

Examiners' Report/
Principal Examiner Feedback

November 2011

360Science

GCSE Science
Multiple Choice Paper P1a (5009)

GCSE Physics
Multiple Choice Paper P1a (5045)

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5009/ 5045 (P1a) Examiners' Report November 2011

Foundation Tier

There was quite good performance on staple-diet items such as the source of solar energy, and the lack of a battery in a dynamo. On other basic, straightforward items, performance was less good. The symbol for a variable resistor was known by only 43% (with 37% choosing the voltmeter symbol). 21% thought that lighting a home was impossible before the discovery of electricity. As many as 42% thought that solar panels provide cheaper electricity *at night*. The relationship between a fuse and the earth wire was poorly understood with 28% thinking they are connected together and a further 30% considering that the fuse neutralises the earth wire. Also, only 52% realised that the '*I*' in $V=IR$ stands for current with 19% choosing power and 20% energy. Checking results to see if they make sense rarely happens, as shown by the result of calculating the cost of using a 2000 W hair dryer for 2 hours. As many as 53% calculated the cost to be 64000p or £640!

Overlap Questions

All common questions efficiently discriminated between Foundation and Higher tier candidates. There was one noticeable improvement from previous years: 66% of higher tier students chose negative electrons compared to 24% for positive ones, with only 10% of candidates thinking neutrons were the charge carriers in a wire. At Foundation level, the latter figure was 25% with 47% choosing negative electrons. High percentages at both tiers understood the diagrams depicting the flow of electricity around the country. More than half the students at both tiers associated unreliability of the given investigation with the idea that the measurements of volume were in cups rather than the more standard unit of litres.

Higher Tier

The highest (91%) and the most disappointing (9% correct) scores concerned RCCBs. The idea that the fuse is connected to the live wire and so the RCCB compares the currents in neutral and fuse wires was poorly understood. In contrast, a very high percentage was able to extract information from the unusual graph relating trip time for an RCCB and the residual current. In between, 52% were able to correctly identify what/who was protected by fuse and RCCB with 32% giving the reverse. 57% chose the only value given for a fuse which would allow the circuit to work normally. Only 29% estimated the temperature change associated with a given resistance change for a thermistor. The link between increased resistance and decreased current was spotted by as few as 52%. Interpreting circuit diagrams such as in the determination of resistance experimentally (27%) or in application items, following information given about diodes (36%), was poor.

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