



**General Certificate of Education**

**Electronics 5431/6431**

**ELE1 Foundation Electronics**

**Report on the Examination**

*2007 examination - June series*

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## General Comments

Candidates' performance on ELE1, the Foundation Electronics paper this year again resulted in a wide spread of marks. The number of candidates gaining the highest marks was slightly up compared to last year, and it was pleasing to see that fewer candidates gained very low marks, below 20 out of 72.

All questions on the paper were accessible to some candidates, since maximum scores for every question were noted somewhere for each question and again maximum and some near maximum scores were noted for the complete paper. Judging by the spread of marks the accessibility of the paper continued to be high, and the Foundation Electronics paper stretched all except a few of the most able candidates as is usual. The complete nature of candidates' answers to the questions, particularly the last question, demonstrated that there was adequate time for the paper to be completed.

Performance in this specification in Electronics has again been maintained this year. Candidates now have an accumulated body of material on which to practise and prepare for examinations which will continue in the same style and format as has become established until the forthcoming revision of specifications at AS and A2 for first teaching in 2008.

## Question 1

This first question on logic has now become a feature of the paper and it was generally well answered by the majority of candidates who in the main appear to have been well prepared for this type of question and only a few mistakes were made.

- (a) The truth table was accurately completed by most candidates.
- (b) Many good diagrams were drawn. It should be noted that due to the reference in this section to the Boolean equation, no account was taken of any errors made in the truth table.
- (c) Most candidates were able to correctly state which single gate had the same function as the complete circuit.

## Question 2

This question followed the same format as was introduced last year. The systems approach is in the specification but had not been examined in this manner before last year, clearly again it caught out some candidates.

- (a) A surprisingly large number of candidates had no concept of a system diagram, leading to a poor attempt at this section of the question. Some did not know the difference between a circuit diagram and what was required by the question. Yet others even drew a flowchart. This must be better reinforced by centres.
- (b) This section was better answered, but could still be improved.

It was stated in last years report that maybe the future response to this type of question would improve now that paper was available for practise and preparation. It did not; there are now two versions of this system based question on which to practise.

**Question 3**

This capacitor question again follows the well established style and format of those from previous examinations and it was pleasing to note a generally good response to it. Most candidates scored high marks here.

- (a) Part (i) was well answered by most candidates although a significant minority had problems in calculating the combined capacitance of two capacitors in series. The few who could not do this still went on to gain marks in part (ii) and section (b) through the error carried forward principle; it is always worth continuing with a question for this reason. Again it was pleasing to see that most candidates automatically set out their calculations as instructed on the front cover of the paper.
- (b) It is again pointed out that exponential mathematics is not required here (although the occasional correct attempt was seen). Knowledge of the “landmarks” on the charge/discharge graph is enough to give the answer to this type of problem at this level,  $0.69RC$  and  $5RC$  are generally well known although a minority of candidates are again muddling the incorrect coefficient of  $0.63$  with the correct  $0.69$  as they did last year.

**Question 4**

Few really good responses were noted to this question, candidates seemed to fall prey to not reading the question thoroughly and answering the question they thought was asked, rather than the question actually asked.

- (a) Whilst many candidates could give the correct temperature for part (i), they could not write a convincing explanation for part (ii). Happily they then went on to use the correct figures to arrive at the answer for part (iii), except for the minority who could not handle standard form. The output voltage,  $X$ , could be calculated by two routes and many correct values were seen.
- (b) The first part of this section required the value from section (a) part (iv) and was an opportunity for an error carried forward mark for those who failed to gain a mark in that previous section.  
The diagram saw the usual potential divider problems (why do candidates want to measure voltages from “the top of the hill”). There were some good attempts at the diagram, but only the most able got the input signals the right way round.

**Question 5**

- (a) Most candidates seem to understand the astable and picked up marks here, although many outputs were just left pointing out to the right of the diagram and failed to gain a valuable mark by not reading (ii) after answering (i) and thinking that they had finished.
- (b) The calculations required brought to light the usual order of magnitude errors caused by an inability to cope with prefixes such as  $k$  and  $\mu$ . Every calculation question should result in candidates automatically showing their calculations, answer and where appropriate correct units.

### Question 6

This was a very short, accessible question that had a good response.

- (a) Candidates proved themselves to be very familiar with this issue, being aware that comparators and logic gates are limited in the amount of output current they could source, compared to the demands of the lamp.
- (b) The difference between a semiconductor active device and an electromagnetic device is well known, as is the use of a diode as protection for the rest of the circuit using an electromagnetic device.

### Question 7

This, the long question, returned to the zener diode theme which has not been well answered in recent years. There was again a mixed response to it.

- (a) Most candidates picked up most of these marks.
- (b) Some candidates failed to gain a mark by subtracting the currents in part (i), but then did much better in the following two calculations even if an error was carried forward. The choice of preferred value sometimes went in the wrong direction and the mark was not awarded.
- (c) A good response was noted to this section overall.
- (d) This was one of the weakest sections here.
- (e) There was much misunderstanding on the concept of energy wastage by this small 9V battery, very few completely correct answers were noted here.

Most candidates completed much of this question indicating that there was sufficient time to complete the paper in the allotted 1 ½ hours.

## **Mark Ranges and Award of Grades**

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA Website.