

Examiners' Report

Summer 2013

PLSC Science (LSC01/01)
Year 9 Achievement Test

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General comments

This was the second examination for the Year 9 Achievement Test in science. Many candidates were very well prepared and it was pleasing to see them able to display their knowledge and understanding of science at this level.

There were very few scripts with blank spaces indicating the accessibility of the questions but also showing that the paper was able to be completed in the time available. There was a good spread of marks indicating the differentiating qualities of the paper.

Some candidates scored very highly indeed with full marks, particularly in the first two multiple choice sections, not uncommon. Free response questions proved to be good opportunities for candidates to display their ability to use, and show their understanding of, scientific terms and principles. Many candidates showed a very high standard reflecting hard work by both them and teachers and they deserve congratulations on their efforts.

Comments on individual questions

Question 1

Most candidates answered this correctly although A was suggested quite often.

Question 2

Most candidates answered this correctly but significant numbers misunderstood the question and suggested that metals were magnetic (C).

Question 3

Most candidates recognised the symbol for a voltmeter.

Question 4

Almost all candidates chose the correct function of the ovaries.

Question 5

Most candidates appreciated that copper is used to make wire in circuits as it is a good electrical conductor but some chose A (it is a good thermal conductor), possibly just picking up on the word conductor.

Question 6

Most chose the correct units for energy.

Question 7

This proved to be one of the more challenging questions of the first set of multiple-choice questions with significant numbers thinking strawberry plants producing runners is an example of sexual reproduction.

Question 8

Most candidates recognised the particle model of a solid.

Question 9

Many candidates picked out the correct description of an artificial satellite.

Question 10

The majority of candidates correctly worked out the resultant force on the bar although some chose B (25N down) instead of A (25N up).

Question 11

This proved to be a challenging question for many candidates and certainly discriminated amongst them.

In part (a) only the strongest candidates gave both water and glucose with sugar being a common acceptable alternative. Many candidates knew light and chlorophyll were also involved in photosynthesis and suggested them as answers in the word equation. As long as the correct answers were also given they were ignored.

Question 11(b)

This question required candidates to describe from a graph how the rate of photosynthesis is affected by the amount of carbon dioxide in the air. Quite a lot could describe the situation in the sloped part of the curve and so gained the first mark but only the very best candidates correctly described what was happening in the horizontal section of the curve. Most incorrectly thought that the amount of carbon dioxide was constant when it was actually still increasing; it was the rate of photosynthesis which was constant. It also seemed that some candidates did not understand the meaning of the word "affected" in the context of the question.

Question 11(c)

This mark proved inaccessible to all except the strongest candidates.

Question 12(a)

It was disappointing that many did not recognise the reaction as being neutralisation. Displacement was a common incorrect answer while others simply put chemical reaction.

Question 12(b)

Only the strongest candidates appreciated that using excess copper oxide ensures all the sulphuric acid is neutralised or reacted.

Question 12(c)

Most could correctly give the left side of the word equation but most also missed out water from the right hand side. Some strong candidates gave balanced equations and were deservedly awarded the marks.

Question 13(a)

Most recognised that the letter S represented the pivot or fulcrum but some weaker candidates thought that the answer had to begin with the letter S and so suggested answers such as South.

Question 13(b)

Many gave correct answers but some incorrectly suggested making the rock smaller.

Question 13(c)

It was very good to see so many correct answers to the calculation of the moment even from those who evidently had no calculator or who had been unable to give correct answers to earlier parts of the question.

Question 14(a)

Many candidates suggested it was to allow the train to go fast rather than giving an explanation referring to the shape decreasing air resistance or making the train streamlined.

Question 14(b)

Many correct answers were seen to the calculation of the average speed of the train even from those who evidently had no calculator.

Question 15

Most candidates answered this correctly.

Question 16

Most candidates answered this correctly but some thought carbon dioxide and glucose were mixtures.

Question 17

Most candidates gave the correct answer.

Question 18

Most candidates answered this correctly but some thought the digestive system transports substances throughout the body.

Question 19

Most candidates knew that igneous rocks are made from cooling magma or lava but significant numbers suggested they were made by changing existing rocks by heat and pressure.

