UNIVERSITY OF MALTA

SECONDARY EDUCATION CERTIFICATE
SEC

CHEMISTRY

May 2007

EXAMINERS' REPORT

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

Part 1: Statistical Information

Table 1 shows the distribution of grades awarded during the May 2007 session.

Table 1: Distribution of grades awarded in May 2007

Grade	1	2	3	4	5	6	7	U	Abs	Total
Paper A	82	153	145	137	142	-	-	116	4	779
Paper B	-	-	-	25	31	27	30	97	8	218
Total	82	153	145	162	173	27	30	213	12	997
% of Total	8.2	15.3	14.5	16.3	17.4	2.7	3	21.4	1.2	100%

The number of candidates who sat for the exam this year rose to 997 from 863 last year. The number of students attempting paper B increased by just 10 over the previous year showing that most of the students opted for the A paper.

The overall standard was better than last year with students sitting for paper A performing better than those in the B paper. The percentage pass rate in paper A (grades 1-5) was however slightly lower (84.4%) than that registered in 2006 (84.7%) where there was a drop in the pass rate over the preceding years. A higher pass rate (51.9%) was registered for students sitting for the B paper when compared to that of last year (41.3%). This contrasts with the tendencies shown over the last two years where a drop in the pass rate for this paper was shown.

A candidate is only considered as ABSENT if s/he fails to turn up for both examination sessions AND fails to submit the Chemistry Lab book. A mark for the practical or exam session/s is given to those who fail to attend one or more of the examination sessions. Such candidates are not registered as absent.

Part 2: Comments regarding performance

Remarks on Paper 1

General Comments

1. The paper distinguished between students of various abilities and similarly to previous examinations, there was a strong correlation between the performance of candidates in paper I and paper II.
2. One must not fail to emphasize that a lot of marks were lost by a considerable number of students in fundamental areas of chemistry such as equations, incorrect formulae and calculations.

3. Students who sat for paper A obtained better marks in each question than those who chose paper B. In fact, the facility indices (see: Table 2) for each question shows that students who sat for paper B found each question more difficult than those who sat for paper A.

Table 2: Averages and facility indices obtained by candidates in all Paper I questions

Question No.	1	2	3	4	5	6	7	8	9	10	11	12	Overall average
Max mark	4	8	5	8	6	6	7	4	6	6	20	20	100
Average Paper 2A Candidates	3.62	5.19	3.59	5.94	3.56	4.35	4.50	1.68	3.21	3.51	13.11	7.45	60.33
Average Paper 2B Candidates	2.83	2.93	1.99	2.95	1.53	2.81	1.63	0.57	1.56	1.80	5.60	1.73	30.11
Facility Index Paper 2A Candidates	0.90	0.65	0.72	0.74	0.59	0.72	0.64	0.42	0.53	0.59	0.66	0.37	0.61
Facility Index[1] Paper 2B Candidates	0.71	0.37	0.40	0.37	0.26	0.47	0.23	0.14	0.26	0.30	0.28	0.09	0.30

4. There was a notable difference between the marks in each question for students who sat for papers A and B. Students who sat for paper B fared badly in Section 2 of the paper. This was also evident in previous years.

Section A

Q1. The majority of students got this question correct and many students in fact scored the 4 marks. Problems encountered were in parts (c) and (d) where some students got confused.

Q2. Most candidates fared well even here. Marks were however lost in cases where:

- a chemical symbol was given instead of the name of the element;
- the wrong type of bonding was indicated;
- students referred to mobile "electrons" (instead of "ions") to explain electrical conductivity of molten/dissolved sodium chloride.

Q3 Several candidates did not label M, fractionating column, correctly which was surprising. The purpose of M as well as of the condenser, N, were well explained by a number of students with others finding it hard to explain their use. Answers to part(c) were mainly correct, although averages of the two boiling points or the difference between the two boiling points were not uncommon!

