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Examiners' Report
June 2014

IAL Biology WBI04 01

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June 2014

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Introduction

We saw some excellent responses from candidates this session; it was very clear that candidates were well prepared for the exam and had used past mark schemes as part of their preparation. There were very few blank responses, even by the weaker candidates and all of mark points were awarded. The strongest candidates scored maximum marks for a number of individual items. The multiple choice questions performed well on the whole and did not cause many candidates much of a problem. The only exception possibly being the two multiple choice questions at the beginning of question 2, where some candidates muddled up their 'How Science Works' terms.

Question 01 (a)

The first question on the paper performed very well; with many responses scoring full marks. This was one of the examples where past mark schemes had obviously been used by candidates in their preparation for this exam.

1 The light-independent reaction of photosynthesis produces GALP (glyceraldehyde 3-phosphate). This product is then used in the synthesis of other molecules, such as DNA.

(a) Describe how GALP is formed in the light-independent reaction.

(4)

In the calvin's cycle, the ~~first~~ first step is carbon-dioxide fixation. This is basically when CO_2 carbon-dioxide (CO_2) joins ribulose bisphosphate to form a 6 carbon compound. That reaction is catalysed by Ribulose Disphosphate carboxylase. This 6-carbon compound is unstable and splits into ~~a~~ two 3-carbon compounds, ~~gly~~ glycerate-3-phosphate. This ~~ga~~ compound then gets reduced using the H+ on reduced ~~to~~ NADP and energy from the ATP to ~~give~~ produce two GALP compounds. Both compounds are produced in the light-dependent stage.

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Examiner Comments

This response is an example of the excellent standard that we saw in answer to this question.

ResultsPlus
Examiner Tip

Use past paper mark schemes as part of your revision programme.

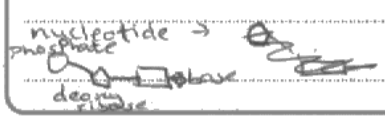
Question 01 (b)

Responses to this question were quite disappointing. This question is a straightforward AO1 question, directly testing unit 1 knowledge. Unit 4 is synoptic with both AS units and questions on this paper can be directed at or include any of their content.

(b) Describe the structure of DNA.

(4)

DNA has a double helix structure. It is made up of 2 DNA strands twisted around each other. It is made up of many nucleotides joined together by phosphodiester bonds. The two strands are joined by hydrogen bonds between the nitrogenous base. A nucleotide is made up of a phosphate molecule joined to a deoxyribose which is joined to nitrogenous base.



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Examiner Comments

This response scored reasonably well, but illustrates some of the muddled responses that we frequently saw on the location of the hydrogen bonds and phosphodiester bonds.

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Examiner Tip

All AS content must be learnt thoroughly for this paper.

DNA is a double stranded molecule made up of mononucleotides made up of a ribose sugar-deoxyribose, a phosphate group and a base. The ~~mono~~ phosphodiester bonds join one phosphate group of a mononucleotide to the base of another mononucleotide. Hydrogen bonds hold 2 adjacent mononucleotides together at the ~~su~~ ribose sugar.

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Examiner Comments

This is very typical of the responses that we saw. Candidates have clearly remembered some facts but their revision has not been thorough enough for the information to be expressed precisely.

Question 01 (c)

This question was an excellent discriminator with the weak candidates scoring very poorly but the stronger candidates being able to access the marks. The spec point 4.5.6 states that candidates should know how nucleic acids are synthesised from simple sugars, but this question seemed to catch candidates by surprise.

(c) In plants, GALP is converted into other sugars that are used in the synthesis of new biological molecules.

Suggest how GALP contributes to the synthesis of DNA.

(3)

GALP can be reacted with nitrate ions from the soil to form nitrogen compands such as the bases C, G, A, T (refer (b)). GALP can also be used to synthesize the 5 carbon sugar ~~deoxy~~ deoxyribose. (2 molecules of GALP combine giving off CO_2 to form deoxyribose). This conversion may require ATP from the light dependent stage. ~~This~~ This reaction may also be ~~enzyme action GALP may~~ catalyzed by specific enzymes.

ResultsPlus
Examiner Comments

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

ResultsPlus
Examiner Tip

Some unit 4 topics include AS content implicitly; remember to consider this when answering questions that appear to be unit 4 questions.

Question 02 (b) (i)

The data presented in the graphs in this question was very straightforward, but did cause some problems to candidates who rushed into their answer without reminding themselves that this is an A2 paper. The mark for graph 1 was the one graph where candidates had to be particularly careful. Many just commented that Sitka spruce had the second highest diameter; this does not actually answer the question.

Sitka spruce seedlings had the highest percentage of seedlings surviving and had the largest mean height. Although the Sitka spruce ~~on~~ had a mean diameter of only 0.04 cm less than that of Silver fir. This shows it had almost ~~highest~~ largest diameter, as there is very little difference between the diameters of silver fir and Sitka spruce.

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Examiner Comments

This response scored all three mark points.

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Examiner Tip

If there are three graphs in a question then each one will need a comment if full marks are to be scored; full marks cannot be scored if only part of a question is answered.

Question 02 (b) (ii)

This caused few problems provided the candidates read the question and gave two reasons.

(ii) Suggest **two** reasons, other than low light intensity, why the Noble fir seedlings did not grow very well in this investigation.

(2)

Competition of food and water.

There there must have been grazers. More grazers as the mean height of the seedling is lower.

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Examiner Comments

This response illustrates two of our mark points.

There was competition of minerals in the soil. The soil may be lacking some minerals and the other plant species may have an advantageous allele that allows them to survive in low mineral concentrations.

Temperature was not optimum for enzymes activity in Noble fir.

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Examiner Comments

This response illustrates another pair of our mark points.

Question 02 (c)

This question caused few problems to those candidates who remembered the principles of answering questions about practical procedures.

(c) Describe an experiment, which could be carried out in a laboratory, to investigate the effect of light intensity on the growth of Noble fir seedlings.

