



General Certificate of Secondary Education

Electronics 3432

Tier F Foundation

Report on the Examination

2007 examination - June series

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General Comments

This examination was in the fifth year of this specification in GCSE Electronics. The subject content and the style of examination are well understood and practised by most teachers teaching this course, and candidates now have had ample opportunity to prepare using the last four years' past papers.

The content of the Foundation Tier Paper followed the established pattern, where the first seven questions were short answer questions. These were again aimed at grades D to F and provided a solid basis of accessible questions for candidates at this level. The last two questions again formed a common core between the Foundation and Higher Tier papers. These core questions were in the style used in the previous years, providing longer questions at two levels of a more searching nature suitable to discriminate between candidates at Grade C - the highest award possible for those attempting the Foundation Tier paper. In this way, a paper was created that met the requirements of the specification that would also look familiar to those candidates who had prepared well for this examination by practising on past papers. In the near future at least this style and content will continue.

The length of the paper this year, and the mark total was the same as last years, 120 marks in a time of 1½ hours. This gave candidates enough time to complete the paper including time for reflection on the higher level questions. Thought was again given to the mark totals that could be expected from candidates on this paper, since there is an overlap at Grade C on the two papers (Foundation and Higher Tier). It was thought, as in previous years, and borne out by the evidence again this year, that candidates at the top of Grade C would have access to all the short-answer questions and approximately half the material in the common questions. These form the core taken with the Higher Tier candidates, giving an effective maximum mark of around 95 marks if candidates have been entered for the appropriate level paper. This has again been proved to be the case since the majority of the range of marks scored this year varied from three candidates with single figures mark totals to four candidates in the 90s, one candidate were 100 marks and one at 108 marks. Only the latter two would have possibly benefited further from entry to the Higher Tier paper. The spread of marks this year was again very wide, with a distribution of candidates gaining marks from the teens all the way up to the 90s. One slightly worrying trend is that the number of candidates gaining marks below 30 seem to have slightly increased compared to last year.

In conclusion, virtually all the candidates this year seem to have been appropriately entered at this level with the possible exception of the two highest scoring candidates mentioned. The length of the paper seemed to be appropriate to the time required to answer it for most candidates, although a little evidence was noted of unfinished questions at the end of the paper, mainly on the very low scoring scripts.

Question 1

This year's question on electrical safety was again not well answered on the whole. There seems to be a continuing lack of knowledge about mains electricity and related safety issues. This topic is of prime importance, and is the first area of the specification, it should be given due attention.

- (a) Very few candidates knew the function of the step-down isolating transformer in giving a safe low alternating voltage from the mains supply.
- (b) Many candidates missed one of the points, most knew about the function of a fuse, but knowledge of the circuit breaker, of any type was limited.
- (c) Surprisingly, relating the colours of the wires in a mains plug to their respective functions is poorly understood.
- (d) This was a more positive section, most knew some measures to take to avoid accidents. Of those who failed to mark here, it was due in the main to measures that were non-specific to electronics.
- (e) Again, non-specific effects on the human body were written in answer and not awarded credit. Some answers were just too general to be considered creditworthy.

Question 2

This question was well answered by most candidates. Lower ability candidates had difficulty in drawing circuit diagram symbols for some of the components. The loudspeaker symbol was generally poorly drawn. It is worth noting that a perfect symbol is not necessarily required for the mark, rather something between two-thirds and three quarters of the correct symbol would be sufficient.

The function of most of the components is well known; the exception being the capacitor, a notable minority of candidates picked up a clue here from question five and gave an effect that it could achieve, rather than its function. However enterprising this was, it was not awarded credit since it did not answer the question.

Question 3

This question is based on knowledge of the systems approach to electronics, and took a very familiar form to candidates who had prepared adequately. This year's response was fairly good, many candidates managed seven or more marks.

- (a) Virtually all candidates identified the input and output boxes, but it was frequently noticed that the analogue and digital processes were harder to identify.
 - (b) This was well answered by most candidates. The only problem here was in confusion generated due to incorrect answers given to the previous section.
 - (c) The first part was poorly answered, probably to gathering confusion for those who had problems earlier. The final part was answered well.
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Question 4

The response to this question was mixed, overall this year's candidates seemed to have more knowledge of logic than in previous years, but there were still some lapses.