[1] An index used to determine how well a question was attempted. This is obtained by dividing the mean mark by the mark allotted for that question. A value of 1 indicates that all candidates got full marks. A low index shows that the candidates found the question more difficult.

Q4 (a) An explanation in terms of loss /gain of oxygen or loss/ gain of electrons was expected. However, it is evident that students don't give enough attention to what they are writing and incorrect statements were very common. E.g. 'Fe_2 has lost 6e's to form Fe'; 'CO has gained an oxygen molecule'. It is clear that several students make no distinction between molecules, atoms or ions with obvious confusion and errors in their answers.

(b) On the whole, the calculations were correct. However, it was very common to come across units for relative molar mass in kgm!

Q5 The question required that a reactant or part of it be circled. Instead several answers showed one of the products circled. Only few candidates managed full marks in this question. Once again the explanations given were far from clear or correct. e.g., 'NH_3 has lost H_3, $FeCl_2$ has gained chlorine'. The reagents being oxidised could best be identified by following changes in oxidation number or by noting the addition/removal of oxygen or hydrogen atoms. The candidates need to be very precise to score good marks.

Q6 This was a typical question on isotopes of copper. (a) Although it is true that isotopes have the same atomic number but a different mass number it is also important to mention that 'Isotopes are atoms of the same element'. Some students believe that the proton number was different! In part (b) the weaker students made mistakes with the number of electrons and neutrons. The hardest task of the question was (c) whereby the students were required to calculate the relative atomic mass. Students quoting the value from the Periodic Table provided without showing any relevant working gained no marks, even though the value was very close to the calculated answer. Other students just assumed a 1:1 ratio in calculating the average!

Q7 It's good to note that students are becoming increasingly familiar with calculations involving moles and molar concentration of aqueous solutions. However, the accuracy of the answers varied tremendously, the necessary decimal places/ significant figures being ignored. There are however still a good number of students who are at a loss when it comes to processing titration results.

Q8 The majority of students got (a) and (b) incorrect as they did not read the question carefully and so did not take into consideration that the electronic configuration of the ION was being asked for! Few students got the final part of the question correct. Again, students did not read the question correctly and did not supply all the information necessary to be awarded full marks.

Q9 Most candidates scored well on part (a) but parts (b) and (c) proved to be a hurdle for quite a few of the examinees. Many candidates failed to draw the correct structure of ethanol and chloroethane, the latter being the main organic product of the reaction between ethanol and phosphorus pentachloride. As a result they could not name either of these products.

Q10 One common mistake was the choice of the diagram (*simple diagram*) for the electrolysis of concentrated brine. Many opted for the industrial (Diaphragm Cell) rather than the requested laboratory set-up (Voltameter or U-tube cell). In part(c) various valid tests were accepted. Dry litmus will not give a positive result!

Section B

Q 11 (a) Nitrogen monoxide is not soluble in water. It is nitrogen dioxide which is soluble in water possibly giving a mixture of nitric(III) and nitric(V) acids. Sulfur dioxide was shown to convert directly to sulfuric rather than sulfurous acid. Many students lost marks in this question as they were unfamiliar in writing the correct equations for the reactions given as well as not understanding how acid rain was formed.

(b) Very often only one equation was given.

(c) The use of powdered calcium carbonate to facilitate reaction was understood by most students. The calculation was straightforward but some incorrectly used a 1:1 ratio of masses! There was also some confusion in conversion of units of mass.

Calcium nitrate is the product formed. The question asked for the name and not the formula (very disappointing to encounter incorrect formulae for calcium nitrate).

(d) The catalytic converter is important in cars to enable a faster and efficient conversion to less harmful gases. The students correctly stated that nitrogen gas and carbon dioxide are constituents of air with N_2 being inert and CO_2 used in photosynthesis. However, several also included the fact that high levels of carbon dioxide lead to global warming. As pointed out in other parts of the report the explanations to part (iv) involving oxidation and reduction were not satisfactory. An easy approach was in terms of loss/ gain of oxygen. The candidates who used oxidation states gave some very unrealistic statements and ionic equations, e.g. $C^{2+} \rightarrow C^{4+} + 2e$!

