UNIVERSITY OF MALTA
SECONDARY EDUCATION CERTIFICATE
SEC

PHYSICS

May 2008

EXAMINERS’ REPORT

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD
Section 1: Statistical Information

During this session, 4291 candidates applied for the examination; an even greater proportion of candidates sat for Paper I+IIA (2344 – 54.6%) than for Paper I+IIB (1947 – 46.4%), than last year. This inevitably meant that a number of candidates have not made the correct choice that best matches their ability. Indeed the number of candidates that migrated to paper I+IIA has been too great and the result is that there is a slight drop in the percentage of candidates who obtained grades 1-5, grade 5 being the minimum grade of Paper IIA.

### Table 1: Distribution of the candidates’ grades for SEC Physics May 2008.

<table>
<thead>
<tr>
<th>Grade</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>U</th>
<th>Abs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper I+IIA</td>
<td>187</td>
<td>345</td>
<td>445</td>
<td>732</td>
<td>397</td>
<td></td>
<td>227</td>
<td>11</td>
<td>2344</td>
<td></td>
</tr>
<tr>
<td>Paper I+IIB</td>
<td></td>
<td>247</td>
<td>492</td>
<td>601</td>
<td>251</td>
<td>293</td>
<td>63</td>
<td></td>
<td>1947</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>187</td>
<td>345</td>
<td>445</td>
<td>979</td>
<td>889</td>
<td>601</td>
<td>251</td>
<td>520</td>
<td>74</td>
<td>4291</td>
</tr>
<tr>
<td>%Tot</td>
<td>4.4</td>
<td>8.0</td>
<td>10.4</td>
<td>22.8</td>
<td>20.7</td>
<td>14.1</td>
<td>5.8</td>
<td>12.1</td>
<td>1.7</td>
<td>100.0</td>
</tr>
</tbody>
</table>

977 candidates (22.8%) obtained grades 1-3
2845 candidates (66.3%) obtained grades 1-5
3697 candidates (86.2%) obtained grades 1-7

Section 2: Comments regarding candidates’ performance

2.1 General Comments

In general, this examination has a high discrimination index that shows that it was able to differentiate extensively well across the ability spectrum. This examination was capable to offer a good challenge to the most able students and at the same time clear enough that candidates of below average ability still managed to give appropriate answers. One must also indicate that each question and part of question was within the current syllabus and that the maximum score of each and every question was in fact gained. The examination has good qualities and apart from being fair across the ability spectrum of the cohort it provides the learning community with good questions that should be a resource to the learning of Physics from when the student starts Physics in Form 3.

Paper I+IIA candidates have shown mastery over the whole of the Physics syllabus. On the other hand, Paper I+IIB candidates perform better in Paper IIB than in Paper I and show that their mastery of certain topics is rather approximate. Furthermore, synthesis and application questions are in fact providing the selection ground for the upper grade boundaries.
This year much more candidates opted for Paper I+IIA (2344) rather than for Paper I+IIB (1947). This could be an indicator of an increased accessibility of the Physics examination to our students since the examination is improving in format and design so that it is more approachable to candidates. Evidence throughout the years shows that more and more high ability candidates are opting out of Paper I+IIB making the lower grades more easily obtainable for the low ability candidates who are not being compared with too many high ability candidates in their category. **However the write-on Paper IIA must not mistakenly be considered an easier paper than the one set in previous years.** Examination standards must be maintained and therefore Paper IIA keeps on testing at a higher level than Paper I as specified in the syllabus. Paper IIA in fact requests candidates to apply physical concepts to everyday situations and also to interpret physical effects through appropriate scientific terms much more than Paper I (as specified in syllabus 2008 p.3). The examiners’ expectations being such, implies that in depth analysis and detail is asked for. As a result, it is not expected that those students who find it difficult to rise to this level during their learning process opt to sit for Paper I+IIA. Paper IIB still tests at a lower cognitive level than Paper I, so these mentioned candidates should find it matching their ability.

