Principal Assessor Report 2007

Assessment Panel:	**Engineering**

Qualification area

Subject(s) and Level(s) Included in this report	**Electronic and Electrical Fundamentals Intermediate II**

Comments on candidate performance

General comments

The setting and vetting teams were slightly disappointed that the number of candidates sitting the Electronic and Electrical Fundamentals Intermediate II Examination in 2007 still did not pass 100. However, at 99 the number of candidates sitting the Examination in 2007 rose by 5 from 2006 representing a 5% increase in numbers.

Perhaps the most pleasing aspect of this year's examination was that three secondary schools presented candidates for the examination rather then just one school as has been the case in previous years. One of the two new schools achieved a pass rate of 100% while the school that has entered candidates for a number of years had only one candidate failing the Examination. Some evidence is emerging that further secondary schools will present candidates for the Electronic and Electrical Fundamentals Intermediate II Examination in future sessions. The SQA have now agreed to update the National Assessment Bank instruments for this course, making them more consistent with the external examination, which is likely to make the Electronic and Electrical Fundamentals course more attractive to both schools and colleges.

Two FE colleges presented candidates for the examination this year compared with one college in 2006. It is pleasing to report that one college reported a very much improved pass rate which can be attributed in no small measure to the additional preparation for the Examination which candidates received. An overseas centre continues to provide the majority of candidates sitting the Examination. In 2007 the percentage number of candidates coming from this centre was 62%.

The pass rate in the 2007 Examination was 65.7%*compared with a pass rate of 87.2% in 2006. There was thus a drop of 21.5% in pass rate. Likewise the mean mark dropped from 67.3% in 2006 to 57.7% in 2007. The setting and vetting teams are of the view that there was no appreciable change in the standard between the 2006 and 2007 Examination Papers. However, it was generally agreed that the standard of most of the 2006 candidates was very good. Furthermore, most 2006 candidates appeared to be very well prepared for the Examination such that even questions that traditionally have been poorly answered were answered to a better standard. The view of the 2007 markers was that a significant number of candidates were not as well prepared for the 2007 Examination. It is interesting to note that the 2007 results are broadly consistent with the results obtained in 2004 when there were 98 candidates and the setting and vetting teams believed they had achieved a good standard of Examination Paper.

* All percentages quoted in this paragraph are pre-appeals

The markers observed this year that some candidates performed less well in Section A of the Examination Paper but made up marks in Section B. This is the reverse of the normal trend in which candidates tend to score higher in Section A. The markers concluded from this reversal of trend that there was more stretching in Section A in the 2007 Examination Paper than has been the case in previous year's papers.

Areas in which candidates performed well

Q1 As in previous years the coding questions were in the main answered well.

Q2 Most candidates were able to interpret correctly the names of the circuits X and Y as half and full wave rectifier circuits respectively.

Q3 It was pleasing to observe that most candidates interpreted the circuit symbols correctly.

Q4 Digital questions are traditionally answered well in the Electronic and Electrical Fundamentals Examination. It is pleasing to report that many candidates got the fault question part (c) correct.

Q8 Most candidates were able to draw the logic diagram correctly and get the correct truth table (although some made one or two mistakes with the truth table). Encouragingly many candidates got the fault question part (c) correct.

Q10 This was the question that was least answered in Section B (this follows the traditional trend of the analogue electronic question being least answered in Section B). However, many of the candidates who attempted this Question scored reasonably well suggesting that candidates are beginning to get a better grasp of analogue electronic principles.

Q11 This question was designed to test fundamental electrical principles (e.g. Kirchhoff's Voltage and Current Laws). It is very pleasing to report that many candidates scored well in this question suggesting that centre staff are giving a great deal of attention to these fundamental principles.

Q12 In common with previous years the digital question in Section B was the most popular in the Section and was generally answered well although surprisingly in part (d) (i) a lot of candidates arrived at a NAND Truth Table rather than an AND Truth Table.

Areas which candidates found demanding

Q5 A significant number of candidates either failed to use the data sheet or misinterpreted it when answering this question. Some candidates failed to add the 2 volt drop across the diode when calculating the maximum value of input voltage in part (c).

Q6 In common with previous years the magnetism questions was not answered well. Some candidates did not transpose the e = Blv formula correctly and most candidates failed to get both angles correct in part (b)

Q7 A significant number of candidates stated the circuit represented an inverting amplifier rather than a non-inverting amplifier which meant that they used the wrong formula to answer parts (c) and (d).

Q9 Some candidates found this question quite stretching particularly determining R_2.

Advice to centres for preparation of future candidates

It is worth stating at the outset that candidates are grasping many of the basic concepts and principles in both electronics and electrical significantly better than in previous years. This was particularly noticeable with regard to Q.11, the Electrical Principles question. Centres are to be praised for the increased efforts they have put into teaching these basic concepts and principles and are encouraged to continue this excellent work.

It is also evident from candidate performance in the Examination that most candidates are being provided with very good support in preparing for the external examination.

Centres are encouraged to continue to develop new methods for delivering the magnetism part of the course in light of the difficulties that candidates experience with this subject area. Candidates at this level traditionally find transposing formula difficult. However, this is a very important skill that should be reinforced throughout the delivery of the Electronic and Electrical Fundamentals course especially as candidates who go onto more advanced studies will require to make regular use of transposing formula skills.

Centre staff are also encouraged to develop candidate's abilities to transfer their knowledge and understanding of electrical principles to different contexts. It is interesting to note that while many candidates were able to

apply Kirchhoff's Voltage Laws in Question 11 they were not able to apply the Law correctly in Q.5 (c), where most failed to add the forward volt drop across the diode to the volt drop across the 470Ω resistor.

In light of the number of wrong answers given to Q.7 centre staff may want to spend more teaching and learning time on operational amplifier circuit configurations.

Statistical information: update on Courses

Number of resulted entries in 2006	94

Number of resulted entries in 2007	99

Statistical Information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum %	Number of candidates	Lowest mark
Maximum Mark - 100	-	-	-	-
A	33.3	33.3	33	70
B	15.2	48.5	15	60
C	17.2	65.7	17	50
D	6.1	71.7	6	45
No award	28.3	100.0	28	-

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 arrangements evolve and change.