Q 12 (a) Z is iron(II) sulfite. Only the best candidates noted the significance of test 3, indicating a sulfite and not a sulfate. Most students realized that aerial oxidation by the oxygen in the air gave the colour change associated with green Fe^{2+} giving red brown/brown Fe^{3+}.

(b) G is calcium chloride. Although the question specified that G is soluble in water several gave insoluble calcium salts and even calcium metal as possible answers! Possibly not realizing that reaction with sodium hydroxide solution cannot be on a solid. The cation was sometimes wrongly identified as magnesium (flame test ignored) and anion as nitrate (with misty fumes being associated with nitric acid vapour rather than hydrogen chloride gas).

(c) Many students lost marks in this part of the question. Although, they knew the tests to use, many made errors in what would be observed or in the equations they had to give. Various sequences of reactions were accepted. In some answers equations to reactions described were not included.

Remarks on Paper 2A

General Comments

Some candidates found this paper somewhat more difficult, the toughest questions being questions 5, 9 and 10. Two of these involved calculations, an area of concern which has been highlighted over and over again.
Table 3 shows the averages and facility indices obtained by candidates in all Paper 2A questions.

Table 3: Averages and facility indices obtained by candidates in all Paper 2A questions

Question No.	1	2	3	4	5	6	7	8	9 n=214	10 n=281	11 n=568	12 n=470	Overall average
Max mark	6	8	6	5	7	7	9	12	20	20	20	20	100
Average	5.02	5.99	3.19	3.24	2.80	4.11	4.77	9.83	8.74	6.77	11.49	11.77	59.79
Facility Index	0.84	0.75	0.53	0.65	0.40	0.59	0.53	0.82	0.44	0.34	0.57	0.59	0.61

Section A

Q 1 This question on basic chemistry was well answered by the majority of candidates. However, the major problem was part (a) concerning the equation for the complete combustion of propanol.

Q2 Some candidates encountered difficulty when answering this question. In part (a) both the solid state and the gaseous state needed to be discussed. In all the parts to the question, the answers showed inaccuracies, mainly no distinction being made between bonds, intermolecular forces and interatomic forces. Using the term 'particles' rather than 'molecules' or 'atoms' would have avoided ambiguities. This was most evident in part (d) where ions/atoms/molecules seemed to be interchangeable! Similarly, in part (c) several candidates are under the impression that there is air in between molecules in a sample of gas. Several candidates confused diffusion with convection and answered accordingly.

Q3 Barium (a group II metal) was frequently assigned with ionic or covalent rather than metallic bonding while barium oxide (an oxide of a metal, and so mainly ionic) was described as a covalent substance.

Many students lost all marks in part (ii) with some rather confusing statements on energetics related to bond breaking (an endothermic process) and bond formation (which is exothermic).

Q4 It was a pleasure to see that the students drew on their experimental observations in the lab. It seems that most students had experienced the reaction between sodium and water in the school lab. However, few students were certain with the observations for this reaction. Most just focused on the fact that the reaction was vigorous. Equations were not always correct with the common mistake being the formation of the oxide rather than the hydroxide, ignoring the fact that sodium oxide itself would continue to react, hence the formation of the hydroxide.

Q5 The equation for the thermal decomposition of sodium hydrogencarbonate proved the students very inventive both with regards to formulae and to the products formed. Several gave Na_2O as the product of reaction.

Q6 This question on the manufacture of nitric acid resulted in some good scores. The main mistakes were in:

- naming the catalyst for the oxidation of ammonia;
- writing an equation for the reaction of nitrogen dioxide with water (which gives a mixture of nitrous and nitric acid, or nitric acid and nitrogen monoxide – both versions being accepted).

