

Principal Assessor Report 2003

Assessment Panel:

Engineering

Qualification area

**Subject(s) and Level(s)
Included in this report**

Electronic and Electrical Fundamentals Int. 2

Statistical information: update

Number of entries in 2002	64
Pre appeal	64

Number of entries in 2003	99
Pre appeal	99

General comments re entry numbers

It is very pleasing to report that 99 candidates sat the Electronic and Electrical Fundamentals examination paper in 2003 compared with 64 in 2002. This represents an increase of 55% in the number of candidates that sat the examination in 2003. However, it should be noted that a new overseas centre entered 44 candidates in 2003. Without these entries the number of wholly Scottish candidates would have been 55 representing a reduction of 9 (14% reduction) Scottish candidates compared with 2002. This reduction is disappointing and may be evidence that centres are not putting forward candidates for the examination because they think it is too difficult.

Eight centres put forward candidates for the examination in 2003 compared with 9 in 2002. These centres comprised of five FE colleges, two secondary school and one overseas centre.

It is disappointing to see that nine FE colleges did not enter candidates for the examination in 2003 whereas they had done so in previous years. These centres are not gaining the long-term experience of putting candidates forward for this Intermediate 2 examination. It is hoped that the steps taken by the setting and vetting teams to adjust the standard of the examination to reflect more closely Intermediate 2 level in the 2003 and 2004 papers will persuade some of the FE centres to enter candidates for the 2004 examination.

Two schools entered candidates for the examination in 2003. It is pleasing to report a significant improvement in the results of candidates from the school that entered candidates in previous exam diets. The same approach of making the paper 'user friendly' to both secondary school and college candidates was adopted in the 2003 paper (eg to allow for both electron and conventional flow in certain questions). It is hoped that the paper will be increasingly attractive to other secondary schools especially as the paper appears to be of a more appropriate Intermediate 2 level now.

Grade boundaries at C, B and A for each subject area included in the report

Grade C boundary = 50%

Grade B boundary = 60%

Grade A boundary (lower) = 70 %

Grade A boundary (upper) = 85%

General commentary on passmarks and grade boundaries

- While SQA aims to set examinations and create mark schemes which will allow a competent candidate to score a minimum 50% of the available marks (notional passmark) and a very well-prepared, very competent candidate to score at least 70%, it is almost impossible to get the standard absolutely on target every year, in every subject and level
- Each year we therefore hold a passmark meeting for each subject at each level where we bring together all the information available (statistical and judgmental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the senior management team at SQA
- We adjust the passmark downwards if there is evidence that we have set a slightly more demanding exam than usual, allowing the pass rate to be unaffected by this circumstance
- We adjust the passmark upwards if there is evidence that we have set a slightly less demanding exam than usual, allowing the pass rate to be unaffected by this circumstance
- Where the standard appears to be very similar to previous years, we maintain similar grade boundaries
- An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions are different. This is also the case for exams set in centres. And just because SQA has altered a boundary in a particular year in say Higher Chemistry does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related as they do not contain identical questions
- Our main aim is to be fair to candidates across all subjects and all levels and maintain standards across the years, even as syllabuses evolve and change

Comments on grade boundaries for each subject area

Standardised 'a priori' Grade Boundaries were again set this year. This represents a restoration of the pass mark and the mark at which Grade A is awarded to 'normal values.' In last year's examination both the pass mark and the Grade A boundary mark were reduced to 45% and 65% respectively to reflect the difficulty of the examination paper.

Comments on candidate performance

General comments

It is very pleasing to report a major improvement in the performance of candidates in the 2003 examination compared with the 2002 examination. In 2003 59% of candidates passed the exam compared with only 27% in 2002. However, this does not leave any room for complacency as 41% of candidates still failed the exam.

At 50%, there was also a significant improvement in the mean candidate mark in the 2003 paper compared with a mean of only 37% in the 2002 paper. This 13% increase in the mean provides clear evidence that the steps taken by the setting and vetting teams to adjust the standard of the examination to reflect more closely the Intermediate 2 level have been effective. However, setting appropriate standards is an on-going process and it will be interesting to see how candidates perform in the 2004 paper.

Twenty-one candidates achieved Grade A passes in 2003 compared with only 3 in the 2002 paper. Seventeen candidates achieved Grade B in 2003 compared with 5 in 2002 and 20 candidates obtained Grade C in contrast to 9 in 2002. These improvements are yet further evidence that the steps taken by the setting and vetting teams to get the standard of the paper right are working.

As in previous papers the combinational logic questions were the most popular and the best answered. It is pleasing to report a clear improvement in candidate responses to the electrical fundamentals questions with the possible exception of the field-drawing question where candidates still displayed difficulties with drawing a field pattern correctly. It is also pleasing to report that some candidates demonstrated competence in transposing simple equations, entering values into the transposed equation and arriving at the correct answer. As in previous examinations, the analogue electronics questions were the least well answered. This was commented on in last year's PA Report and is an on-going problem in electronic engineering courses at all levels (see comments in the section on Feedback to Centres).

It is also pleasing to report, that as was the case with last year's paper, there was clear evidence that candidates were using better exam techniques when attempting the Intermediate 2 paper

Areas of external assessment in which candidates performed well

- Q.1 As in previous papers the conversion question tended to be answered well.
- Q.2 Answered well although most candidates did not add the diode volt-drop to the volt drop across the resistor in part (c).
- Q.3 Answered well, although some candidates were not able to calculate the rms voltage in part (b).
- Q.11 This was the most popular question in Section B and in the main was well answered by candidates.
- Q.12 Encouragingly, in the main this question was fairly well answered with candidates demonstrating the ability to transpose simple equations correctly.

Areas of external assessment in which candidates had difficulty

- Q.6 A number of candidates showed the correct force direction which was not the case in the 2002 paper. However, field plots were not clear with nearly all candidates failing to show clearly the influence of the current carrying conductor field on the main field.

Q.7 This question was not answered well. For part (b) some candidates were putting base, collector and emitter instead of the correct terms (gate, source and drain).

Q.10 This was the least popular and least well answered of the Section B questions although many candidates answered part (e) well.

Recommendations

Feedback to centres

As noted under the General Comments section there is clear evidence of improvement in candidate performance in this year's examination paper compared with the last two examination papers. For example, three centres achieved a higher than 70% pass rate. However, one centre which entered a significant number of candidates had no passes in the examination. This situation reinforces the need for centres to ensure that their candidates are being entered for the correct course at the correct level. It would be advantageous for centres with low pass rates to have their internal assessments externally moderated and to receive developmental support from the SQA where this is appropriate.

Whilst the setting and vetting teams are pleased with the improvement in candidates' performance they are not complacent and are committed to continually monitoring and evaluating the standard of the examination paper and candidates' performance. They will be particularly interested to see if candidates' performance in the 2004 examination is as good if not better than in the 2003 examination.

The setting and vetting teams continue to be concerned about the number of poor responses they see from candidates in the analogue electronics questions. The teams recognise that candidates tend to find this subject area more difficult than the combinational logic area. It is clear from seeing a large number of candidate responses that the amplifier configuration type questions (both BJT and FET) prove particularly difficult for candidates (this is not the case with the operational amplifier questions). Colleagues in schools and colleges are encouraged to explore ways of improving candidates' knowledge and understanding of what is traditionally a difficult subject area.