



General Certificate of Education

Electronics 5431/6431

ELE5 Communication Systems

Report on the Examination

2007 examination - June series

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General Comments

It is pleasing yet again to report a generally good response to this paper. Slightly more candidates scored the very highest marks and the general trend remains one of improving performance, although the improvement noted was slight this year compared to last. It was also pleasing to see fewer candidates scoring the very lowest marks. It remains obvious that the increasing number of past papers available is helping, by enabling candidates to practise on previous year's papers, their having the same style and content.

There is continuing evidence from the range of marks that a wide range of candidates continues to be entered for A2; again this year there was a broad peak in the numbers of candidates scoring marks throughout the 50s. The accessibility of the paper was found to be in line with the previous year, the histogram of available mark data being a close fit to that of last year. Again all the papers scrutinised offered plenty of evidence that time was not an issue in completing the paper.

Question 1

Most candidates coped well with this accessible question and made a good start to the paper.

- (a) The marks for this section were for the interconnections between subsystems on the diagram. The most common mistakes were in the order of the front-end subsystems.
- (b) This section was generally well done; it was refreshing to see more candidates tackling the wavelength calculation. Even where mistakes crept in, credit was often given for correctly determining the dipole length.

Question 2

The response to this synoptic question was quite good and the majority of candidates attained half marks or more.

- (a) Both parts of this section were done well; op-amp based inverting amplifiers have been well learned.
- (b) Most candidates were aware that a current or power amplifier was required here and were able to draw an outline circuit, most even differentiated correctly between n-channel and p-channel devices. However, only a very small minority understood how to correctly bias the MOSFETs. Most candidates knew about heatsinks.

Question 3

Sadly, this question was quite badly done which is surprising in view of the frequency with which this type of question has appeared in recent papers.

- (a) This introductory part proved problematic to most candidates who are obviously unaware of the different broadcast bands and their frequency limits.
- (b) The diagram was well drawn in the main, except for those who still do not appreciate the difference between sidebands and side frequencies.

- (c) The bandwidth calculation was quite well attempted.

Question 4

This question was perhaps the best answered on the whole paper, helped by a similar question (although the other way round) in a recent past paper.

- (a) Candidates had no difficulty.
- (b) This was also almost universally well answered.
- (c) Most candidates were able to place the pulses (of any reasonable width) within the timeframe to represent the amplitude of the analogue signal.
- (d) This was the only part to cause difficulty despite two variations of answer being allowed, either lsb first, or msb first.

Question 5

This largely synoptic question was extremely well done. Candidates are starting to cope more than adequately with synoptic content.

- (a) Very few problems were evident here.
- (b) A few candidates failed to gain marks here due to lack of care with logic diagrams, particularly the NAND gate connected as a NAND gate.
- (c) In spite of the instruction (in bold type) to give two practical advantages, several single advantages, or too closely related advantages were given, thus failing to gain a mark.

Question 6

This question marked a downturn in candidate performance; much of this topic appears to be not well understood and would benefit from further work in centres.

- (a) Few candidates understood that a demodulated waveform follows half the modulation envelope in frequency and phase.
- (b) Many arithmetic calculation errors were evident here; less able candidates often inverted the relationship between period and frequency.
- (c) Calculations were also poor; it is evident that some candidates could still not handle standard form even at this advanced level.

Question 7

The longer question this year used the topic of optical communication to bring together some more synoptic content and also mobile communications.

- (a) This section was reasonably attempted but less able candidates often produced a diagram based on a graded index fibre. There was also a misconception about where the reflection occurred. No credit was given here, since the question clearly asked for a step index fibre.
- (b) This section had an almost universally correct response.
- (c) This synoptic section was well answered and there were many correct calculations also, with the exception of those who, as stated earlier, had difficulties with standard form.
- (d) There were some excellent responses to the extended writing section on the mobile phone network. It is clear that most candidates understand the usefulness of both TDM and frequency re-use, and are able to write coherently on this topic.

The vast majority of candidates gave quite complete answers to this last question demonstrating that again this year that they had sufficient time to complete the paper.

Mark Ranges and Award of Grades

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