(4)

Obtain seedlings of the same age and mass. Prepare 5 trays of soil each having the same type of soil and same mineral contents. Plant the seedlings in the soil equally, at the same distance apart. Keep each tray at a different light intensity by using lamps of different watts equidistant from the trays. Note the mass of seedlings should be measured before planting. After 2 weeks, measure weigh the seedlings and obtain a mean at each light intensity. Find the % increase in mass for each light. The one which has increased the most in mass is the one grown in the suitable light intensity.

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Examiner Comments

This is an excellent response illustrating six out of the seven possible mark points.

This candidate has remembered to include key points that make the investigation valid, that will produce a range of data and has specified what measurements will be taken. The mark point omitted is the one that describes what needs to be done to collect reliable data.

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Examiner Tip

Responses to this type of question should include a description of key aspects of the procedure, a description of what measurements should be made, how to make the investigation valid and how to collect reliable data.

First the noble fir need to be carefully planted and germinate in the laboratory in cotton wool. After two week the seedlings should be uprooted ~~carefully~~ and their mass weighed. Each seedling should be carefully inserted into agar solution containing test tube with same nutrients in all tubes. The bottom should be covered with foil to prevent growth of algae and other microorganisms. They should then be incubated under different light intensities (with at least 7 different values of intensity) for 48 hours. They should then be uprooted again and mass measured again & to get percentage increase. The entire experiment should then be repeated for reliability.

(Total for Question 2 = 11 marks)

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Examiner Comments

Another good response that has included mark point 5.

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Examiner Tip

Sometimes we expect you to explain that investigations need repeating so that a mean can be calculated.

Question 03 (b)

Candidates coped very well with the first two parts of this question. The multiple choice question scored highly and candidates were not phased by part b.

Question 03 (c) (i)

Candidates were not phased by this novel approach to testing their understanding of tree rings.

Question 03 (d)

The candidates who scored poorly on this particular question were those who did not read the question correctly and simply wrote down everything they knew about the causes of global warming.

(d) Explain how global warming may affect tree ring growth.

(4)

Global Warming is an average increase in global temperatures. In cold climates, an average increase in temperatures can be favourable as it will increase rates of enzyme controlled photosynthesis. As temperature increases, molecules gain more kinetic energy and move and collide faster. Enzyme action increases and products of photosynthesis are produced faster. Also, higher temperature means higher GPP and this in turn mean higher NPP and more

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Examiner Comments

This is a good response that scored all but one of the mark points available.

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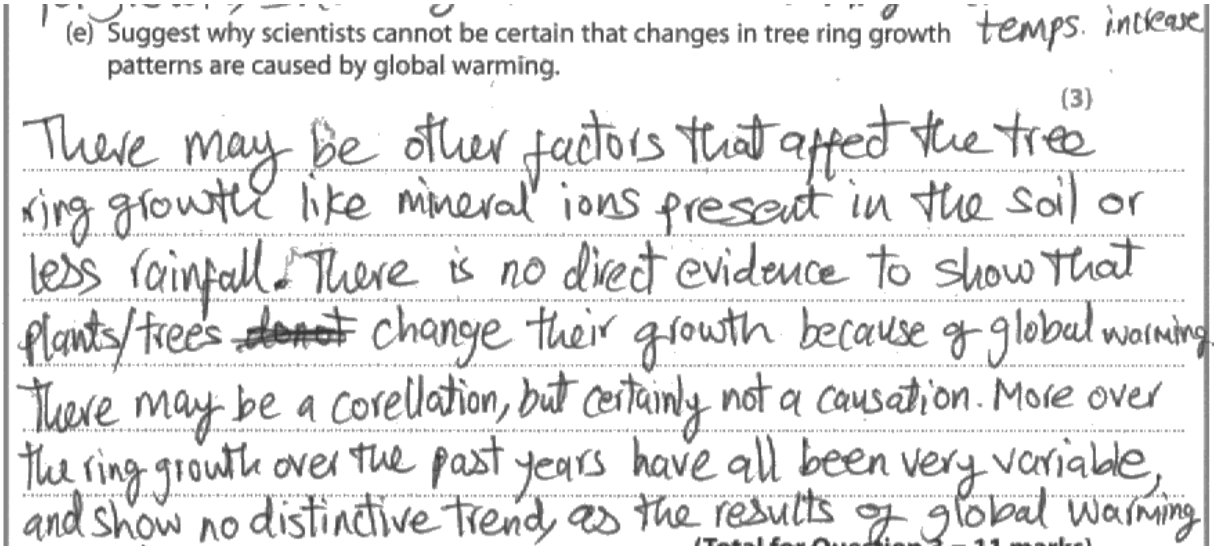
Examiner Tip

Read through the whole question a couple of times before beginning your response; do not look for key words and assume what the question is asking you.

Question 03 (e)

The majority of candidates scored the third marking point by making some very good statements about what other factors could affect tree ring growth. A minority tried to discuss correlation and causation, frequently getting the two terms confused.



(e) Suggest why scientists cannot be certain that changes in tree ring growth patterns are caused by global warming. temps. increase

(3)

There may be other factors that affect the tree ring growth like mineral ions present in the soil or less rainfall. There is no direct evidence to show that plants/trees ~~dont~~ change their growth because of global warming. There may be a corellation, but certainly not a causation. More over the ring growth over the past years have all been very variable, and show no distinctive trend, as the results of global warming

