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General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology 1

Report on the Examination

2012 examination – January series

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Science B / Biology
Higher Tier BLY1H

General

There were nine questions on the paper. Questions 1-5 were targeted at grades C – D. Of these questions 1, 3 and 4 were common with the Foundation tier paper. Questions 6-9 were targeted at grades A* – B.

Some command words were not fully understood by significant numbers of students. 'Explain' generally means give the reason for, the answer should normally contain link words such as 'because' or 'so that'. 'Suggest' means that there is no unique answer: students are expected to base their answers on scientific knowledge and/or principles. 'Evaluate' means give arguments for, arguments against and a reasoned conclusion.

Many students did not confine their answers to the spaces provided, instead writing in the margins or blank parts of other pages. These portions of the script are not scanned and the examiner may not be able to read what is written there.

Question 1 *(Standard Demand)*

(a) Half of the students gained full marks on this question. Most students referred to the soft body parts but many stated that the flesh disintegrated or was eroded rather than decayed. A number of students misread the question and focussed upon the formation of fossils with descriptions of how the skeleton 'decayed' slowly being replaced with minerals from the soil leaving a fossil behind.

(b) Almost all the students gained at least one mark for this question. Many students gained two marks by stating that the legs were like flippers / fins to walk with. Many aquatic features were given in the same answer. Streamlined, scales, flippers and fins were the most frequently stated aquatic features. Some students gave gills as an aquatic feature, a feature that could not be observed on the photograph.

Question 2 *(Standard Demand)*

(a) Most students realised that competition was involved, but only half of them went on to give an acceptable factor. Many students stated that the plants 'fought for resources'. The term dispersal was not always understood and the answer bore no resemblance to the question, examples of incorrect answers included descriptions of asexual reproduction and genetically identical plants or carrying on the family name or being able to reproduce quicker. The benefit to humans was another common answer such as 'the person who plants seeds does not have to do it'. There were also a number of answers which centred on the idea of extinction and a better chance of survival.

(b) It was surprising that only half of the students realised that the fruits were animal-dispersed. Those students who noticed the hooks normally went on to describe the hooks attaching to animals as they brushed passed. Most described the hooks as spikes or spines. There were many unacceptable descriptions of the hooks – stems, long arms, shoots, strands, tentacles, hairs, bits and even roots. Many students described wind dispersal with descriptions of how the fruits had a large surface area and were light. Others stated that the seeds exploded out of the shoots or birds' faeces spread the fruits. The hooks were also thought to protect the plant from predators or the spikes helped them to stick into the ground.

Question 3 *(Standard Demand)*

(a) It was surprising that only one third of the students could name all three structures. Most students recognised the muscle, but many gave sensory neurone or stimulus for **W**. The spinal cord was not well known, many students giving relay neurone or synapse.

(b) Half of the students failed to score on this question. The answers given suffered from a lack of comparison; many students had a good knowledge of the differences between hormones and reflex actions but could not bring the correct information into comparisons; eg 'Reflex actions are quick but hormones work over a long period of time.' Many students stated that hormones work inside the body and reflexes don't. There was a widespread belief that reflexes are triggered by an external stimulus and hormones just happen on their own.

Question 4 *(Standard Demand)*

(a) Only one third of students opted for hearsay, a majority choosing hypothesis.

(b) Only one tenth of the students knew what an experimental control was, many of them giving examples of controlled variables. The most common incorrect responses were 'time the feet were in the bowls' and 'the number of people'.

(c) Most students gained at least one mark, but few gained all three. Many students obtained two marks by stating "only some of cold water volunteers caught colds" and "some of other volunteers (wrapped up/no cold water) did catch colds". Many students failed to make a clear distinction between the test group and the control group of volunteers and some seemed to think that all the volunteers needed to catch a cold to prove the advice correct. Some students merely copied the information from the question without making it clear why they had selected this information. Few students noted the small sample size or that the test only lasted 20 minutes.

Question 5 *(Standard / High Demand)*

(a) The majority of students failed to notice that the question was about blood cholesterol concentration and gave exercise as one factor. Many students simply wrote 'fat' or 'saturated fat' without making it clear whether they were referring to diet or blood.

(b) **(i)** A majority of students gave the correct answer, most of the rest opting for positive correlation.

(b) **(ii)** Half of the students quoted the correct range. Many of the others focussed on the data for heart disease.

