

Principal Assessor Report 2002

Assessment Panel:

Engineering

Qualification area

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

**Electronic and Electrical Fundamentals -
Intermediate 2**

Statistical information: update

Number of entries in 2001	68
Pre appeal	68
Post appeal	

Number of entries in 2002	64
Pre appeal	64
Post appeal	64

General comments re entry numbers

The number of entries for the 2002 examination was four less than for the 2001 examination. This represents a reduction of 6% in the number of candidates taking the examination. This reduction was disappointing since it was anticipated that the number of enrolments would rise this year (see general comments for further information).

Nine centres presented candidates for the 2002 examination: 8 were Further Education colleges and one was a secondary school.

Whilst it was pleasing to see a number of new FE colleges enter candidates for the examination for the first time, a number of other FE colleges who have entered candidates in the past did not enter candidates for the 2002 examination. This is disappointing as few colleges are gaining long term experience in offering this Intermediate 2 examination. On a positive note one FE college that previously had no candidate passes achieved its first pass in the 2002 exam.

The school that presented candidates in 2001 was the only school to present candidates for the 2002 examination. This was also disappointing as it was hoped that the steps that had been taken in the 2002 examination (e.g. allow for both electron flow and conventional current flow in certain questions) to make the paper more attractive to secondary schools might have resulted in a higher number of entries from schools.

General comments

As already noted the final number of candidates sitting the examination was disappointing given that there were in excess of 100 entries on the SQA MIS (Management Information System) prior to the date of the examination. It is not clear whether this is due to centres entering candidates for the examination in the hope that they are ready to take it and then finding out they are not, or candidates simply not turning up for the exam or a combination of both. The difference between the numbers shown entered for the examination on the SQA MIS and those who actually sit the exam raises the following issues:

- (1) Do FE colleges still see the examination as an extra assessment demand over and above candidates passing individual units and, therefore, place less importance on it?
- (2) Are candidates not presented because of fears about low pass rates and poor performance indicators?
- (3) Are there still general reservations about FE candidates sitting external examinations?

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

Grade C boundary = 45%

Grade B boundary = 55%

Grade A boundary = 65%

Upper A boundary = 80%

General commentary on grade boundaries

Notional percentage cut-offs for each grade

Question papers and their associated marking schemes are designed to be of the required standard and to meet the assessment specification for the subject/level concerned.

For National courses the examination paper(s) are set in order that a score of approximately 50% of the total marks for all components merits a grade C (based on the grade descriptions for that grade), and similarly a score of 70 % for a grade A. The lowest mark for a grade B is set by the computer software as half way between the C and A grade boundaries

Comments on grade boundaries for each subject area

Based on the evidence presented below it was agreed at the pass mark meeting to lower the pass mark to 45% and the mark at which a grade A was awarded to 65%.

This is the third year that the Intermediate Electronic and Electrical Fundamentals examination paper has been offered. In 2000 the average pass mark was 53%. In 2001 the average pass mark was 35%. In 2002 this rose to 36%.

Last year's Principal's Assessor Report indicated that it was difficult to identify the reasons why there had been such a significant decline in candidate performance. It suggested that it was partly due to candidates lacking experience in examination techniques and partly to the background of the candidates (e.g. candidates who had left school and gone into Further Education because they did not like taking examinations).

Following the 2002 examination there was an analysis of the available data and whilst this data was limited in volume the conclusion was that the standard of the Intermediate 2 examination paper may be too high. There now follows a brief consideration of the data (including weaknesses in using the data) which led to this conclusion:

- The 2000 paper was modelled closely on the format of the specimen paper. Centres may also have only entered their better candidates in 2000. And there is some anecdotal evidence that extra resources were provided to support candidates in this first year of delivery.
- A comparison with the Intermediate 2 Physics and Technological Studies 2002 examination papers suggests that the standard of the questions in the Electronic and Electrical Fundamentals paper was higher than corresponding electrical and electronic questions in the Physics and Technological Studies papers. Whilst such a comparison is useful it has to be treated with a degree of caution as both the Physics and Technological Studies syllabi are much broader than the Electronic and Electrical Fundamentals syllabus and, thus, the depth of electronic and electrical questions asked in papers is unlikely to be as deep as in the Electronic and Electrical Fundamentals paper.
- Discussions with the Higher Electronics vetting team (the PA is a Vetter for this paper) after the 2002 Intermediate 2 Electronic and Electrical Fundamental Paper had been sat which suggested that the Intermediate 2 paper may be of too high a standard.