Q7 Several marks were lost in this question, primarily for not reading the question well. A number of students were unsure of the dot and cross notation…some just gave only crosses! Some students forgot the lone pair on ammonia. Several answers showed a nitrogen atom rather than a nitrogen molecule. Moreover, nitrogen atoms often ended up having too many shells.
In part (b) the product was given as NH_4OH instead of $NH_4^+ + OH^-$. As mentioned elsewhere in the report some students are unaware that ions can conduct electricity, not just electrons.

Q8 A good number of students scored high marks in this question. However, it seems that several students did not realize that stoichiometric calculations in part (b) depended on the total volume of hydrogen produced, which in turn, had to be taken from the table of results (or graph). There were also occasional slips in the conversion of the units from cm^3 to dm^3 or vice versa.

Section B

Q9 (a) Some of the candidates thought that sodium chloride was the precipitate. This of course affected all the calculation. Although the question was leading the students, some faltered half-way through the calculation. Commonly encountered mistakes in this question included:

- incorrect formulae and/or equations to describe the precipitation of barium sulfate from the aqueous solutions of sodium salts provided;
- incorrect calculation of the relative formula mass of the sulfates.

Such basic mistakes were crucial and determined the remaining response to part (a).

(b) When a solid is deliquescent a solution results and not a liquid! Such inaccurate use of words leads to loss of marks. A number of students did not know what deliquescent was or where the carbonate came from. Candidates generally did not give an equation to represent the reaction of atmospheric carbon dioxide with aqueous sodium hydroxide to explain the origin of the carbonate ion.

(c) The preparation presented a situation which most students have encountered during the course of their practical work. However, the explanation lacked a lot of necessary detail. Few students realized that it is necessary to add excess magnesium and then filter. A few students believed that evaporation rather that crystallization was needed.

Although a standard type of calculation, the marks for parts (ii) and (iii) were at times not very high. In fact, these parts of the question proved to be another hurdle for those who are not so confident with calculations involving moles. Only the top performers in this question realised that the mass of the product had to be worked out using the relative formula mass of the hydrated (not the anhydrous) sulfate.

Q10 The accounts given varied from very exhaustive or detailed descriptions complemented by a number of relevant equations, to confused / vague / completely irrelevant information with no concrete idea of reactions occurring. Some were simply outstanding and deserved no less than full marks.

Parts (a) and (b) were fairly well answered although some students gave incorrect equations. However in (c) the bleaching action due to HOCl and the relevant equations were rather shaky. Similarly in (d) only one colour change was often given. In part (e) the evolution of nitrogen dioxide does not confirm the presence of copper. It is the formation of a blue/green solution which indicates that Cu^{2+} is formed. Again some candidates presented very sketchy details to prove the presence of a nitrate. Some even managed to combine details from two different tests!

As regards part (f), both Devarda's test and the Brown Ring test were considered as acceptable identification tests for nitrates, however, a good number of students were unfamiliar with any of these tests. Examiners did not expect any relevant equations in this case.

Q11 This was a very popular question with candidates where high marks were scored for correct illustrations and statements on the extraction and properties of aluminium.
In part (a) (iii) candidates gave multiples of the basic ionic equations in an attempt to make the electrons balance. An ionic equation, unless a full equation is required, should always be in its simplest form.

In part (b) the students had to indicate a metal higher than Al in the reactivity series. Some candidates strangely opted for carbon (non-metal) or some relatively inert metals such as copper or platinum. Others suggested a valid metal but then were unable to explain their choice, possibly not realizing that sodium or potassium react so readily in air, while calcium or magnesium react readily with steam. Hence the difficulties associated with handling such metals.

Part (c): The good thermal conductivity of aluminium in (i) was mentioned by very few students while in (ii) the protective oxide layer was not given much importance.

Part (d): This should have overlapped theory and practical work carried out in the lab. Few knew about the precipitate forming. Although most could argue that aluminium hydroxide forms, very few went on to say that aluminium hydroxide dissolves in excess alkali. Again, students were not expected to quote any equations involving the formation of aluminate.

Part (e): The economic aspect of electricity consumption was well tackled.