ResultsPlus
Examiner Comments

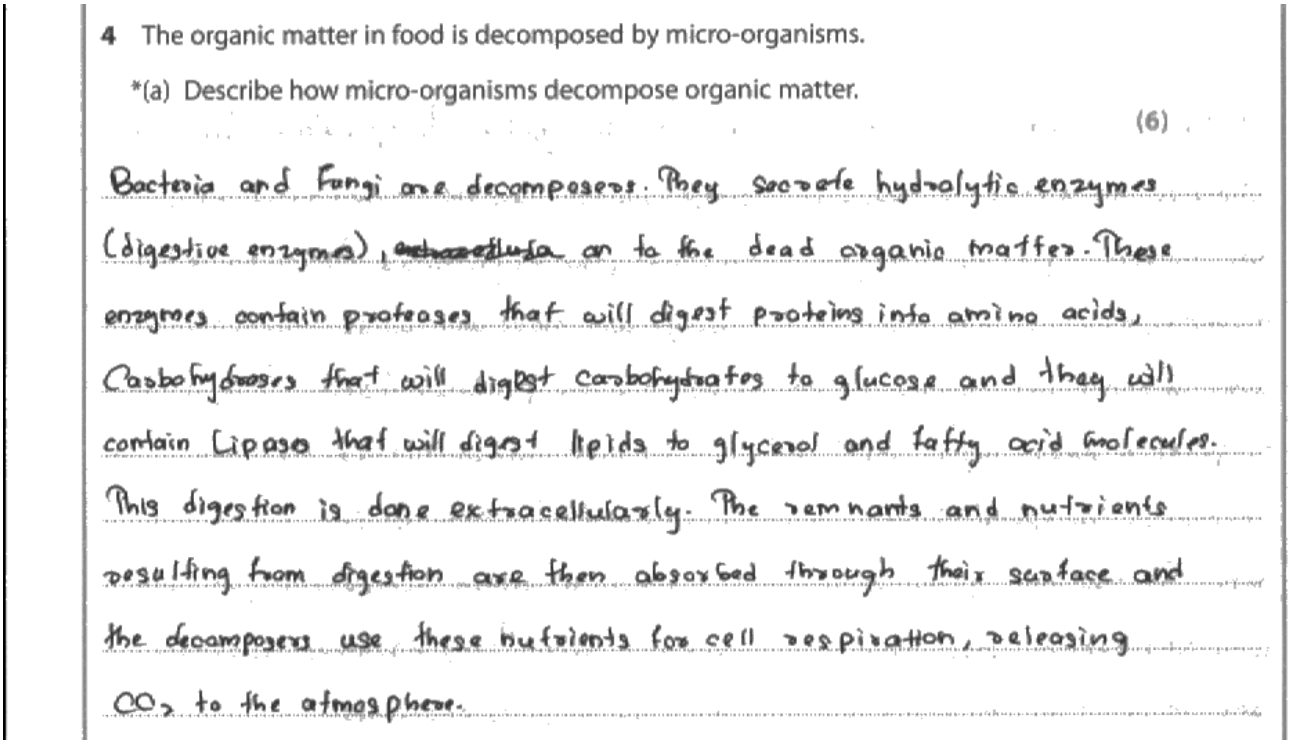
This candidate did not confuse their 'HSW' terms and scored all three marks.

ResultsPlus
Examiner Tip

Ensure that you learn the meaning of the 'HSW' terms such as causation and correlation in the case of this question, but also terms such as validity, reliability, etc.

Question 04 (a)

This question was probably the best performing question on the paper. The weaker candidates scored a couple of marks and the more able candidates scored all six marks, often in the first three or four lines of their response, by giving specific names of enzymes, their substrates and the resulting breakdown products.



4 The organic matter in food is decomposed by micro-organisms.

*(a) Describe how micro-organisms decompose organic matter.

(6)

Bacteria and Fungi are decomposers. They secrete hydrolytic enzymes (digestive enzymes), ~~extracellularly~~ on to the dead organic matter. These enzymes contain proteases that will digest proteins into amino acids, Carbohydrases that will digest carbohydrates to glucose and they will contain Lipase that will digest lipids to glycerol and fatty acid molecules. This digestion is done extracellularly. The remnants and nutrients resulting from digestion are then absorbed through their surface and the decomposers use these nutrients for cell respiration, releasing CO_2 to the atmosphere.

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Examiner Comments

This is an example of some of the excellent responses that we saw to this particular question.

ResultsPlus
Examiner Tip

Giving some specific examples to illustrate your answer can score highly.

Question 04 (b) (i)

Variable responses were seen to this question. Disappointingly, mark point 2 was rarely seen. This point has appeared on unit 1 mark schemes several times in the past, possibly indicating again the lack of preparation of some candidates for the synoptic element of this paper.

(i) Suggest why pH affects the growth of bacteria.

(3)

pH affects the availability of certain minerals & like calcium which are required for the growth of bacteria. pH affects enzyme activity. ~~An increase in~~ A pH close to optimum will enhance enzymes to increase the rate of metabolic reactions. Any extreme pH conditions will lead to denaturation of enzymes by destroying the active site. This will lead to slower metabolic rates hence fewer products formed which will reduce growth of bacteria

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Examiner Comments

A good response which did not quite gain the second mark point.

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Examiner Tip

Usually if you see a question relating either pH or temperature to living organisms, you will be expected to use your unit 1 knowledge and discuss enzymes and their significance to the living organism.

Question 04 (b) (ii)

Candidates got the idea of this question but unfortunately repeated the information given in the table without adding some biological knowledge to their answer; this is A2.

(ii) Malt vinegar has a pH of 2.4 and is used in the preservation of food.
Using the information in the table, suggest why malt vinegar can be used in the preservation of food.

(2)

Malt vinegar has a very low pH. It's a pretty acidic pH, which would denature the enzymes and their active sites, which would kill the micro-organisms preventing any further decomposition. pH range of all 5 bacteria doesn't go as low as 2.4, not used to such low pH

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Examiner Comments

This is an example of the type of response that we were looking for to award all three of the mark points available.

2.4 is not in the range for any of the bacteria hence these bacteria can not ~~grow~~ grow and replicate at this pH hence will not decompose the food.

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Examiner Comments

This is more typical of the type of response that we got from the weaker candidates. We tell them in the stem of the question that the bacteria cannot grow at certain pHs, so expect them to say more than just this in their explanation.