Question 6 *(High Demand)*

(a) **(i)** Many students seemed to be obsessed with the idea of curry spices but the idea that coriander 'kills bad bacteria' often then came at the end of the answer. Many thought that the coriander absorbed the methane or 'fought' / 'neutralised' bad bacteria. Others thought that it produced antibodies to attack pathogens. Some even thought that it changed bad bacteria into good bacteria!

(a) **(ii)** Very few students seemed to have noticed the information that 14% of the animal's food was converted into methane by the bacteria and that killing the bacteria would result in increased food for the animal resulting in faster growth. The majority ignored benefits to the farmer, instead concentrating on environmental effects. Others concentrated on antibiotics and stated that animals would be healthier. There were a few bizarre accounts of the inflammable nature of methane and how it would be less dangerous down on the farm.

(b) The mechanism of global warming is understood by the majority of students. Most of the answers pointed out that methane is a greenhouse gas and then went on to describe the effects of global warming. Consequently, only one mark was gained for the answer. Those few who attempted to describe the mechanism often became confused between radiation and reflection or heat and light. The fact that the energy absorbed by the methane had been radiated from the Earth was rarely seen. As we have come to expect, the ozone layer suffered a lot of damage.

Question 7 ***(High Demand)***

(a) Only a minority of students gained both marks. Many students referred to gametes, but failed to mention fusion during fertilisation. Similarly, many students mentioned two parents, but failed to refer to their genes / chromosomes / DNA.

(b) **(i)** Only a tiny minority of students gained all three marks. Many students gave accounts of adult cell cloning. Almost half of the students mentioned the use of enzymes but most were very vague as to where the gene was extracted from and where the gene was inserted. Few referred to the pout chromosome. Most students went on to state that the gene was inserted into a salmon or its cells rather than the egg or embryo.

(b) **(ii)** Most students misread the question which asked why the government might not allow the production of GM salmon. They therefore answered mainly in terms of ethics and religion rather than the possibility of the gene being transferred to the wild population or possible effects on human health.

Question 8 ***(High Demand)***

(a) Many students referred to "a dead or inactive form" went on to state 'of the disease' rather than bacterium / virus / pathogen. Many students gained only two marks, most of these by stating that white blood cells produce antibodies. However, a considerable number stated that it was the body that produced the antibodies. Antibodies were frequently confused with antigens or antitoxins. As usual the majority of students thought that immunity results from the persistence of antibodies rather than their rapid production by the white blood cells upon reinfection. Many students stated that 'when the pathogen came back the white blood cells / body knew how to fight it'. Again a significant number described an immediate response to re-invasion by the pathogens but described the white blood cells' / body's response in terms of a lot of antibodies produced rather in terms of the speed of antibody production. Many students answered in terms of 'memory cells' but in a number of cases the 'memory' component resided in either "the body" or in "the antibodies".

(b) **(i)** There were frequent references to 'if you stop, you get withdrawal symptoms'; references to craving; or to ideas of getting used to it. There were also references to nicotine making you feel good / relaxing you / reducing stress or tension. Only a quarter of the students correctly referred to effects on body chemistry.

(b) (ii) The number of students who thought that 'vaccination' would 'kill nicotine' was staggering. Practically no students stated that the 'vaccine' would stimulate antibody production. Even fewer went on to state the effect of this antibody production. However, a few students did convey the idea that the combined molecule would be too large to pass into the brain.

Question 9 *(High Demand)*

There were many good answers to this question with students recognising that there needed to be some 'value added' to the information given in the question stem. Most students gave a clear comparison of the effectiveness of each method and many recognised that there was a convenience in not having to remember the IUCD every day. Some students did not go on to look at the disadvantages of the IUCD, clearly not recognising the need for both sides in an evaluation. Those students who did discuss the disadvantages, in the main, recognised either that the IUCD might be painful / damaging. Very few responses discussed the issue of the IUCD preventing the fertilised egg developing. One common misconception given in this answer was that only the pill involved hormones and possible side-effects of the pill were then discussed. Many students recognised that the preferred method to use would depend on the woman's circumstances. Expressed clearly, with reasons, this would obtain the conclusion mark. This way of obtaining the mark seemed to be gained more often. Fewer students gained the conclusion mark by expressing a preference, and then explaining their choice with both an advantage and disadvantage. Far fewer students than in the past resorted to a tabulated list of 'pros and cons'. There were many more narrative answers and comparisons between IUCD and the Pill were often made.

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