- Reference to the national ratings for examination performance for Diet 2001 which placed the Intermediate 2 Electronic and Electrical Fundamentals examination at -1.36. This figure gives an indication that the paper is significantly harder than the average Intermediate 2 examination. However, the -1.36 was produced on the basis of a low number of candidate entries for the Electronic and Electrical Fundamentals paper. This means that the -1.36 can only be regarded as indicative rather than absolute.

Comments on candidate performance

General comments

It is disappointing to report that candidate performance is still in the main poor with 73% of candidates failing the examination. However, eight candidates were within 5 marks of the pass mark which suggests that with only a slight improvement in performance they would have passed the examination. Such improvement may require greater study and/or simply an improvement in examination techniques. With regard to the latter point it was noticeable that a number of candidates performed reasonably well in section A of the examination but fell away in section B resulting in them failing the exam. However, there was also some evidence this year that candidates were employing better examination techniques.

Both this year and last year candidates performed best in the combinational logic questions. There was evidence that many candidates still fail to grasp basic electrical and electronic principles and demonstrate an inability to transfer knowledge and understanding from one subject area to another.

Areas of external assessment in which candidates performed well

Qu.1 The best answered question in section A with most candidates able to do the conversions.

Qu.4 Most candidates made a good attempt at producing the Boolean expression and the corresponding truth table.

Qu.12 This was the best answered of the questions in section B although candidates found part (f) difficult

Areas of external assessment in which candidates had difficulty

Qu.2 (b) A number of candidates managed to get this question partially right but failed to add the zener voltage of 5.6V to their answer. This appears to demonstrate a lack of understanding of voltage levels at different points in a circuit.

Qu. 3 Almost all candidates failed to give the direction of the forces for the current carrying conductors.

Qu. 5 Many candidates seem to have difficulties with manipulating combinations of series and parallel resistors.

Qu. 7 Many candidates had real difficulty in moving beyond step (i) in this Question.

Qu. 9 Many candidates were not able to explain the function of Rv and C in the circuit.

Qu.10 This was by far the least answered question in section B and most candidates who did attempt it answered it poorly.

Qu.11 Answered more frequently and better than question 10 but still not well answered.

Areas of common misunderstanding

See previous section

Recommendations

Feedback to centres

Evidence is clearly emerging from the last two examination papers that candidates prefer to do combinational logic questions and score consistently higher in these questions. Candidates seem to find greater difficulties in solving electrical principles and analogue electronic problems. They often appear not to have a good grasp of basic principles and the ability to apply these principles to different electrical and electronic problems. It is acknowledged that this is not a new problem. Over the years candidates at different stages in their education have found digital electronic problems easier to solve than analogue electronic problems (perhaps this is why there are fewer analogue electronic engineers than digital electronic engineers). There are no easy answers to this problem. However, teachers and lecturers are encouraged to continue to concentrate their efforts on teaching basic electrical and electronic principles and ensuring that their candidates have a good grasp of these principles by allowing them to apply the principles to solving a diverse range of problems.

FE centres are encouraged to 'stick with' the Intermediate 2 Electronic and Electrical Fundamentals examination. Some centres seem to enter candidates for a year or two and then no longer enter candidates. This may be because their candidates do not perform well and/or they believe the examination paper is too hard. However, such centres do not build up experience in running the Intermediate 2 Electronic and Electrical Fundamentals course.

It was encouraging to see some improvement in examination techniques. Centres are encouraged to continue this good work so that future candidates are better equipped to sit the examination.

Centres should continue to give careful consideration to the quality of the estimates they submit. Estimates submitted invariably gave an over confident prediction of candidate performance.