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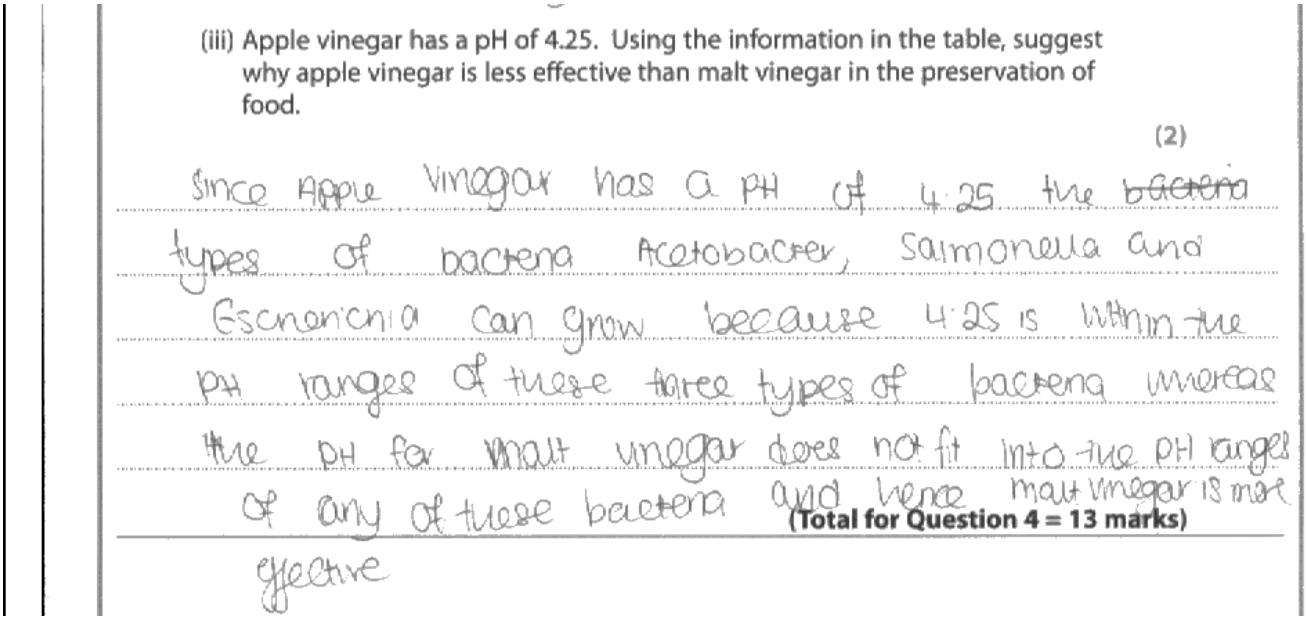
Examiner Tip

You will not get marks for simply repeating what is in the stem of the question.
We expect you to either interpret the information or explain it, using your biological knowledge.

Question 04 (b) (iii)

Candidates made the same sort of mistakes in this question as in the previous one. In addition there were a large number of candidates who could not count; we frequently saw reference to only three bacteria being able to survive at this higher pH.



(iii) Apple vinegar has a pH of 4.25. Using the information in the table, suggest why apple vinegar is less effective than malt vinegar in the preservation of food.

(2)

Since Apple Vinegar has a pH of 4.25 the ~~bacteria~~ types of bacteria Acetobacter, Salmonella and Escherichia can grow because 4.25 is within the pH ranges of these three types of bacteria whereas the pH for malt vinegar does not fit into the pH range of any of these bacteria and hence malt vinegar is more effective

(Total for Question 4 = 13 marks)

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Examiner Comments

This example illustrates both the points made above about candidates repeating the stem of the question and not being able to count.

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Examiner Tip

Look at data carefully and make accurate comments about it.

Question 05 (a)

Whenever we ask candidates to make comparisons or give differences, we frequently get two descriptions. Generally we would not piece together answers from two descriptions on an AS paper, so it is a very rare case that we would on an A2 paper. This question was not an exception.

5 Antibiotics are used to treat bacterial infections because they affect bacterial cells and not the cells of the patient being treated.

(a) Give **two** differences in the structure of a bacterial cell and a cell of the patient.

(2)

① Bacterial cells have a cell wall of peptidoglycan. Patient cells don't have a cell wall

② Bacterial cells have circles of DNA called plasmids, which is not found in Patient cells.

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Examiner Comments

A nice clear response that is easy to mark and will guarantee the candidate full marks.

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Examiner Tip

Numbering your points like this may help you organise your answer and ensure that you are writing sufficient information.

Bacteria cells have ~~peptidog~~ murein cell walls whiles the patient cell has no cell wall. The bacterial cell ~~have~~ have a loop of DNA while patient cell has double stranded DNA. Bacterial cells have the following which are not

ResultsPlus
Examiner Comments

This response was awarded mark point 5 and 3. A loop of DNA is not a comparable point about the number of strands in a DNA molecule, even if it had been correct. We ignored the reference to 'flagellum' at the end of the response and awarded mark point 3 for the reference to slime layer.

ResultsPlus
Examiner Tip

When comparing prokaryotic and eukaryotic cells, try and stick to features that they all have or don't have.

Question 05 (b) (i)

Generally well-answered except by those who thought that anaerobic conditions had to be avoided because bacteria needed oxygen to grow. The vast majority knew the correct way to seal the plate.

(i) Describe how the Petri dishes should be sealed. Give a reason for your answer.

(2)

Cross – taped.

To prevent harmful anaerobic bacteria from growing.

ResultsPlus
Examiner Comments

A nice clear response.

Question 05 (b) (ii)

A whole range of temperatures and responses were seen for this question. Candidates could still be awarded the second and third mark point even if their stated temperature was not within what we felt was a reasonable temperature range.

(ii) Suggest a suitable incubation temperature to use in this investigation. Give **two** reasons for your answer.

(3)

Temperature 20°C

Bacteria that ~~are~~ are harmful to humans do not grow at this temperature.

This temperature is not too low to cause inactivation of enzymes and it is not too high to denature it hence bacteria can grow.

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Examiner Comments

This is an example of the point being made above. The stated temperature is too low, but the reasons given are correct for two marks.

Temperature 25°C.

This is because 25°C is the favourable optimum temperature for bacterial growth.

Furthur, if it was at 37°C, body pathogenic bacteria could grow.

