

Examiners' Report/
Principal Examiner Feedback

Summer 2016

Pearson Edexcel PLSC
in Science (LSC01)
Year 9 Achievement Test

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General comments

This was the fifth examination for the Year 9 Achievement Test in Science. Many candidates seemed to be well prepared and the paper seemed to give candidates of all abilities the opportunity to demonstrate their knowledge and understanding. The majority of candidates attempted all the questions which was evidence of the overall accessibility of the paper. There was no indication of candidates being short of time.

The paper produced a wide spread of marks indicating that the paper successfully differentiated between students of varying abilities. The groups of ten multiple choice sections were designed to become more difficult as the paper progressed and this was reflected in the performance of the candidates. As in the past it was noticeable that Section B, which contained free response questions designed to test practical and experimental skills, proved more challenging to most students than did Section A.

Comments on individual questions

Section A

Question 1

Most candidates knew that the root takes up water but significant numbers thought it was the leaf.

Question 2

Most appreciated that a mixture of sand and iron filings is best separated by using magnetism.

Question 3

The majority knew that gravity is a force measured in newtons with option A proving a good distractor suggesting a force but with the incorrect units.

Question 4

This question surprisingly caused problems with many not selecting a producer and all of the options were seen on a regular basis.

Question 5

This proved very accessible to many but as expected there was some confusion between ductile and malleable.

Question 6

Almost all chose the correct direction arrow for the force of weight.

Question 7

Most knew why fertilisers are used to improve growth but the two options involving water also proved attractive.

Question 8

The majority selected burning as being impossible to reverse.

Question 9

Choosing C as the direction of reflection proved quite straightforward for most with B understandably being the most common incorrect selection.

Question 10

Most were able to interpret the force diagrams using the relative sizes of the arrows.

Question 11

Most were able to gain at least one mark for (a) by mentioning *human made* or *man-made* but many candidates failed to give the idea of orbiting.

Although most gave at least one acceptable use in (b) there were too many vague answers e.g. *take pictures*. Surprisingly some gave examples of types of satellites such as geostationary or polar satellites.

Question 12

This proved to be a challenging question with, in (a), fewer than expected of the candidates appreciating whether the forces were balanced or unbalanced in the different situations. In (b) many correctly identified weight as a force which would increase but few gave two acceptable answers.

Question 13

The vast majority gained full marks in this question involving food webs.

Question 14

As expected almost all knew the correct chemical formula for water.

Question 15

Most knew the nucleus of a cell contains genetic material but vacuole attracted quite a few candidates.

Question 16

The correct answer of A was the most common answer although answer B was also popular, presumably because they knew slate is a hard igneous rock. However, this answer does not really explain why slate is used for house roofs.

Question 17

This question as to why the force of gravity on the Moon is less than the force of gravity on the Earth proved taxing, as although the correct answer, D, was often given, all the other three alternatives were commonly seen.

Question 18

Identifying diagrams of chromosomes, genes and DNA was carried out rather better than expected. Mixing up genes and chromosomes was the most common error.

Question 19

Most knew that galvanising means coating with zinc.

Question 20

The majority selected the correct energy transfer taking place when using a hairdryer.

Question 21

The diagram showed the human respiratory system but significant numbers thought it was the digestive system.

Question 22

Most identified potassium as the most reactive metal.

Question 23

From the diagrams most correctly chose helium existing as atoms and hydrogen as molecules.

Question 24

In (a) the majority of candidates were able to put the metals in the correct order from most to least reactive. Of those that did not, few identified the most and least reactive, even in reverse order, implying they just did not understand the information in the table. Some tried to identify the names of the metals. In (b) most correctly elected B as most likely to be copper with D the most common alternative.

Question 25

This question, particularly part (b), proved to be very discerning in identifying the best candidates as genetic modification is not an easy topic at this level. Many were able to gain at least 1 mark for giving a suitable environmental factor in part (a). However, only the most able candidates were awarded marks elsewhere in part (b) of the question. In (i) the meaning of the term *genetically modified* was particularly poorly understood, with many different but rather vague responses offered about genes being changed or altered. Others wrote about cloning or selective breeding. In part (ii) some candidates were able to be allowed a mark for an answer deemed equivalent to *increased yield/vitamin content*. In part (iii) many did not gain credit as they suggested genetically modified plants are dangerous/harmful or cause cancer.