One major frequent error across the cohort suggests that candidates still need to be more careful with **units**. Over the past recent years the Physics SEC examination is in fact including specific questions requiring the candidates to express their answer in the correct units. The skill of using appropriate **scientific terms** seems to be improving although it is still one of the obstacles for certain candidates. The question format adopted whereby the candidates know what to answer to specific prompts is proving to give them the necessary security to respond with confidence. Similarly, the write-on format as from last year including Paper 2A, has also given the candidates clear layout of the expected length for their answers. However, despite the fact that questions do not request extensive qualitative answers, a significant number of candidates still fail to express themselves in **coherent English**. Whilst they are not being penalised directly for this, they sometimes manage to bungle a straightforward answer or even write irrelevant lengthy material and get it wrong or provide a counter argument to their previous answer. **The SEC Physics Examination Board is finding that candidates are extensively failing in application and synthesis level questions across all topics.** It can be said that only those candidates that fare well at these levels gain access to the higher grades.

As regards specificity by topics, evidence from this year’s examination and from previous ones, indicates repeatedly that there is a drastically low performance across all candidates in the following topics: **Momentum** (Section 6.1) and **Waves** and related topics (Sections 11 to 15 of the syllabus). One must take this seriously into consideration during the learning of Physics.

Again as in previous years, questions requiring candidates to describe simple experiments were often not answered properly. Candidates seem to **lack direct experience in using apparatus** and sometimes show that they may not even have seen the experiment being done let alone handling it themselves. This year this was most evident in Question 3 of Paper II, i.e. the Sonometer experiment. Coursework-related interviews with selected candidates confirm that this is indeed true. **It is well-known among all educators that first hand experience does not only enhance the students’ enjoyment of the lesson but it also compounds understanding of the concepts and allows for their interlinking. Students gain a sound grasp over the topics and their performance in examinations should show this.** (Refer also to Section 4: Laboratory Coursework).
It is highly recommended that the school passes on the examiners’ report to all Physics teachers of all Forms and as early as possible in the academic year. The main function of this report is a diagnostic one that should be helpful throughout the whole learning process rather than being simply a list of frequent errors. It is also found helpful and is in fact done in some schools already that this report is made available to the students themselves for discussion in parallel with the class correction of the questions.

2.2 Paper I

Table 2: Mean and Standard Deviation of raw scores for Paper I questions by Paper choice

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Tot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper (IIA)</td>
<td>Mean</td>
<td>7.9</td>
<td>6.1</td>
<td>3.9</td>
<td>6.3</td>
<td>7.2</td>
<td>6.8</td>
<td>5.3</td>
<td>5.6</td>
<td>6.8</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>1.6</td>
<td>2.7</td>
<td>2.9</td>
<td>2.8</td>
<td>1.5</td>
<td>1.7</td>
<td>1.9</td>
<td>2.2</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Paper (IIB)</td>
<td>Mean</td>
<td>5.3</td>
<td>2.5</td>
<td>1.0</td>
<td>2.5</td>
<td>5.4</td>
<td>3.9</td>
<td>2.9</td>
<td>3.1</td>
<td>3.2</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>2.5</td>
<td>2.4</td>
<td>1.5</td>
<td>2.4</td>
<td>2.0</td>
<td>2.4</td>
<td>2.0</td>
<td>2.2</td>
<td>2.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Table 2 above clearly indicates that Paper A candidates score higher than Paper B candidates in each and every question of Paper I. This implies that Paper I is well tuned to reach the whole ability spectrum and that it is found easier by Paper A candidates as is expected. Table 2 also shows evidence of the large influx of Paper A candidates this year that should have sat for Paper IIB. The rather high standard deviations of Paper A candidates in many of the questions indicate a wider range of scores obtained by these candidates than usual. This in turn implies that apart from very able candidates, there are some other Paper A candidates of a rather low ability. The other evidence is from the scripts themselves that show that some Paper A candidates found serious difficulties in answering correctly, sometimes just repeating the question text, and perhaps even in understanding the questions.

**Question 1. This question concerned density of liquids.**
Most candidates fared well in part (a) calculations of density and in part (b) to explain how the mass was determined. Density is a topic that is usually covered in Form III in schools perhaps it is considered rather straightforward with easy introductory calculations. However, the difference in means between the low ability candidates that sat for Paper I+IIB and the Paper I+IIA candidates. Indeed the low scores above pertain to those parts which asked the candidates to infer from the results and explain their answers. In part (c) some ignored their own calculations and concluded about water and oil when water was not even included. As for parts (d) and (e) the able students fared well whereas others found difficulty in bringing out the right contrast between relative densities of the materials mentioned in these parts.