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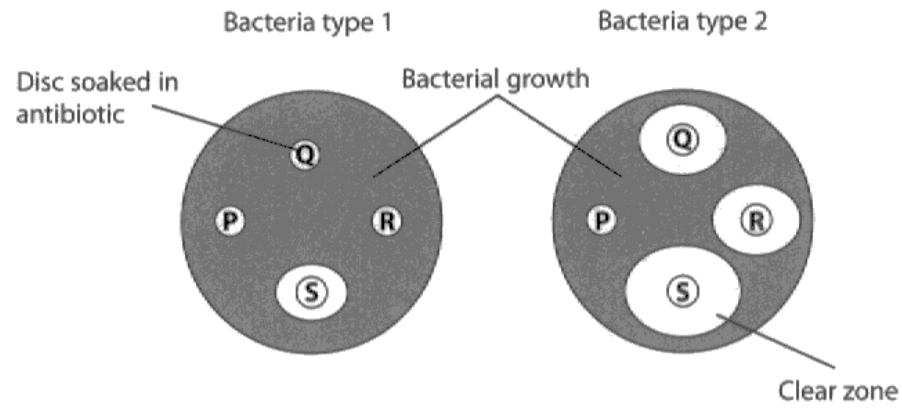
Examiner Comments

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

Question 05 (b) (iii)

This question caused similar problems to questions 2bi and 5bii and iii, where candidates are simply repeating the stem of the question and are not using the information given to actually answer the question. Many candidates discussed the resistance of the bacteria to the antibiotics, whereas the question was asking them to write about the antibiotics' effects. Others described the size of the clear zone without extending this idea further to draw a conclusion about the effects of the antibiotics. Others wrote about antibiotic S, but we simply ignored this.

(iii) The results of this investigation are shown below.



Describe the effect of antibiotics P, Q and R on these two types of bacteria.

(3)

~~R, Q, P are less effec~~ The diameter of the clear zone indicates the effectiveness. Greater the diameter greater is its effectiveness. P, Q and R are not very effective against Bacteria type 1 but S is effective against the bacteria. P is not effective against Bacteria 2 as whereas Q, R and S are effective against Bacteria type 2. P is the ~~least~~ least effective antibiotic and S is the most effective antibiotic against both types of bacteria. R is more effective than Q against bacteria type 2.

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Examiner Comments

This response is a clear illustration of the points being made in the introduction to this question.

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Examiner Tip

Read the question and then interpret the information to answer the question.

Question 05 (b) (iv)

Most candidates knew that either the diameter or the area of the clear zones had to be obtained to work out the difference in effect of antibiotic S on the two types of bacteria. Again, we had candidates who repeated the stem of the question by saying that the difference was then worked out, instead of telling us that one value had to be subtracted from the other.

(iv) Describe how these results could be used to calculate the difference in the effect of antibiotic S on these two types of bacteria.

(3)

For each clear zone around S, ~~take~~ measure the diameter at different ~~points~~ and determine the average diameter of each zone. Calculate the area of the clear zone of each. ~~The zone~~ Subtract the bigger area from the smaller area to obtain the ~~with a bigger area has greater effect on bacteria. divide it~~ difference in the effect of S on these two types of bacteria.

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Examiner Comments

A good example of the response we were expecting, scoring all three mark points.

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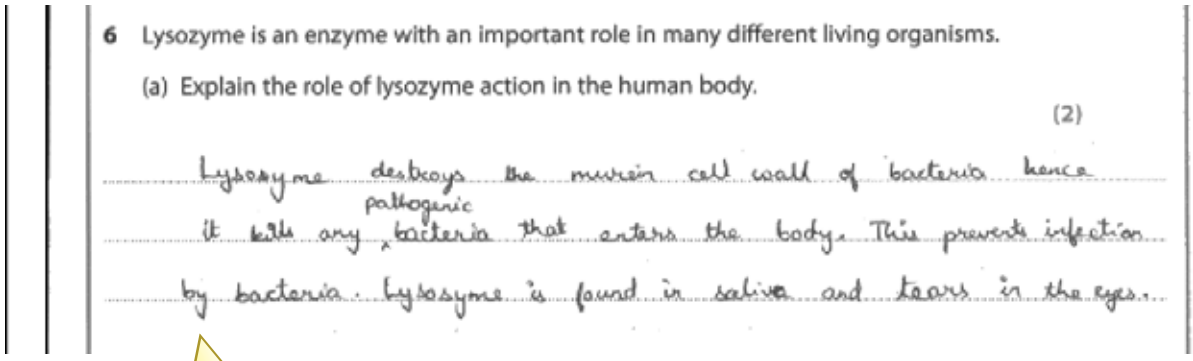
Examiner Tip

Use the question's mark allocation to help you work out how much detail you are expected to put into your answer.

Question 06 (a)

We saw good descriptions of where lysozyme is to be found in the body, which does not answer the question. Most candidates could tell us that it kills bacteria but fewer went on to say specifically how. One or two mentioned the non-specific response, although incorrectly refering to it as a non-specific immune response, which we ignored. Very few appreciated the whole purpose of lysozyme which is to prevent bacterial infection.



6 Lysozyme is an enzyme with an important role in many different living organisms.

(a) Explain the role of lysozyme action in the human body.

(2)

Lysozyme destroys the murein cell wall of bacteria hence it kills any pathogenic bacteria that enters the body. This prevents infection by bacteria. Lysozyme is found in saliva and tears in the eyes.

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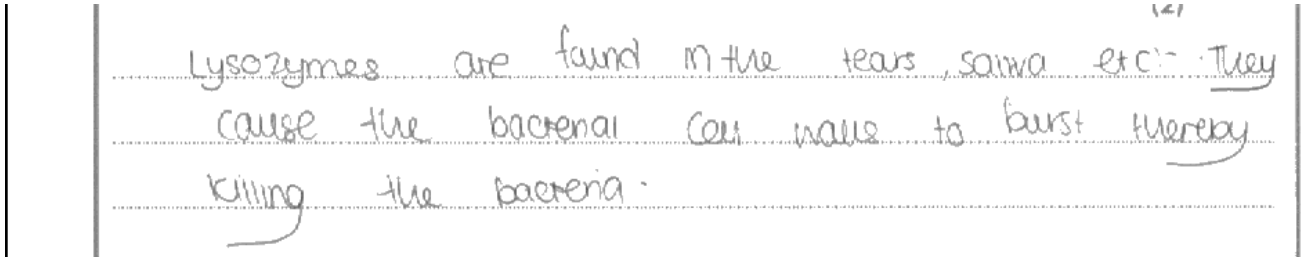
Examiner Comments

This candidate was one of the few who appreciated that lysozyme's role is to prevent bacterial infection.