Question 26

Only a minority of candidates were able to calculate the correct answer in this question about moments. Some were able to gain one mark for their working but more often the numbers given in the question seemed to be just thrown together without any logic or method. It was evident that some candidates did not have a calculator.

Question 27

Many could not pick out alleles as being different forms of the same gene with genotypes being the most common alternative selection.

Question 28

The displacement reaction between iron and copper oxide was surprisingly considered to be combustion by many candidates.

Question 29

The reading on the voltmeter in the electrical circuit was correctly given as 2V by many with 6V as a common incorrect answer.

Question 30

The question on health risks was correctly answered by most.

Question 31

Almost all candidates selected the correct formula for calcium carbonate.

Question 32

Identifying the point where the gravitational force would be lowest proved difficult with all answers being given regularly.

Question 33

Selecting the correct features of asexual reproduction proved difficult with many in particular believing the offspring would be genetically identical.

Question 34

The efficiency of the light bulb from the Sankey diagram was correctly calculated by many with the obvious distractor of B being the second most common answer.

Question 35

This question required the selection of the correct calculation for working out the pressure of a man wearing snow shoes. As expected it proved challenging with only the best regularly getting it correct.

Question 36

The relationship between light intensity and rate of photosynthesis was correctly picked out by more candidates than in the past.

Question 37

In (a) acid rain was the most commonly identified environmental problem and breathing problems were mentioned quite regularly. In part (b)(i) the question involved interpreting the information on air pollution in the table. This was too difficult for most candidates with very few obtaining the correct answer and many indicating *little/small amounts of pollution* or hedging their bets with *little or no pollution*. Also part (ii) was very rarely answered correctly with *micro-organisms* often seen as a wrong answer.

Question 38

Part (a) was well answered by many but variations on sulfate such as sulfide were sometimes seen. In (b) most candidates were able to recall the symbol for magnesium; however a minority were able to balance the equation correctly. In some instances, candidates wrote numbers after the formula e.g. HCl_2

Question 39

This proved a very difficult question. Very few students scored full marks, many were confused with cloning and described the cloning process.

Many responses mention selecting two horses with "desirable characteristics" however they did not identify speed as the requisite quality of the parent horses. M2 in the Mark Scheme was the most commonly awarded one. Hardly any candidates described repeating the process after the first offspring.

Section B

As always, this section contained questions which were mainly practically based. As in previous years, the responses in this the section were again generally not as good as those in the earlier section.

Question 40

(a)(i) Most correctly stated it was to ensure a fair test but in (ii) some candidates gave information that was given in the question such as volume or type of drink.

In (b)(i) excellent graph plotting skills were seen. Nearly all candidates scored at least one, with the majority gaining both marks. In (ii) many identified the incorrect temperature although less were able to give an acceptable reason.

In (iii) the curve was drawn well on the majority of occasions. When done incorrectly it was usually because the anomalous point had been included. It was very rare to see the lines joined up dot-to-dot.

Part (c) was difficult and was correctly answered by strong candidates who usually suggested *because of rooms with different temperatures*. Many did not really give a reason with a common answer *because A cooled down more*.

(d)(i) as expected was most often correct but more than expected gave incorrect readings. (d)(ii) was poorly answered with candidates often just giving vague answers involving the term *accurate*.

Question 41

(a) Many did correctly suggest a timer or ruler. The most common incorrect answer was *thermometer* perhaps because of the Bunsen in the diagram or candidates may have been thinking about the previous question. In (b) the possibility of *burns* was often suggested and in (c) many made at least one sensible suggestion about what must be done to ensure a fair test, but *same amount of heat* was not accepted. In (d)(i) independent and dependent variables, as has been the case in the past, were poorly identified, but in (e) most were able to suggest *repeating* to make the results reliable. Most candidates correctly interpreted the bar chart in (f)(i) and good candidates finished the paper well by correctly choosing stainless steel and giving a sensible explanation.

Summary Section

Based on their performance on this paper, candidates should:

- Be given as much practical experience as possible
- In practical situations consider why particular steps in a method are used
- Think about the identification and understanding of, the terms dependent and independent variables
- Read more about genetic modification of plants and its implications
- Read more about selective breeding
- Practise calculations on moments
- Ensure that they take a calculator into the examination