**Question 2. This question concerned linear motion.**
The common mistake in part (a) was the confusion of signs ending up with a negative time mostly. On the other hand most candidates were familiar with the central part (b) where Paper I+IIA candidates obtained near perfect scores. In this part, Paper I+IIB candidates fared best and obtained the major part of their meagre score. In part (c), very few candidates could come up with a correct answer even among Paper I+IIA as the s.d. (2.7) indicates.
**Question 3. This question concerned momentum.**
Year in year out this topic poses problems when it comes to detailed problem solving and not merely inputting straight forward data. In fact, overall candidates were able to answer part (a). However, most were quite unable to continue working parts (b) and especially (c). It seems that some candidates are unable to extract data from the other parts of the question or from the introductory lead-in statements. Very few candidates scored this question totally correct as the low means (3.9, 1.0) indicates.

**Question 4. This question concerned energy.**
Overall candidates fared well in part (a) however, immediately in part (b) quite a good number of candidates were not sharp enough so ignored that the ball was half way down, mainly considering only one type of energy. This especially concerned the Paper I+IIB candidates who lost most marks here. In the rest of the question, some scored quite highly even noticing that they could find 40% of the 8m height, since the latter was the only variable concerned, i.e. since m and g were constants.

**Question 5. This question concerned plotting an experimental graph.**
Like in previous years, candidates performed very well in this question. Looking back at last year’s report about this type of question, it seems that plotting a straight line (as in most of the past examinations) is much more familiar than plotting a curve (as in last year’s exam). The graph was on the whole well drawn, most of the marks that were still lost in this part were due to inverted axes. Another very common error was setting an inappropriately small scale. Paper I+IIB candidates could not answer the last two parts where higher order thinking was called for. Part (e) also provided selection ground for the Paper I+IIA candidates as very few of them could interpret the graph and relate it to the concept. Most simply could not apply that the system is in equilibrium and that the mentioned forces are thus equal and opposite. It seems that most of the marks gained by the candidates are those of purely mathematical nature; candidates seem not well trained to interpret graphs and drawing the correct inferences that relate to the application of the physical concept/s concerned. This is repeatedly the case over a number of years.

As indicated earlier on in the general comments, the Board of Physics SEC Examiners wishes to stress the importance of the practicals being done by the students themselves. During the learning process students are expected to have repeated this skill during their practical sessions where they must have been lead to graph interpretation and drawing up the correct conclusions individually. (Refer also to Section 4: Laboratory Coursework).

**Question 6. This question concerned energy resources.**
Most candidates scored high in this question as the means (6.8 and 3.9) indicate. Again, the main questions that posed problems were those that requested higher order thinking. In part (b)(i) a good number were not capable to suggest another use for landfill gases. In part (b)(iv) many did not realise the situation in Malta and gave generic answers. One must note that in such questions, the explanation itself carries the mark/s.
Question 7. This question concerned optics.
In general, candidates showed familiarity with the items asked in this question. Paper I+IIA candidates finding it easier than paper I+IIB candidates obtaining a mean 5.3 and 2.9 respectively (Table 2). However, the difference between the two sets of candidates was rather strong. Most frequent errors include for instance in part (a)(i) where candidates were keen enough to mention dispersion rather than most others who simply wrote refraction, but surprisingly spelt it in many different ways. One must say that although these were awarded the stipulated mark, it is wise for teachers to take note of this. Throughout the years this has been quite frequent in other terms such as diffraction spelt as defraction where in that case the mark was never given. There was no benefit of the doubt given in favour of the candidate, since it is very close to the term refraction.

One worrying error is that most of the candidates lost marks in part (a)(iii) where they were almost all rather incapable to link the positions of the dispersed colours with the respective wavelengths. It seems that this concept and happening of this phenomenon is not clear enough. In part (a)(iv) the majority again did not manage a correct answer; this part was usually left out. Although most candidates could draw a correct diagram for the periscope (b)(i), only a few able ones could relate the path they have drawn to the function of this device; a lot did not even mention total internal reflection and some mentioned simply reflection.