Lysozymes are found in the tears, saliva etc. They cause the bacterial cell walls to burst thereby killing the bacteria.

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Examiner Comments

A typical first sentence describing where lysozyme is to be found. We felt that the reference to the enzyme causing the cell wall to burst was not accurate enough.

Question 06 (b) (i)

All sorts of confusion seen here between structure, function and properties. We ignored any irrelevant information written by the candidates. Many could tell us that enzymes are soluble but fewer made reference to the hydrophillic nature of the outer enzyme.

Question 06 (b) (iii)

A whole range of responses seen here; some very good and some very muddled, usually with translation. Full marks could only be obtained if the candidates expressed their answer in the context of lysozyme as requested and included the A2 content of this topic: post-transcriptional modification. The QWC focussed on spelling.

*(iii) Describe the processes involved in the production of the mRNA that codes for lysozyme.

(6)

- The process is called transcription, and takes place in the nucleus of a cell.
- RNA polymerase causes a DNA helix to separate into 2 strands so that the bases are exposed. This is done by breaking hydrogen bonds between bases, and only the part of the DNA containing the gene coding for lysozyme is unzipped.
- RNA mononucleotides align against the 5' to 3' (antisense) DNA strand by complementary base pairing: ~~A binds to~~ A–U form a pair, C–G and T–A (where there is thymine, adenine RNA binds and uracil binds to adenine) Hydrogen bonds form between complementary bases.
- RNA polymerase catalyses formation of phosphodiester bonds between the RNA mononucleotides, and this occurs ~~via~~ in condensation reactions.
- The pre-mRNA strand then dissociates from the DNA
- This undergoes post-transcription modification where introns ~~are~~ exo removed and exons are joined by RNA spliceosomes, so that the mRNA now has only the codons that would be translated into lysozyme.

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Examiner Comments

A good illustration of the standard of response that we were hoping for and saw. The candidate could not be awarded mark point 6 for their spelling error, but was still awarded the full six marks, as they made all the other points on our mark scheme.

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Examiner Tip

Try and write more relevant points that there are marks allocated to the question on a QWC question. If you are penalised a particular mark point, you can still achieve full marks if you have stated a sufficient number of our other mark points.

2 processes are involved in the production of mRNA that codes for lysozyme.

1) Transcription -> DNA helicase unzips and free RNA nucleotides from cytoplasm are brought in and arranged according to the base pairing rule.

B ~~RNA~~ helicase joins the free nucleotides to form messenger mRNA which leaves the nucleus through stroma going to the cytoplasm where translation occurs.

2) Translation -> is whereby mRNA codes for amino acids and are arranged to form a primary structure which is a peptide chain bonded through peptide bonds.

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Examiner Comments

The only potential point made by this candidate that is on mark scheme is the first one. However we cannot choose whether it is transcription or translation that they think makes the mRNA so nothing can be awarded.

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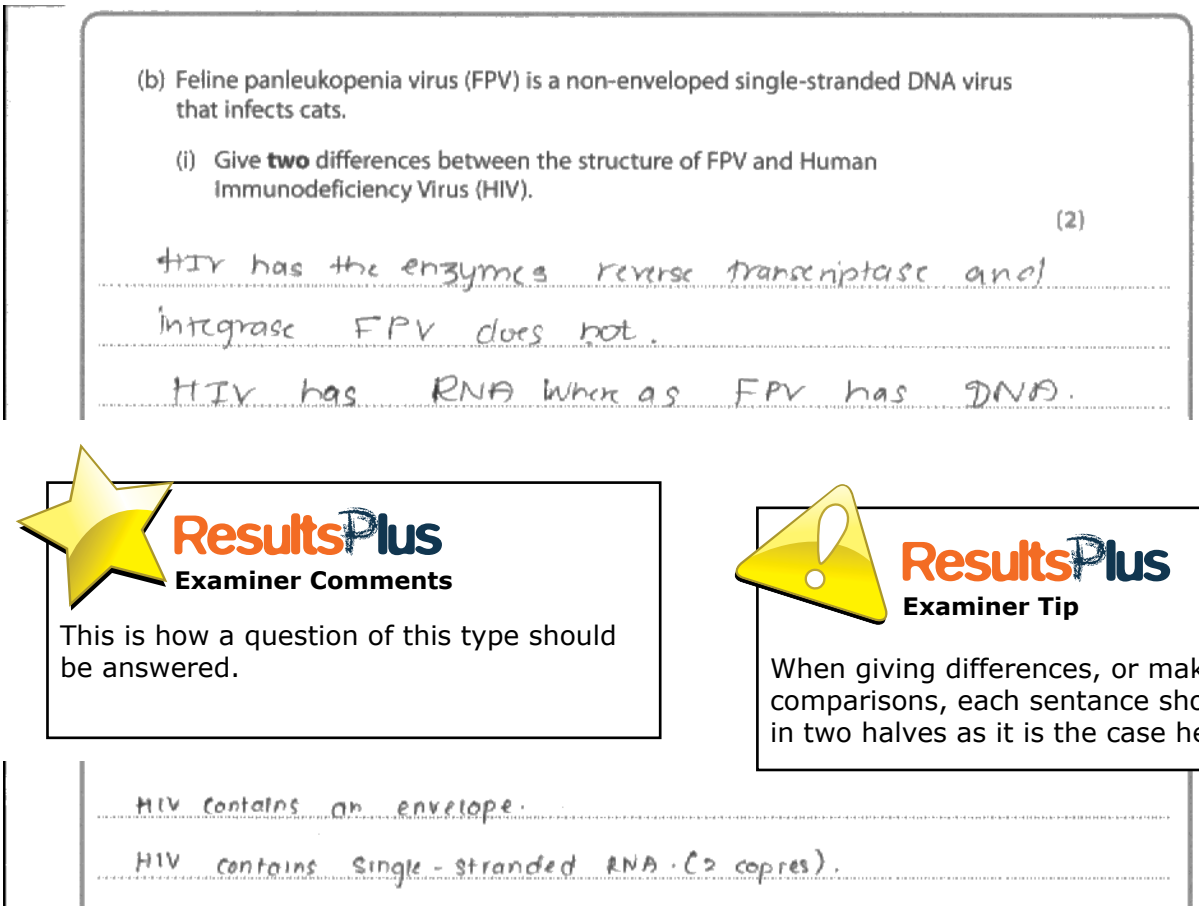
Examiner Tip

The examiner cannot choose what to mark, you have to make it clear.

