Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel GCSE Combined Science

(1SC0) Paper 1PF

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The candidates did particularly well on the mathematically-related questions. Achievement was not so great with ‘explain’ questions and ‘how to’ (experimental) questions proved to be the hardest for students to respond to, although some baulked that trend and did very well.

Question 1

1 (b) (i) Nearly everyone gave an acceptable answer for x-ray usefulness, with nearly all saying ‘to see broken bones’.

1 (b) (ii) The answers seen here were mostly creditable, with many citing cancer as a proposed harm.

1 (c) Some candidates recognised infrared as the electromagnetic radiation that is associated with a burning fire and many candidates knew that the energy transferred to the hands was thermal energy. Significant numbers of candidates showed confusions in their response to this question however.

Question 2

2 (a) (i) Most candidates did well with this, correctly multiplying the values of m, g and Δh. A few got into trouble with wrongly changing the mass, or with neglecting to include the value of g.

2 (a) (ii) Many achieved success with this. Some did not square the 6.0, but still achieved some marks.

2 (a) (iii) Some success seen here, talking about the kinetic energy being lost / dissipated to the surroundings. Some were not clear enough in their explanations however, not answering ‘what **happens** to the K.E.?’.

2 (b) (i) A majority of candidates worked this out well.

2 (b) (ii) Most got this correct as 0.79 (0.8 accepted). With 79 the ‘%’ sign was needed to get the second mark point.

Question 3

3 (a) (ii) Many candidates worked along the right lines using the horizontal section of the graph to arrive at 0.6s. It was incorrect to use decelerating part, so if the result was 2.0 – 0.6, that showed the wrong part being used. Some candidates misread the graph arriving at 0.7s for their answer. They scored the first mark point, however, with a correct identification.

3 (b) Some candidates achieved success with this question giving experimental descriptions of measuring a distance (or a time) taken to stop, and then going on to talk about changing the surface. Many candidates, however, did not focus on the ‘how’, which invariably requires an experimental focus. Instead they gave conjectural answers

of what would result with different surfaces, slippery or otherwise. Those type of answers could not gain any credit.

3 (c) (i) Most candidates correctly identified the anomalous value.

3 (c) (ii) Many students achieved success with this question either by taking the average of the four distances, ignoring the anomaly, or by averaging all 5. Coincidentally candidates achieved success through finding the median, since that gave the same answer (0.35) as the mean.

3 (c) (iii) Most did well on this with a majority opting to increase the slope. Some chose giving the toy car a push, equally acceptable.

3 (d) Most achieved success with this, with correct substitutions and evaluations.

Question 4

(b) (i) Many candidates included the use of a stop watch, and some the use of a ruler. The mark scheme required the candidate to suggest measuring an appropriate distance and an appropriate time. Some distances and times were too vaguely stated to credit and some required benefit of doubt to be applied. Very fine professional judgments were often required. Candidates would help themselves by stating clearly the beginning and end points of time and distance measurements. A small number explained how they would calculate the speed by dividing distance by time.

(b) (ii) Some attempts at this achieved partial success in drawing lines on the test tube or filling the test tube to different levels. Rarely seen full marks answers compared times or speeds for different distances the ball had fallen through.

4 (c) Some candidates achieved success with this calculating v from substituting in $v^2 - u^2 = 2 \times a \times x$ (= 30). Getting to 30 or a correct substitution got you 1 mark. To get to 2 marks the square root then had to be taken.

Question 5

(a) this proved to be a demanding question. Whilst many managed to use some reading associated with the x-axis relatively few recognised that ¾ of a wave was shown on the graph, and then using such an idea to calculate what a whole wavelength would be.

(b) (i) Many candidates found it hard to express themselves with this question. Candidates attempted to describe counting waves in a certain time (to be measured). Candidates were not good at describing how the frequency was arrived at via $\text{frequency} = \frac{\text{number of waves}}{\text{time}}$

(ii) Rearrangement of the equation to make λ the subject eluded most candidates. Most incorrectly just multiplied the two numbers together.

(iii) A minority of candidates knew the difference between transverse waves and longitudinal waves.
(c) This was a straight forward question requiring the multiplication of speed and time to obtain distance. The vast majority succeeded with this.

Question 6

(b) a good number of candidates succeeded with this question, including answering via atomic number and mass number. Regrettably a few got their descriptions of a similarity / difference the wrong way round.

(c) (i) Some students recognised that the aluminium blocked the beta particles. Very few made explicit that (without that aluminium) then more beta particles reached the GM tube.

(ii) Candidates largely failed to see that background radiation accounted for a reading on the counter with the beta source taken away.

(iii) A very small number of students recalled Becquerels - the SI unit for Activity.

(d) This question enabled candidates to access the full range of marks. Candidates knew about both dangers of radiation and protection against the harmful effects of radiation.