Part (f): The inert nature of the polymer towards atmospheric and household cleaners was well understood. However, it was not always emphasized that polymers such as PVC were chemically inert and hence superior (to a certain extent) to aluminiumware.

Q12 This question was fairly well-answered but with some common pitfalls.

The following were the main problems encountered in this question.

(a) Indicating an alternative raw material for sulfur. Many quoted the allotropes of sulfur, air and even sulfites (all wrong) where what was expected was any one of the naturally occurring sulfides e.g. iron pyrites – FeS_2, zinc blende – ZnS, galena – PbS, copper pyrites – $CuFeS_2$.

(d) Substances M and Q were correctly identified in most cases as being sulfur trioxide and oleum – $H_2S_2O_7$. However, it seemed to be a harder task when it came to writing the appropriate equations for steps 2 and 3 in part (d) of the same question.

(e) Although some candidates proved the presence of the ammonium ion by thermal decomposition of the salt and subsequently testing for the ammonia released, the standard test to prove the presence of the NH_4^+ ion consists of warming the solution with sodium hydroxide solution and checking for ammonia gas by means of moist red litmus paper. Many students believed that adding red litmus to ammonium sulfate was a correct test for the ammonium ion!

(f) Another simple calculation involving moles and molar concentration which baffled the same students with little practice / exposure to such key exercises in quantitative analysis. Many students did not realize that the silver nitrate was in excess and thus basing the calculation solely on the mass of silver nitrate gave the wrong mass of product formed.

(g) Quite a few students mistakenly gave silver as being divalent.

Remarks on Paper 2B

General Comments

There were several candidates who opted for this paper but failed to turn up for the written part of the examination. Obviously, their final mark was equivalent to that of the practical component.

It seems that there is a good percentage of these candidates who are ill-prepared to sit for the examination. It is a pity because after a course in chemistry a reasonable attempt at the examination is expected from all students.

There were only a handful of students who got more than half the marks in this paper. Only about 4% of the students who sat for this paper got an aggregate of more than 75% of the marks, indicating that most students who sit for this paper made the correct choice.

Table 4 shows the averages and facility indices obtained by candidates in all Paper 2B questions.

Table 4: Averages and facility indices obtained by candidates in all Paper 2B questions

Question No.	1	2	3	4	5	6	7	8	9 n=72	10 n=71	11 n=131	12 n=126	Overall average
Max mark	6	8	6	6	7	7	8	12	20	20	20	20	100
Average	2.94	4.21	1.91	2.69	2.21	3.13	1.68	5.15	2.39	1.43	7.38	5.68	37.96
Facility Index	0.49	0.53	0.32	0.45	0.32	0.45	0.21	0.43	0.12	0.07	0.37	0.28	0.38

Section A

Q1 The main problems encountered by students in this question were those in giving the proper formula for iron(III) oxide and for giving the correct equation for (c).

Q2 Students did relatively well in this question but most gave less detailed answers than their Paper IIA counterparts. Many students lost marks in this question as they could not explain their answers in a reasonable fashion. Few students had an idea of what diffusion was!

Q3 In part (a) many students did not know what neutralization means. In the second part of the question the main problem was where students did not know the type of bonding, apart from the few who did but could not explain the difference between NaCl crystals or in solution.

Q4 The first part of this question should have shown whether the students were familiar with this type of reaction in the lab. However, the usual answer was that the reaction between sodium and water is vigorous; that is only part of the answer. Part (c) was meant to elicit whether students were familiar with reactivity trends down a group of metallic elements. Many claimed that the reaction was less violent losing all the marks in the process.

Q5 The main problems with this question were those concerning the calculations involving moles and volumes of gases where most of the answers were either incorrect or students failed to attempt the questions.

Q6 Many students did not know the catalyst involved in the first stage in the production of nitric acid. The other problem was that of balancing the given equations.

Q7 There was a poor show by students who attempted this question. Very few could give correct dot and cross diagrams of hydrogen, nitrogen and ammonia molecules in spite of the fact that these form part of the basics of chemistry. There was hardly anyone who could explain why aqueous ammonia is weakly alkaline.