Question 07 (b) (i)

As commented on in question 5a already, we frequently get two descriptions when we ask for two differences and this question was no exception.



(b) Feline panleukopenia virus (FPV) is a non-enveloped single-stranded DNA virus that infects cats.

(i) Give **two** differences between the structure of FPV and Human Immunodeficiency Virus (HIV).

(2)

HIV has the enzymes reverse transcriptase and integrase FPV does not.

HIV has RNA whereas FPV has DNA.

HIV contains an envelope.

HIV contains single-stranded RNA (2 copies).

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Examiner Comments

This is how a question of this type should be answered.

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Examiner Tip

When giving differences, or making comparisons, each sentance should be in two halves as it is the case here.

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Examiner Comments

This is an example of another type of mistake that candidates make in this type of question: they comment on one subject and not on the other; we need statements, in this case, on both viruses.

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Examiner Tip

You must make a comment about both subjects that you are asked about. The examiner will not assume that something is the opposite.

Question 07 (b) (ii)

Disappointingly, relatively few candidates spotted the significance of FPV particles being made in S phase of the cell cycle.

(ii) New FPV particles cannot be made unless the cells of the cat are in S-phase of the cell cycle.

S-phase occurs before mitosis. The DNA is replicated during S-phase.

Suggest why these FPV particles can only be made in S-phase of the cell cycle.

(1)

• DNA of virus must also be replicated using enzymes of cat cells to produce new virus particles

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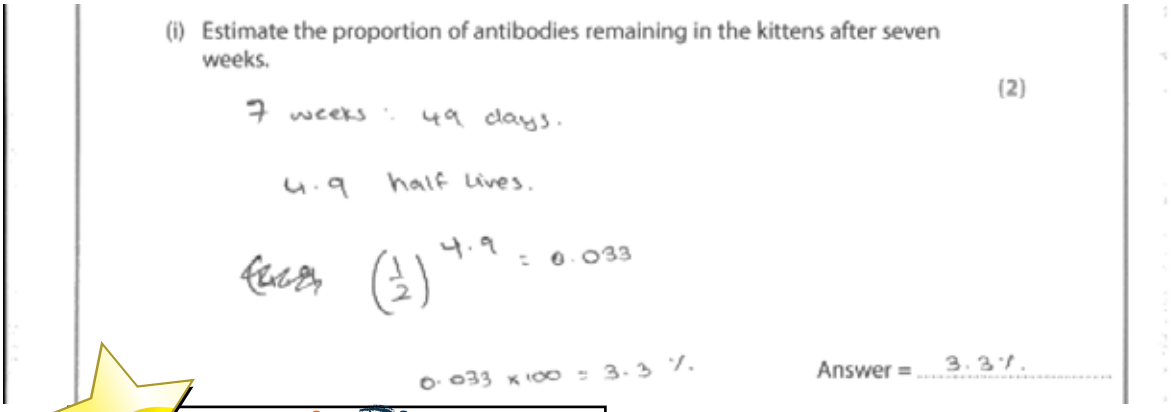
Examiner Comments

This candidate appreciated the point of the question and scored the mark.

Question 07 (c) (i)

This was a slightly unusual calculation for this paper but we saw very few blank spaces, with the majority of candidates attempting to answer it. There were a number of ways of calculating the answer and our mark scheme allowed for each of these. There were clearly some candidates who did not have a calculator with them; all of our papers are likely to have at least one calculation in them and candidates should therefore take a calculator into the exam with them.



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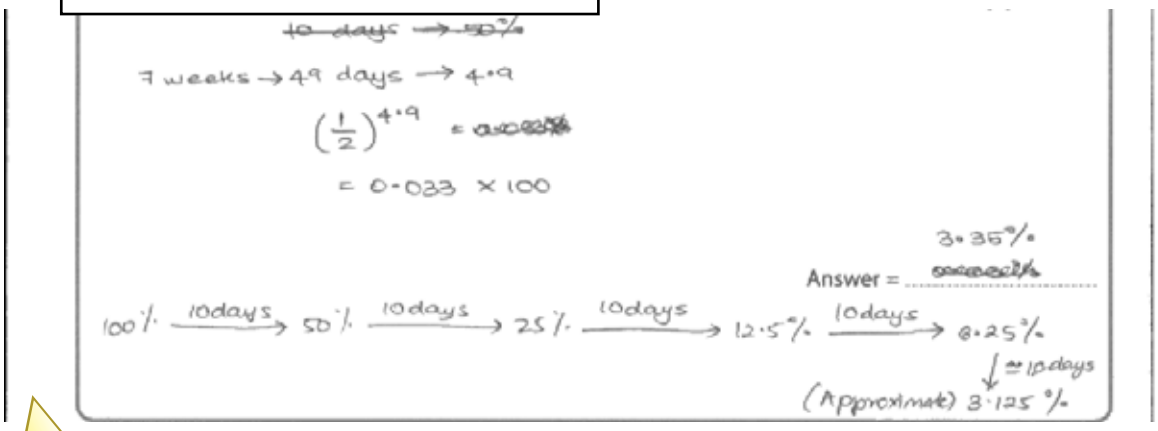
Examiner Comments

This is an example of one approach.



ResultsPlus
Examiner Comments

We gave this candidate the benefit of the doubt and ignored the wrong answer written on the answer line as both the calculations shown were correct and neither had arrived at 3.35%.

ResultsPlus
Examiner Tip

Be careful to write the correct answer on the answer line.

ResultsPlus
Examiner Comments

Correct answer scores the two marks.