- (a) The ability to name the type of gate from its symbol is widespread, but there is still confusion as to the function of the negation bubble on the output of the gate.
- (b) The truth table had a mixed response, but many candidates scored well.
- (c) Too many candidates were distracted by drawing and embellishing the lorry, some failed to gain credit in trying to emulate the three-dimensional appearance by making their diagrams ambiguous in terms its exact position.

Question 5

This was the first question on this paper that met with an overall poor response. It seems that the topic of the three-terminal regulator is not frequently taught.

- (a) Many candidates failed to gain marks here, the mark scheme was broadened out to include credit awarded for the zener diode, but this was only offered by a tiny minority of candidates.
- (b) This section was not attempted by most candidates; it appears that it is simply not known.
- (c) Often the only marks awarded for this question were given in this section; even then, many were reluctant to show their calculations as requested on the instructions on the front cover of the paper. It would do no harm to take candidates through the instructions as part of their examination preparation in future.

Question 6

- (a) The diagram was the best answered section of this question; candidates failed to gain marks when the labels were not written in the correct order.
- (b) The second and third parts of this section were often confused leading to the conclusion that this topic is not firmly set in candidates' minds.
- (c) Easily the poorest answered section of this question, marks will never be awarded for poorly scrawled diagrams. A recognisable carrier wave with symmetrical amplitude variations was called for here.

Question 7

Another question that met with a notably poor response. Due to the complete lack of valid answers from all candidates in some centres leads to the conclusion that this topic is simply not taught in those centres.

- (a) The names of the inputs and the location of the output, thought to be an accessible introduction to the final non-core question, are not known to the majority of candidates. Many wanted to label inputs as just that; inputs, and others confused the two outputs and so failed to gain credit.
- (b) It is perhaps better to draw a veil over the responses to this section this year. It seems to be totally unknown. Please teach it, it will re-appear at an early opportunity, it is important.
- (c) The function of the D-type flip-flop as a frequency divider is an unknown to most candidates. Many random diagrams resulted along with half remembered fragments such as connecting Q back to an earlier part. The same comments apply here as to the previous section, efforts are made always to cover as much of the specification as possible in each years examinations.

The final two questions on this paper form the common core with the Higher Tier.

Question 8

Flowchart diagram questions have always been a feature of core examination papers. This year candidates have again demonstrated knowledge and understanding, resulting in some high marks being awarded on both pages of the question.

- (a) Correct flowchart symbols were often drawn except for some minor confusion as in previous years between process and input/output symbols and between start and input symbols. Some candidates are also a little unsure of exactly what constitutes a loop in a flowchart.
- (b) Identification of the various parts of the flowchart met a similar good response.
- (c) This year, understanding of the process illustrated by the flowchart was tested by these directed questions which had definite answers. The only one to cause difficulty was part (ii) where many failed to gain the mark by being too general in their answer.
- (d) Many good responses were noted here.

Question 9

This question was again aimed at the higher ability candidates entered for this paper. Responses ranged from a few marks up to, in a few cases, more than 20 marks. Very few candidates scored over half the marks available as was expected.

- (a) This section, the accessible introduction was well answered. Candidates are familiar with timer circuits. Only those that can not distinguish between astable and monostable circuits failed to gain marks.
- (b) Most candidates missed the point here and did not point out the incompatibility between the LEDs and proposed driver circuits.
- (c) These calculations were poorly done in the main; Foundation Tier candidates have problems with calculations, however straightforward.
- (d) This part was very poorly answered. The specification states that candidates should have some knowledge of bipolar transistor circuits which obviously is not the case.
- (e) This section of the question was really a big comprehension, in asking for a system diagram to be completed from a written description. Most candidates gained some marks here, even though this part of the question was aimed at the highest level of ability, showing that most had at least had sufficient time to reach the end of the paper.

Mark Ranges and Award of Grades

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