they are defining in their definition

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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