Question 8. This question concerned electromagnetism.
A surprisingly common mistake is immediately in part (a)(i) where many candidates did not realise that the question is asking about permanent magnetic materials i.e. alloys of iron (steel) and of nichrome and not the pure metal. During the learning of Physics the application in relevance to the concept must be thoroughly emphasised in any content area. This question however shows evidence of this type of flaw since usually when a recall question was set, such as “Name a material for a permanent magnet” most scored high. Again for part (a)(ii) most candidates lacked to provide detail and simply stated “connect current to”. One must still point out that the most able candidates gave correct answers to part (a). Part (b) took an analytical approach where the candidates had to understand it, make the correct inference about the presence of unlike poles and not go beyond it. Only in part (c) there was enough evidence given to deduce the actual polarity of A and B. Most did very well here and also drew the field diagram correctly. Part (d) gave an opportunity for the most able candidates to show their analytical skills. These were capable to explain it in good scientific terms such as “reduced magnetic strength or reduced count on gauge where less magnetic material or less magnetic domains are present on panels”. Unfortunately, most others had no idea whatsoever.

Question 9. This question concerned electromagnetic spectrum.
In part (a) of this question, a good number of candidates simply gave the generic definition of frequency and did not mention the 100 waves per second or else missed out on kHz and only quoted 0.1 cycles per second. This is a case in point where the units must be considered as part and parcel with the quantity; a quantity is only correct if its units are correct. Those candidates of low ability secured a mark in part (c), that for the property of em waves. The table of the electromagnetic spectrum also gave an opportunity for the less able to gain some marks, although in general many candidates failed to recall properly the wavelength ranges.
**Question 10. This question concerned radioactivity.**

In general, candidates showed familiarity with this topic. Most candidates could write the nuclear equation correctly. However, many failed at explaining how the radio isotope can actually be detected by a GM tube. Applications of the half life also seem to be well known across the cohort. In part (c) however, only the very able candidates scored these marks, many of which expressing clearly that “nuclear bombs have a long half life thus take a long time to decay and are never totally eliminated from the environment”. Most of the candidates just mentioned a long half life and many others just reworded the question text. Some also have the false impression that after a half life the radiation simply stops.

### 2.3 Paper II

**Table 3: Mean and Standard Deviation of raw scores for Paper IIA questions**

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paper IIA</strong></td>
<td>Mean</td>
<td>9.0</td>
<td>8.0</td>
<td>7.8</td>
<td>10.0</td>
<td>10.7</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>4.9</td>
<td>4.3</td>
<td>4.4</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Paper IIB</strong></td>
<td>Mean</td>
<td>7.4</td>
<td>5.1</td>
<td>7.7</td>
<td>11.4</td>
<td>8.2</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>4.4</td>
<td>3.6</td>
<td>3.1</td>
<td>3.1</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Paper I+IIA candidates sat for Paper IIA whereas Paper I+IIB candidates sat for Paper IIB. The questions are set from the same syllabus area/s but are designed at different cognitive levels according to syllabus 2008.

Paper I+IIA candidates found questions 4 and 5 relatively easier than questions 1, 2 and 3. Paper I+IIB candidates found question 4 relatively easier than the rest, with question 2 the most difficult.

The relatively high standard deviations for Paper I+IIA candidates are indicative that a number of these candidates fell well below the pitched level, decreasing the overall mean for each question indicating once again that these have made a wrong choice of paper.

**Question 1. This question concerned electricity and electromagnetism.**

This question’s two parts got very different scores from candidates (Table 3). All candidates seemed well conversant with the electricity part of the question such that most marks were scored here. In part (a) candidates generally could give the names of the different wires but a good number of them jumbled up the function, even amongst Paper I+IIA candidates. The function of the earth wire is the best mastered but for the other two wires, most especially Paper I+IIB simply stated that they allowed current to pass through. The electromagnetism part gave a very hard time to the Paper I+IIIB as very few answered correctly. Furthermore it made important differences in the Paper I+IIA candidates’ final grades, as can be seen from the relatively high standard deviations. Most of them gave partial correct answers as to how the construction of the transformer relates to its function, leaving out salient parts of the transformer. Some had difficulties explaining the need for an a.c. current. Most simply stated that there was a cutting of current and did not mention a magnetic field.
Question 2. This question concerned the turning effects of forces.
Year in year out, candidates do very well in questions set in this area of the syllabus. However, by placing the question in an altogether unfamiliar context, most candidates could not provide clear and error free answers to the simplest of questions (Table 3). Thus, the first part of the question the majority of candidates failed to provide correct answers, even the Paper I+IIA. Throughout the years, one meets a very common error in the statement of the principle: candidates state it as if moments are always counterbalanced. **During the learning of Physics one must make clear with reference to specific examples and applications that clockwise and anticlockwise moments are only equal at equilibrium.**

