Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

November 2021

Pearson Edexcel GCSE Combined Science
(1SC0) Paper 1PH

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Question 1

(a) Many candidates seemed put off by the fact that an incomplete wave was shown. More confident candidates were able to calculate the wavelength from the portion of the wave shown in the diagram, but although many were able to identify a suitable distance on the horizontal axis, they often failed to arrive at a correct value for wavelength.

(b)(i) Although many candidates incorrectly attempted to describe measuring velocity and wavelength followed by use of the wave equation, most candidates had the idea of counting waves over a period of time. Many often failed to express themselves clearly enough to score all three marks.

(b)(ii) Most candidates were able to use the supplied values to calculate wavelength.

(b)(iii) The difference between transverse and longitudinal waves was often described using the ideas of perpendicular and parallel vibrations but answers commonly failed to clearly relate this to the direction of travel of the wave.

Question 2

(b) Candidates usually correctly described isotopes in terms of proton and neutron number although many included electrons in the description. Credit was given for correct reference to atomic number and mass number.

(c)(i) Candidates could state that the removal of the aluminium sheet was responsible for the increase in count rate but sometimes failed to clearly state that the sheet had previously been absorbing or blocking the beta particles.

(c)(ii) The idea of background radiation was generally known.

(c)(iii) The SI unit for activity was not well known.

(d) Candidates generally knew that a division by 3 was required but there was less clarity about exactly which quantity to divide.

Question 3

(a)(i) Most candidates could draw a reasonable best fit curve through the given points with only a minority either missing some of the points or drawing a very untidy line.

(a)(ii) Most candidates could extrapolate their curve to obtain a reasonable value at 80^{o}.

(a)(iii) Candidates could generally describe the graph in terms of angle r increasing with angle I but many failed to mention the non-linearity of this relationship.

(c) Examiners were looking for two reasons for the decrease in intensity of the light. Credit was most commonly given for descriptions of some light being attenuated or

absorbed by the glass during transmission. Only a minority of candidates mentioned partial reflection of the light at the surface of the glass.

Question 4

(b)(i) A mark was given for recalling the equation linking change in velocity , acceleration and time. Identifying the values from the graph and using the equation correctly scored a second mark. The final mark was given for showing that the answer should have the same number of significant figures as those substituted into the equation; in this case 2 figures. The mark for this, independent mathematical skill, could be awarded as a result of an incorrect calculation provided that the final value was rounded accordingly.

(b)(ii) Some candidates made some progress in calculating the area under graph and a few of those carried this through successfully. Others successfully used the equation linking velocity, acceleration and distance. Most incorrect answers attempted a calculation using the formula for distance, speed and time using either initial or final values on the graph.

(c) Candidates were often able to score one mark by mentioning that the acceleration increases. However, it was common to see responses that attributed this to the constant resultant force from the engines. This exposed widespread confusion between acceleration and velocity. Examiners saw very few answers that mentioned a change in mass of the rocket as fuel was being consumed.

Question 5

(a) Very many candidates were able confidently perform the calculation using the given values with the equation supplied.

(b)(i) The idea of the limitations associated with reaction time was commonly known.

(b)(ii) Most improvements focussed on improving the accuracy of time measurement by using some electronic timing method. A few suggested dropping from a greater height in order to give a longer time. Incorrect answers usually described repetition of the same procedure; either by the same students or by additional students. Candidates need to be aware that although repeating measurements is good practice, this is not the only way of improving a procedure.

(c) (i) Candidates could often select the correct equation and use it calculate the force from the values given for momentum and time. It was also pleasing to see that many rounded the value given on the calculator to 2 or 3 significant figures.

(c) (ii) Many candidates seemed uncertain about the term magnitude and attempted to give descriptive answers rather than a numerical value. Most knew the direction of the force.

(d) This two stage calculation proved too challenging for many candidates who did not appreciate that the velocity of the ball needed to be determined in order to calculate the momentum and instead attempted to find and use a single equation that could include the values of g, h and momentum.

Question 6

(a) The risk of radiation causing cancer was well known and better candidates could explain that this is particularly dangerous if the source is inside the body; in other words emitted from food that has been eaten.

(b) It was widely appreciated that food irradiation can make the food “cleaner” in some way; usually by sterilising it. There was less clarity that this is achieved by destroying harmful pathogens.

(c) Correct answers were usually given in terms of a change in energy or an increase in stability.

(d) Examiners saw some very clear descriptions of alpha and beta radiation with correct descriptions of the effect on the nucleus for at least one type of radiation. Such responses were level 3. Weaker candidates gave a level 2 response that either gave a comparison of the effects on the nucleus of the two types of radiation or described both the nature and effect on the nucleus of just one type. Level 1 responses mainly gave some basic facts about one type of radiation. Many candidates gave unnecessary information about properties of the radiation (for example, ionising ability, penetration through substances or dangers). Although possibly correct, this did not address what the radiation actually consists of. Candidates also tended to include gamma radiation in their responses.