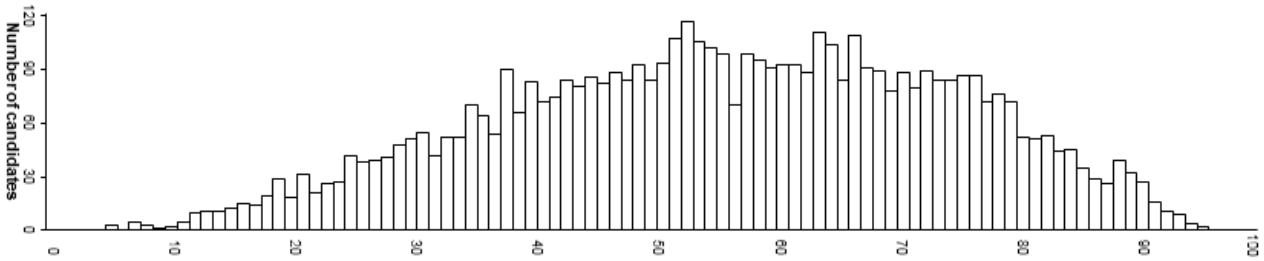
Government of **Western Australia**
School Curriculum and Standards Authority

Summary report for candidates on the 2015 WACE examination in
Chemistry Stage 3

Year	Number who sat	Number of absentees
2015	5193	62
2014	3658	32
2013	4874	45

Examination score distribution



Summary

The 2015 examination was attempted by 5193 candidates; an increase of 42% from 2014 ('half year' cohort) and an increase of 6.5% above the 2013 candidature. In times of declining candidates in science-based courses, this indicates that the chemistry examination candidature is very healthy.

All feedback indicates that the paper was straight forward, pitched at an appropriate level of difficulty and the questions reflected a good spread of the syllabus. The statistical reports generally support these perceptions. The examination mean was 55.99% and the standard deviation was 18.53%. The paper functioned well to discriminate between the ability of candidates with scores ranging from 4.50% to 96.44%. This was significantly lower than the mean of 60.3% for the 2014 examination but still higher than the mean of 54.6% for the 2013 examination.

Section means and standard deviations were:

Section One: Multiple-choice	Mean 16.21(/25)	SD 18.23%	Max 25.00	Min 0.00
Section Two: Short answer	Mean 18.74(/35)	SD 20.02%	Max 34.25	Min 0.50
Section Three: Extended answer	Mean 21.05(/40)	SD 20.20%	Max 39.48	Min 0.00

General comments

The questions covered an appropriate spread of the syllabus and a similar weighting was given to both Units 3A and 3B of the course. Candidates appeared to have no problems with the time; those who made a genuine attempt to answer the questions were able to complete the paper in the time allowed. Those candidates who did not attempt questions appeared not to know the content, as opposed to being rushed to complete the paper.

A possible reason for the discrepancy between the expected and actual mean was the larger number of questions requiring explanation in this examination. Generally, candidates demonstrated familiarity with the concepts and principles of the course but were unable to provide detailed explanations drawing on and linking fundamental chemical principles. Candidates need to realise that marks are not awarded for re-stating information provided in the questions nor for vague references. It was evident within the examination that candidates could often do the calculations well but many did not express themselves clearly and concisely using the appropriate scientific terminology when explaining concepts.

In the explanatory questions marks were awarded for quite specific points, which provided for effective discrimination between candidates at the 'upper' end of the spectrum. Many candidates at the 'lower' end of the spectrum, however, often gave answers that showed some understanding of chemistry but, because they were not specific enough in providing the information required to answer the question asked, they were awarded zero for that question.

Advice for candidates

- Be conversant with the terms used in the syllabus, e.g., ionisation energy, trend, polarities, pyramidal, partial pressures, chemical test, polymerisation, origin of intermolecular interactions, hydrolysis.
- Understand the differences between similar terms: e.g., intermolecular force and intramolecular force, equivalence point and end point.
- Practise writing clear, concise and coherent extended answers and incorporating illustrative, labelled diagrams that are clear and relevant.
- Make it a habit to use the appropriate units and express numerical answers to the appropriate significant figures.
- Be familiar with the contents of, and how to use, the *Chemistry Data Booklet*; knowing where to find the information it contains quickly.
- Know how to generate, read and apply data from graphs and tables.
- Use the given formula to determine the nature and bonding of a substance.
- Practise writing equations providing the appropriate formula for only those species that are taking part in the reaction.
- Answer questions with specific reference to what the question demands rather than as a generalisation or implication. Candidates are not necessarily awarded any marks for correct chemistry unless it pertains specifically to the question asked.
- Read and select the relevant information provided carefully in order to answer the specific question asked.

Comments on specific sections and questions

Section One: Multiple-choice

Attempted by 5193 Candidates Mean 16.21(/25) Max 25.00 Min 0.00

All candidates attempted every question in Section One. This might be a contributing factor for a higher mean for this section relative to Section Two and Section Three of the examination paper.

The easiest questions, with means above 84%, were questions 6, 22 and 23. Question 6 was the simple application of the general equilibrium law expression to a given equation. Question 22 was a commonly used type of question ranking boiling points of similar organic compounds according to their intermolecular forces of attraction. Question 23 was an identification of a chemical process. Another seven questions had means of about 75% and above; these included questions 1, 8, 9, 11, 14, 16 and 18. Most of the capable candidates did well with these questions.

The most challenging questions, with means less than 50%, were questions 2, 4, 12 and 15. Many candidates found Question 2 difficult. It would seem that they did not adequately understand all the characteristics of a saturated solution. Question 4 involved candidates interpreting and understanding graphs depicting both forward and reverse reaction rates. Question 12 challenged many candidates. Although candidates are required to know trends of the hydrides, some did not expect to know the finer detail; e.g., that NH_3 and water have the highest melting points in their groups. This is despite such evidence being important in understanding the origin and effect of hydrogen bonding. The poor success rate for answering Question 15 illustrated a confusion candidates had between the mole ratio required in neutralisation reactions and the available concentrations of weak and strong bases in solution.

The rest of the questions provided a spread of success for the candidates. Of note was that option IV in Question 3 caught out some candidates as they did not distinguish between ethyl propanoate and propyl ethanoate which lead them to select the incorrect answer (d).

Section Two: Short answer

Attempted by 5193 Candidates | Mean 18.74(/35) | Max 34.25 | Min 0.50

To gain full marks candidates need to set out their working and reasoning clearly; some marks are not awarded unless it is clear how the answer was obtained. Questions 28 and 33 were the most difficult with means around 38% while the easiest was Question 29 with a mean just above 71%.

Section Three: Extended answer

Attempted by 5189 Candidates | Mean 21.05(/40) | Max 39.48 | Min 0.00

Where questions require an explanation and/or description, marks are awarded for the relevant chemical content and also for coherence and clarity of expression, hence to gain full marks candidates need to set out their working and reasoning clearly. Question 40 was the most difficult with a mean around 38% while the easiest was Question 37 with a mean just above 66%.