Question 20

Most candidates answered this correctly.

Question 21

Most candidates answered this correctly but some were attracted by the word lungs and so incorrectly gave A as the answer.

Question 22

This was incorrectly answered by many with D commonly given as the answer suggesting hydrogen was produced instead of carbon dioxide.

Question 23

Many answered this correctly but it was not uncommon to see any of the other alternatives.

Question 24

Most knew that green pigment in plant cells is chlorophyll but some were attracted by the answer chloroplast.

Question 25(a)

Most were able to describe how beetles help the farmer have a bigger wheat harvest but in (b) it seemed that many did not understand the word "affect" and simply repeated the word.

Question 26(a)

The question asked for an organ system so the word lungs was not acceptable but almost all candidates gave a correct answer in (b).

Question 27

This was a good discriminator. Part (a) was very often correct but in (b) many thought that hydrogen or carbon dioxide is produced when an acid reacts with a base. The equation in (c) was accessible to stronger candidates.

Part (d)(i) asked for two harmful effects of acid rain. It was regrettable that lots of answers were too vague or contained incorrect references to skin damage, cancer and damage to the environment or simply pollution. Answers concerning damage to statues and buildings did not gain credit unless the key word limestone or marble was also given.

In (d)(ii) the answers showed there was some confusion between numbers of atoms and numbers of elements.

Question 28

Many candidates gained all three marks although some incorrectly answered (a) as chemical energy instead of electrical energy.

Several questions in this last group were more demanding and discriminated between candidates.

Question 29

This was the easiest question and was correctly answered by most candidates.

Question 30

The reason for scratched galvanised nails not rusting was not well understood and all four answers were seen.

Question 31

The correct answer of refraction was given by many but many suggested diffraction.

Question 32

Many answered this correctly but many gave the opposite answer of B.

Question 33

This involved choosing an example of a chemical reaction and although many did give the correct answer all the other three alternatives were suggested.

Question 34

Describing a satellite in polar orbit proved to be challenging with all four answers being seen.

Question 35

Most candidates gave the correct answer but some thought one of the plants grew taller because the seeds had different numbers of genes.

Question 36

The correct word equation for rusting was picked out by most but some chose B which did not contain oxygen.

Question 37

Selecting the correct formulae for sodium chloride and water was correctly done by most but it was surprising to see how many selected S as the symbol for sodium.

Question 38

Most correctly identified water resistance as being responsible for slowing down a swordfish but air resistance and gravity were also suggested by quite a few.

Question 39

In (a) many were able to give a correct prediction and in (b) which was a straightforward data interpretation and prediction exercise, it was surprising that more than expected did not score both marks. In (c) although the majority appreciated that the springs were made of different materials others incorrectly focussed on the lengths.

Question 40 (a)

This was very accessible with the majority scoring both marks. In (b) many correctly answered goggles but it was surprising to see sunglasses being suggested so often. In (c)(i) too many candidates simply said silver was unreactive or very unreactive when a comparison was required to score the mark. In (ii) many just quoted the reactivity series without referring to the evidence given in the question.

Question 41

It was pleasing to see that many were able to plot the line graph as instructed and scored full marks. However some chose non-linear scales and others drew bar charts. Most correctly identified the anomalous point.

Question 42

This proved to be a good discriminator. In (a) large number of candidates were unable to identify the independent and dependent variables making suggestions such as the tripod or Bunsen or giving numerical answers. In

(b) only the best candidates could describe the pattern shown by the results but in (ii) most could pick out the result which did not fit in with the pattern.

(c) This was worth two marks and candidates should appreciate that just a simple suggestion such as repeat the test will only score one mark. Most did score this mark with only the strongest candidates scoring a second mark.

Summary Section

Based on their performance on this paper, candidates should:

- be given assistance to improve their skills in interpreting graphs;
- be given every opportunity to improve their practical skills and the reasons for taking particular steps in a practical experiment;
- practice word and simple formulae equations;
- be clear what the term "affect" means in a question;
- not give vague answers but rather try to be specific eg when asked about the effects of acid rain;
- improve their understanding of the terms dependent and independent variables;
- be given further opportunities to produce their own graphs from data including the need to choose sensible linear scales.

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