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Electronics ELEC2

(Specification 2430)

Unit 2: Further Electronics

Report on the Examination

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General Comments

This module examination tested the Further Electronics module of the AS Electronics specification as well as the basic knowledge acquired from the Introductory module, ELEC1. The examination reflected the style of the previous papers, with questions being set in the context of real applications wherever possible, so recognising the importance of electronics in the real world.

When constructing the examination, 50% of the marks were based on standard bookwork which should have been readily available to all candidates who had studied the course and undertaken some revision. All sections of the specification were examined and it is expected that this will continue in future years.

The papers were marked via an online viewing system and so the presentation and handwriting of candidates was very important. While the presentation and handwriting of some candidates was excellent, a significant number of candidates produced scripts which were difficult to read. Candidates communicate with examiners via their handwriting, and all too often their responses were verging on being illegible. Candidates need to be reminded that examiners must be able to read responses if they are to gain any credit. Candidates should also consider crossing out errors with a single line and not producing a scribbled mess over which they attempt to write a modified answer.

All of the marks were gained overall by candidates with no marks being inaccessible. As in previous examinations, candidates gained credit for all responses that contained correct electronics.

This report should be read in conjunction with the question paper and the mark scheme.

Question 1

This question was intended to provide a straightforward introduction to the paper.

(a) Some candidates completely reversed the answer and the first two lines of the truth table were often incorrect. However, many candidates gained 2 - 4 marks.

(b) Many counter circuits were produced instead of shift registers, and many candidates did not clearly label the inputs, so losing marks.

(c) Despite this section starting with a diagram showing a labelled shift register, many candidates produced counter timing diagrams. There were, however, some completely correct responses.

Question 2

This question was also intended to provide candidates with an opportunity to show their knowledge of op-amp amplifiers.

(a)(i) Many correct responses were seen, though some candidates confused input and output voltages.

(a)(ii) For basic bookwork, this was poorly answered. Many candidates used the +ve input instead of the -ve input of the op-amp for the feedback loop.

(b)(i) It was worrying to see how many candidates could not draw summing amplifiers. Few gained all three marks and often the resistor values was too low or the gain inappropriate.

(b)(ii) Many creditworthy responses were seen with candidates recognising that the two interference signals were inverted. However, too many just restated the information in the question and so did not gain credit.

Question 3

This question should have provided few difficulties to candidates.

(a) Many good responses were seen, though it was clear that some candidates had not met the NAND gate astable before. Too many responses showed the two outputs being connected together.

(b) Many creditworthy responses were seen, though some candidates offered no response at all.

(c) Again many correct responses were seen. Some candidates used the wrong formulae and many had problems with powers of 10.

(d) Many creditworthy responses were seen, but too many candidates offered no response.

(e) This part presented more of a challenge and few creditworthy responses were seen. Few candidates realised the latch would provide definite switching levels for the MOSFET.

Question 4

The first seven marks of this question should have been straightforward to most candidates but unfortunately this did not prove to be the case.

(a)(i) Many answers of >1 were seen. The source follower seems to be a mystery to many candidates!

(a)(ii) Few creditworthy responses were seen. It would seem that many candidates are not taught about MOSFETs.

(a)(iii) More appropriate responses were seen than in the previous sections but many candidates thought that the input resistance was low! Answers were often given as 'high' or 'low' and not justified, as requested in the question.

(b) Many creditworthy responses were seen, but preventing back emf was a common, incorrect response.

(c)(i) Again many correct responses were seen, though there were too many candidates who used the inverting amp formula or had no idea of where to start.

(c)(ii) This part was more demanding and provided a discrimination for the more able candidates.

(d) Very few fully correct responses were seen. Many candidates used 15V as the supply voltage across the speaker but too many candidates did not know where to start.

Question 5

This was another question where many of the marks should have been straightforward but this proved not to be the case.

(a) Many creditworthy responses were seen but too many candidates made errors leading the examiners to question whether they ever constructed a 555 timer astable!

(b) Again many creditworthy responses were seen but too many candidates could not deal with powers of 10 correctly. The unit prefix, 'pico' seemed to be a mystery to many candidates.

(c) Some good answers were seen but too many candidates believed that the frequency would decrease when a load was added because the capacitance would increase, despite the question clearly saying the opposite!

Question 6

This question required candidates to complete a standard circuit diagram and tested the '7-segment decoder for the first time.

(a) Most candidates scored some marks, but significant numbers of candidates were very confused between counters and shift registers. The presentation of some diagrams was not at the required standard.

(b) While some completely correct responses were seen, some candidates omitted the 0V connection to 2^3 input. Many other candidates had clearly never connected a decoder to a counter and had no idea of what the question was asking. There was also some confusion between most and least significant bits.

(c) This part was intended to be demanding and it was no surprise that very few creditworthy responses were seen. Those that did suggested connecting the output of the NOR gate to the SET input of the 2^0 flip-flop then usually failed to say what they would do with the RESET input of this flip-flop.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.