ResultsPlus
Examiner Tip

Although you will score all available marks for the correct answer alone it is risky. You may have made a mistake and just the wrong answer will be given zero wheras showing your working will give you consequential error marks.

Question 07 (c) (ii)

Questions on the immune system always cause the most problems to candidates and this was no exception.

(ii) Suggest why these maternal antibodies do not give the kittens **long-lasting** protection against this virus.

(4)

Firstly, antibodies are proteins that they will be quickly destroyed. Moreover, It is a form of natural passive immunity, which doesn't stimulate the immune system of the kitten. So not only we do not have B-plasma cells but also we don't have production of B-memory cells. So the kittens aren't going to recognise the virus at a next infection.

ResultsPlus
Examiner Comments

This was an answer from one of the more able candidates who wrote a response that was more the exception than the rule. Full marks were awarded: mark points 3, 1, 4 and 5.

ResultsPlus
Examiner Tip

Immunology is a large chunk of the unit 4 spec and candidates should be fully prepared for questions. Use past mark schemes to help learn the basic principles.

Question 08 (a)

Responses were varied. Although mark point 1 is key to evolution by natural selection it was rarely seen. Most candidates got the gist of our second mark point but it was rarely awarded due to poor expression. Mark point 3 was frequently awarded except to those candidates who talked about genes instead of alleles and mark point 4 was very common.

8 Evolution of a species can come about through natural selection.

(a) Explain how natural selection can result in evolution.

(3)

Natural selection occurs in case of environmental change the species with best adaptive features survive, reproduce and pass on the advantageous alleles that code for the gene responsible for the adaptive features to their offsprings for future generation, the ones without advantageous allele die or migrate causing change in allele frequency hence evolution.

ResultsPlus
Examiner Comments

A good response except for the incorrect reference to genes when it should have been alleles.

ResultsPlus
Examiner Tip

You must make sure you understand the difference between genes and alleles.

~~Diffe~~ There are many different alleles in the gene pool. ~~However, the~~ This means that there are going to be different phenotypes. species with However, only ~~the~~ alleles that have a high Darwin fitness are going to survive and (natural selection) live long enough to reproduce. So this allele is going to pass to the next generations and its frequency will increase this leads to evolution

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Examiner Comments

Another good response, this time correctly expressing mark point 3.

x Through natural selection, only the most adapted individuals are selected, others are ellimination.

x The individuals will be subjected to a selection pressure, and individuals which survive it, will undergo mutation. As a result, different alleles will get expressed to withstand the selection pressure. So the individuals will undergo a change in genotype ~~and evolves~~ which results in evolution.

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Examiner Comments

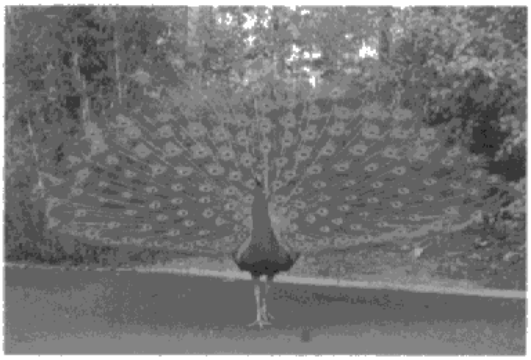
A poor wishy-washy response that did not quite meet any of our mark points.

Question 08 (b) (i)

This question caused few problems to the majority of candidates.

(b) Peafowl is a species of bird. The peacock is the male bird that has a large number of colourful feathers.

The photograph below shows a peacock displaying his feathers.



Magnification ×0.05

(i) Suggest why these colourful feathers have been selected for in the evolution of peacocks.

(2)

When they have colourful feathers, they will find it easier to find mates as they will be more attractive to mates. So, chances for reproduction are higher. Presence of colourful feathers will give them a selective advantage over those who don't have them.

ResultsPlus
Examiner Comments

Mark points 3 and 4 illustrated here, which were probably the most frequently awarded of all the points.

These with colourful feathers are more likely to attract mates and reproduce. ~~passing along~~. The colourful feathers might ~~stimulate~~ are drive predators away thinking that they are flowers.

ResultsPlus
Examiner Comments

Another good response illustrating mark points 3 and 4 again, but also mark point 2.

ResultsPlus
Examiner Tip

If you are not short of time in the exam it is a good idea to make more suggestions than there are marks allocated to the question, just in case one of your suggestions is not seen as being feasible.

Question 08 (b) (ii)

Very few problems encountered here.

(ii) Suggest why a large number of colourful feathers could be a disadvantage a peacock.

⇒ The feathers may make them visible to predators

ResultsPlus
Examiner Comments

We did award the mark but it would have been safer to have said why.

A large number of colourful feathers will make them more susceptible for hunters who may poach for peacocks illegally as they can bring them lots of money.

ResultsPlus
Examiner Comments

An example of one of the ideas that we were looking for.

Question 08 (b) (iii)

Again, candidates experienced few problems with this question, even though it was the last one on the paper.

(iii) Suggest why the female peafowl (peahen) has smaller, dull-coloured feathers.

(2)

There is no need for the peahen to have colourful feathers. The peahen is involved only in producing young. It would be biological waste for them to have coloured wings. They don't need to attract mates.

ResultsPlus
Examiner Comments

The idea of the female not needing to attract mates amused us but it was the right idea for mark point 1.

(iii) Suggest why the female peafowl (peahen) has smaller, dull-coloured feathers.

(2)

Female birds need to nest for a long time when they lay eggs, so ~~the gives~~ dull colors can help her stay out of predators' sight during the nesting time until the eggs hatch

ResultsPlus
Examiner Comments

Mark points 2 and 3 illustrated here.

Paper Summary

On the whole there were some very good responses but a number of candidates are still making the same mistakes as those who have gone before them, despite all the advise that we give, and you surely do as well.

Candidates must remember to:

- read the question through carefully and not just to word spot and assume the question
- revise all AS content thoroughly and always consider whether it needs to be included in the answer
- not to repeat the stem of the question or graph/table but to interpret it and then use it in their response
- not to write two descriptions when they are asked to compare or give differences
- show all workings out in their calculations
- learn and use the 'How Science Works' terms

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