Q8 Most students did relatively well in parts (b) and (c) of this question but failed in the other parts. The simple ionic equation which was required in (a) proved to be difficult for some. In part (d) many did not choose the correct option and also failed in writing a correct balanced equation.

Section B

Q9 Students who attempted this question gave answers which were rather skimpy. Others failed miserably in the parts concerning calculations, where some either did not attempt any such questions or they just confused the numbers losing most, if not all the marks in the process. In part (c) of the question, there were only a few students who knew what was going to happen.

Q10 In general, students who chose this question generally did not answer accurately enough and lost marks! In part (a) few students understood what was happening. In part (b) fewer students knew why some acids are strong whereas others are weak. Many still think that chlorine by itself is responsible for the bleaching action (part c). The reaction between copper and concentrated nitric acid showed that most students hadn't seen it in the lab since a great majority didn't know that a blue solution formed. In (e) the test for nitrate proved too difficult with a majority of the students opting not to answer this part.

Q11 This was a popular choice with most candidates. In spite of this, there were still a considerable number of students who did not give a proper diagram or correct equation in part (a). The ionic equation in part (c) proved to be another pitfall for most students.

Q12 In this question the main areas where students lost marks were those concerning the catalyst used in the formation of sulfur trioxide [part (b)(i)], the name and formula of oleum [part (c)], the test for ammonium ions [part (d)(ii)] and the part dealing with calculations [part (e)].

Part 3: Comments about coursework

There were 972 students (97.49%) students out of a total of 997 who submitted their coursework by the date stipulated by the MATSEC SUPPORT UNIT.

Table 5 shows the breakdown of marks obtained by all the registered students.

Table 5: Marks obtained for coursework

Grade	Number of Students	%
15	105	10.53
14	301	30.19
13	266	26.68
12	134	13.44
11	66	6.62
<11	100	10.03
np	23	2.31
pr	2	0.20

(**np** implies no coursework submitted while **pr** implies that candidate was entitled to a pro rata mark since he/she finished school before 1994)

Registered candidates came from 26 different schools where moderation took place. This year moderators filled in a form for each school visited. The form contained a selection of criteria which were being used as a means to evaluate the coursework. There was also space for other comments to be added. The MATSEC office will send this feedback to the respective schools. This should serve as guidelines to a number of schools and teachers in particular to take corrective actions where necessary. The need for such forms has been long felt and it is evident that in spite of the fact that certain comments in the examination report keep cropping up, still there are schools where the same problems are evident. Hopefully such feedback will rectify matters.

There were 13 private candidates who submitted their practical work all of whom were called in for an interview. It was clear that a good number of private candidates had not done any or part of the practicals. Some of the students admitted that this was the case and that they were given the results or else the practical reports were dictated. There were also cases where it was claimed that the practicals were done by the tutor at home. The tutors who sign the forms whereby it is stated that the practicals were done under their supervision should understand that such a declaration carries a significant responsibility both for themselves and also for the student. The original marks were significantly reduced where it was clear that candidates had inflated marks and where it was found that the practicals were not done or had been dictated. The examiners consider this as being a serious offence on the part of the tutors and the candidates.

General Comments
Students presented a variety of experiments and it is recommended that all experiments carried out should be presented, not just the best fifteen experiments. One got the impression of a relaxed easy approach to the experiments carried out and reported about in Form 3 and of a somewhat rushed approach in the other years.

The following general comments are being highlighted in this report notwithstanding the fact that those found in reports for previous years are also valid and should also be taken into consideration.

Valencies, formulae and equations

- Students should be encouraged to include more equations with particular emphasis on correct formulae. Any chemical reaction should be represented whenever possible by a correct balanced equation.

Diagrammatic representations

- Diagrams should be drawn to a reasonable scale. A beaker drawn to A4 size is an exercise in art work and not chemistry. Besides if a conical flask and a condenser are also drawn to A4 size unrealistic diagrams result.
- A thistle funnel can be easily replaced by a dropping funnel in gas preparations, giving better control on the rate of addition of a particular reagent.
- A condenser used in simple distillation will not give satisfactory results if perfectly horizontal!