An important repetitive error of a good proportion of the I+IIA candidates was in part (b)(iv) knew that a force at the end of a spanner produces a large turning effect, but none emphasised that this force must be perpendicular it. Similarly, the Paper I+IIB candidates’ performance was riddled with errors throughout. Even in the most basic questions that required simple definitions, the candidates dropped marks and so their overall mean score is very low.

Question 3. This question concerned sound waves.
Candidates obtained a very low mean score in this question (Table 3). Although the sonometer is specifically mentioned as an application in the syllabus, most of the cohort seemed to have never tackled it. (Refer also to Section 4: Laboratory Coursework). The low S.D. for the Paper I+IIB candidates indicates that most of the candidates’ performance was rather a homogeneous one. On the other hand, the high S.D. for Paper I+IIA shows that within this group there were heterogeneous scores. While the mean is below the pass mark some candidates managed to obtain a good score here giving them the edge over the others to obtain an excellent grade. The most common errors for Paper I+IIA candidates where in part (a)(i) and (ii) where despite the fact that most had good knowledge of this experiment, nearly none of them mentioned resonance to find the frequency of the vibrating wire. Also in part (b)(i), they wrongly associated the given diagram with a transverse wave.

As regards the Paper I+IIB candidates, their answers were very inaccurate even when they knew part of the answer, their responses were rarely flawless. In part (a), many did not label the pulley and the bridge; could mark the weight correctly but not the tension; the sequence of the experimental steps was not known especially steps 4 and 5 were erroneous. In part (c)(ii) a good number of candidates could identify the amplitude but very few the periodic time. In (c)(ii) a majority used the formula $c = f \lambda$ instead of using the graph to find their answer.

Question 4. This question concerned the Earth and the Universe.
In this question candidates obtained a good mean score, a pass mark both for Papers set (Table 3). Furthermore, the S.D. was rather low indicating that these scores were quite close to each other, i.e. a narrow range of scores. Nonetheless there were some frequent errors that require mention. The Paper I+IIA candidates showed a degree of mastery over the topic especially in the first part of the question. Some candidates did not know that the probes accelerate although they seemed to be aware that lunar probe P1 is faster than P2 (b)(ii). Similarly, a large number of candidates failed to realise that the probes are still under the influence of the sun’s gravitational field. Parts (b)(v) and (b)(vi) were other sore spots.

The Paper I+IIB candidates also showed an understanding of the topic. Their major weakness was that they failed to use the relationship that the greater the mass and the smaller the distance the greater the gravitational pull. Hence they committed errors in part (b) except for the calculation (b)(v) in which they obtained respectable scores as in part (a).
Question 5. This question concerned mechanisms of heat transfer.
This question presented heat transfer in an orthodox manner, except for the higher order questions which were inferential and analytical in nature, as the relatively high scores for it show (Table 3). Paper I+IIA candidates obtained their best score and the lowest S.D. However, in part (a)(iv), some candidates gave wrong answers indicating some lack of knowledge about radiation. In part (b)(iii), very few gave the correct physical name for the phenomenon observed. While in part (c) many gave correct answers, some candidates suggested the use of the Bunsen burner or that one should touch the teaspoon at the end of the experiment - both showing lack of health and safety considerations. The Paper I+IIB candidates provided a great number of errors. In part (a)(i) some said that heat travels by radiation, others said that heat travels by conduction only in solids while others said that heat travels by convection. In part (c)(iii) very few candidates made the link with specific heat capacity. Similarly, in the experiment with the spoons, part (d) very few Paper I+IIB candidates could give a coherent and logical answer. Most jumbled up the steps or used methods that do not apply to the situation, such as direct heating of the spoons. (Refer also to Section 4: Laboratory Coursework).

Section 3: September Session (Paper I + IIB)

Table 4 : Distribution of candidates’ grades.

