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June 2011

International GCSE
Physics (4PH0) Paper 2P

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International GCSE Physics 4PH0 2P Report - Summer 2011

Question 1

Candidates appeared to have prepared very well for the astronomy section of the specification. The vast majority of candidates scored well in all sections of this question. The only parts that seemed to cause any difficulty, and this was only for the weaker candidates, were about the structure of the Solar System (a)(ii) and choosing the correct unit for gravitational field strength (d).

Question 2

The first part of this question (a) was designed to test AO3. In their description, candidates were expected to clarify how they would observe and record whilst investigating the field of the bar magnet.

Most candidates were able to describe some basic observation. Usually, this was explicit but sometimes it was implied through the subsequent recording activity they described. Some candidates observed the field using iron filings, however these candidates rarely went on to describe how the observation would be recorded. Many candidates gave a clear description of how they would record their observations to show the shape of a single line of flux. The best answers included a method that would yield a fuller record of the magnetic field, for instance repeating the technique used for a first line, but starting from a different place on the magnet.

The magnetic field question (b) was answered well by most candidates. Many drew the correct field pattern with the magnetic lines of flux distributed properly around the magnet. However, some candidates appeared to be less certain of the direction of the field and their diagrams were spoiled by the omission of any arrows or the inclusion of some contradictory arrows. Some otherwise good diagrams were spoiled by the inclusion of field lines that crossed.

Question 3

Candidates seemed to have prepared well for the electrostatics section of the specification. Most candidates mentioned friction in their explanation (a) of why the aircraft became charged. However, very few of these answers went on explicitly to include the idea of electron transfer. Most candidates could identify a possible danger of refuelling a charged aircraft (b) and nearly all identified the earth connection correctly (c). Most explanations included the idea of charge flowing in the wire, but few candidates went on to complete their explanation by mentioning that the aircraft would be discharged. A few candidates confused the situation and explained the combined action of an earth wire and a fuse.

Question 4

Many candidates could describe digital signals adequately (a). This was usually done in terms of binary coding (e.g. 0 and 1, or just “on” and “off”). Far fewer could describe analogue signals as continuously variable. Those who chose to draw labeled diagrams of the waveforms usually did well. Many candidates struggled to give an advantage (b) of analogue signals. There was a large proportion of vague answers, for instance just mentioning improved clarity or a lack of interference. Developed ideas such as the removal of noise or signal regeneration were rarely offered.

The diffraction part (c) of this question was not generally well answered. Few candidates chose to answer in terms of wavelength and so made their task difficult. Fewer seemed to be properly clear about the nature of diffraction. However, there were some very good answers from candidates who were able to relate the situation to their understanding of diffraction and wavelength. Again, those who illustrated their answer with a diagram usually did well.

Question 5

Parts (b) and (c) of this question were designed to test AO3. Candidates were expected to communicate and analyse data using the graph and then to evaluate the data and methods presented in the question.

The majority of candidates calculated (a) the weight of a 1.5 kg mass successfully. Graph plotting (b) was generally very good. There was no penalty for using a small scale on this occasion, since a perfectly adequate graph could be drawn using less than half of the printed grid. If candidates missed any of the available marks, it was usually because they drew a poor line. Weaker candidates, who merely joined the points instead of drawing a line of best fit, placed themselves at a severe disadvantage when attempting to identify the anomalous point. The candidate’s evaluation could be of the data provided, of the methods described or of both data and methods. Candidates were asked to give more than one reason, but many limited their answer to a single reason. Most candidates were able to make some sensible criticism of the planned investigation and gave at least one good reason. Most commonly this was either that the weight of the tins themselves had not been taken into account or that the scales were obviously broken. Many of the more successful candidates were clearly used to evaluating in this way and gave fuller answers that also included other appropriate ideas.

Question 6

Most candidates had prepared well and showed a thorough understanding of kinetic theory. There were some very good answers to this question. The majority of candidates could convert between the Celsius and Kelvin scales (ai) and could distinguish between molecules in a liquid and in a gas (aii). There was a small minority who answered the first part by giving a negative number of kelvins. Gas pressure (aiii) was generally very well explained in terms of molecular motion. Some of the weaker candidates found it harder to relate force and pressure in a meaningful way. Very few candidates chose to include the idea of change of momentum in their answer. The calculation (b) was also well

answered with the majority of candidates choosing the correct equation from page 2 and then going on to calculate confidently. When presented with the cooled sample of gas (c) most candidates correctly stated the pressure would also decrease and many went on to explain why this decrease would happen.

Question 7

The momentum calculation (a) was extremely well done by the majority of candidates. They remembered the correct equation and calculated with confidence. The force calculation (b) proved to be more difficult and fewer candidates were able to complete it correctly. In both cases, one mark was awarded for a creditable attempt towards an incorrect solution. Nearly all candidates could identify (ci) one factor that affects the stopping distance of a car and many could also state a second one. Candidates are expected to answer within the context of the physics specification they have studied, so suggestions such as reaction *time* and braking *force* were thought to be quite acceptable, but the idea of *a slippery road* was seen as too vague. Most candidates began their explanation of the crumple zone (cii) well, but few went on to give a full account. The point that most candidates made well was that the time for the collision would increase. However few went on to link this increased time to a reduction in the *rate* of change of momentum (or alternatively to link it to a reduction in the deceleration). Some were able to link the reduction in force to a reduction in the severity of injuries.

Question 8

Well-prepared candidates were able to score when answering this question. A few floundered, but they usually managed to gain at least one or two marks by making a sensible expansion on the stimulus material given in the diagram. There were many serious errors. Some candidates named electrons rather than neutrons as the particles involved in the chain reaction, others described the fission of atoms or molecules rather than nuclei. Making either of these errors limited the total number of marks available. Nevertheless there were many candidates who gave excellent descriptions that included all or some of nuclear fission, the chain reaction, moderation, control and the energy transfers in this process.

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