Experimental techniques used

- Experimental precautions in titrations are not always given the necessary importance.
- An average of at least three **concordant** readings in titrations should be used.
- Use of dangerous chemicals should be avoided especially where other less toxic ones could be use instead. Examples such as the action of heat on mercury(II) oxide or the use of chloroform by students as a solvent in a separation technique or the use of naphthalene are not recommended.

Presentation of results

- Observations in qualitative analysis should include the necessary detail. Theoretical and experimental work can be better correlated if an equation can follow the test-tube reaction carried out. A whole list of equations at the end of the experiment does not have the same effect as the continuity in thought is lost.
- Some chemistry experiments can be very conveniently followed using a mathematical approach, e.g. by using graphs. In fact some schools present nicely drawn graphs for rates experiments. Unfortunately, some schools seem to avoid this type of experiments, while there are other centres where although graph work is presented, the graphs are very untidy.

Over marking

- There were a number of schools where over marking of practicals seemed to be a common trend across all the coursework. Marks of 15/15 were awarded in several cases where it was clear that practicals were either copied or dictated or had a number of uncorrected errors.
- Another issue which needs to be dealt with is that of incorrect marking by some teachers who persist in commenting a 'VeryGood' and allocating full marks for incorrect formulae in equations and wrong answers in calculations. The experiment used to find the empirical formula of MgO was a case in point. There were cases where the methodology used by the students was incorrect but the answers produced were all correct in spite of the fact that the workings showed otherwise.

Out of syllabus

- There are still a number of schools who present students with practicals which do not form part of the SEC syllabus. Students presenting such work are penalised. This is especially so when the total number of practicals resulting in the lab book would be less than 15, considering that one cannot take into account such incorrect work.

Simplistic practicals

- The presentation of simple and similar practicals as individual practicals has been encountered once again in spite of similar comments made in previous years. It is not acceptable to have two different practicals one to collect a gas by upward delivery and collection of a different gas by downward delivery. The use of lathering of water as an experiment to determine its hardness or diffusion of potassium permanganate crystals in water or the identification of different substances by reading the contents of their bottles can hardly be considered as chemistry experiments.

Recommendations

The following are some important reminders.

1. Reports should be structured and are to include a clear aim, list of reagents/apparatus used, procedure, diagrams/graphs, results (possibly tabulated) and calculations, equations summarizing any chemical changes taking place (if any) and a short conclusion which could be followed by a brief discussion of the topic under study. Reports are to be kept as concise as possible.

2. Teacher demonstrations must ideally complement but not replace practical sessions. Any class demonstrations are to be clearly stated accordingly in the report or not presented as part of the coursework.

3. Students are to be guided in report writing; however, reports should never be dictated by teacher or supervisor. The use of the words "I" and "we" should be avoided in practicals, preferably using passive voice. Students will easily adopt such a format if the necessary training is provided once they start writing their reports.

4. Generally speaking, diagrams should be realistic, properly labelled and drawn to an appropriate scale. No works of art are necessary. The appropriate use of stencils is encouraged. Large, massive, disproportionate drawings are discouraged as is shading.

5. More volumetric work should be presented by students. This will serve a number of purposes, that of teaching the students the particular techniques involved in the process, the cleaning and safe handling of particular equipment and also the calculations involved in the process. Most of the problems which become evident in the written parts of the examination indicate the lack of hands-on experience in the lab and limited practice in the calculations.

6. Although rather limited in nature at this level one would also expect to see at least one organic practical done throughout the course.

7. The concept of oxidation number must be better utilised both in nomenclature and in following redox reactions.

8. Again, more emphasis must be made on the proper use of IONIC EQUATIONS (accompanied by state symbols) especially in qualitative analytical work.

Chairperson
Board of Examiners
July 2007