<table>
<thead>
<tr>
<th>Grade</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>U</th>
<th>Abs</th>
<th>Total</th>
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<tbody>
<tr>
<td>Frequency</td>
<td>4</td>
<td>57</td>
<td>194</td>
<td>134</td>
<td>107</td>
<td>5</td>
<td>501</td>
</tr>
<tr>
<td>% Total</td>
<td>0.8</td>
<td>11.4</td>
<td>39.0</td>
<td>26.7</td>
<td>21.4</td>
<td>1.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Papers I and IIB of the September session were designed to match the respective Papers of the May session. The candidates’ scores demonstrate this as on the whole they are in line with each other. The low frequency of pass marks indicate that it is only those candidates who made a stringent effort to catch up during the summer months managed to pass (Table 4). These candidates would also probably have benefited had they made a better choice of paper in the November registrations. The highest score for the exam was around 60 which means that none of these candidates would have made it had they taken up Paper I+IIA.

The means for each question also confirms this (Table 5). The candidates found question 1, 6 and 10 of Paper I and question 2 of Paper IIB most challenging. These questions covered the topics Energy, Speed and Power (1 & 6), ultrasound (10) and converging lenses (2, paper IIB). The candidates’ mean scores are so low that it could hardly be argued that they knew anything at all about the questions asked. Candidates fared best in question 3 of Paper IIB obtaining the only pass mean score in it. This question was once again about the Earth and the Universe. One must indicate here that after the low score obtained by the May 2006 candidates in Paper II Question 4, this topic seems not to be receiving the cold shoulder anymore but is recently being given more adequate attention.
Section 4: Comments regarding the school-based Practical Coursework

Thirty-two schools were chosen by MATSEC to have their Physics laboratory scripts moderated. These schools were visited by Physics moderators between the 9th and the 23rd April 2008 as stipulated by MATSEC. The total number of scripts moderated on school site was 982. The total number of scripts presented by private candidates was 140. The total of 1122 represents about a quarter (26%) of all the 4291 candidates sitting for Physics SEC May 2008. Some candidates, both private and from schools were called for an interview.

Comparison between the moderators’ comments and the actual marks allotted by the schools shows that while in some schools, excellent work is being carried out in others practical work seems to be only performed in theory or as demonstration. Sometimes, marks are still being considerably inflated at the expense of other schools that assess more fairly or even more stringent. In these schools, class reports are compiled and very little individual work is allowed to creep into the report. Furthermore, teachers end up correcting their own dictated work as transcribed by the students on the lab book. Evidence of low quality and/or repetitive work also surfaces from the interviews. Some interviewees claim that all experiments were in fact purely teacher demonstrations or sometimes pupil-aided and then students copy down the results from the board.

In contrast to this, the trend for better experiments and producing better lab reports recognised in recent years seems to be consolidated. Although, the variety of experiments is at fault in some schools and no proper balance achieved, the quality of the work is improving and there is room for building on positive practices.

Most schools must make an effort to implement improvement on the following two issues:

(i) a comprehensive discussion composed by the student but inspired by the teacher. Student’s retention of that particular concept under test should be increased. Two questions of Paper II always test candidates on a concept under test, inferences, extrapolations and also higher order applications of it;

(ii) experiments that involve a set of variables that are plotted on graphs so that proper inferences may be drawn to consolidate the discussions. One must point out that after all graphs are a visual image of the mathematical relationship of the concept/s that again enhances student’s retention apart from having a more scientific approach to experiments. Question 5 of Paper I is there to emphasise the graphical and inferential aspect of experiments.
These two issues raised mainly contribute to the following trend.

(i) **Poor** work presented by the boys’ secondary schools although Junior Lyceums in general still present better work;

(ii) **Good** work in the girls’ schools with the church schools and J.L. presenting better coursework than secondary ones;

(iii) **Excellent** work is presented by the boys’ church schools, so their marks are more often than not deflated when compared to all the rest.

A greater number of schools are in fact producing better work than vice versa. Finally, again this year MATSEC piloted a feedback sheet that had to be filled by moderators for each school moderated which should be regarded by the respective schools as a guideline in the light of what has been reported above.

It is much desired that the Examiners’ Reports of recent years are given due attention and are used in conjunction with the current syllabus and the Examination Questions themselves.

The Chairperson
Board of Physics SEC Examiners
September 2008