Agricultural and Horticultural Science

2010 ASSESSMENT REPORT

Society and Environment Learning Area

Government of South Australia

SACE Board of SA

AGRICULTURAL AND HORTICULTURAL SCIENCE

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GENERAL COMMENTS

Marks, particularly in the examination, were on a par with last year, although with a larger range. Students, and their teachers, need to be fully aware of the specific requirements for each assessment component, and then aim to meet them. Disappointingly, several students demonstrated work that clearly was not of a Stage 2 standard. That said, this subject continues to have outstanding examples of students' work presented for moderation, which reflects a vast range of student experiences, enthusiasm, and commitment to achieve at a high level.

ASSESSMENT COMPONENT 1: EXAMINATION

This year 117 examination papers were marked, which is an increase of 10 over last year. The range of examination marks was from 3 to 111 out of a possible 120 marks. The mean score for the examination this year was marginally up at 52.3%.

Part 1: Short-answer Questions

The examination setters aim to produce questions that vary in difficulty from easy knowledge through to difficult knowledge and problem-solving. This variation in question difficulty is reflected in the range of the question mean marks, as identified in the following table.

Question	Mean Mark	Maximum Mark	Mean Mark (%)
1	3.82	5	76.41
2	5.85	9	64.96
3	2.41	5	48.21
4	1.68	4	41.88
5	2.97	5	59.49
6	2.64	6	44.02
7	2.83	5	56.58
8	1.88	4	47.01
9	3.50	5	69.91
10	3.21	7	45.91
11	6.20	13	47.67
12	2.68	5	53.68
13	1.18	3	39.32
14	3.87	8	48.40
15	2.64	7	37.73
16	2.94	6	49.00
17	0.56	3	18.80

It was somewhat disappointing to see very low marks in questions where everything that was required for students to demonstrate that they understood the agricultural terminology, was presented in the curriculum statement. Students must ensure that

they cover the agricultural terminology of the key concepts, and understand the five topics, as a minimum requirement in their studies. As in previous years, students were encouraged to read the question in the examination carefully, so that their responses were relevant to the question asked. In several instances, students produced what appeared to be 'rote' type answers. Where a diagram or other stimulus material was provided, these should be considered carefully to aid in answering the question. It was noted by markers that, too often, students ignored information provided in the question that would have assisted them in their answers, either directly, or acted as a memory aid for other questions in the paper.

Question 1

This question had the highest mean percentage for the examination paper. Part (a) was generally well answered. In part (b), many students were able to competently describe biosecurity measures, but then neglected to finish their answers with the required explanation. Again, reading the question was important, as it referred to *live* animal imports. Answers that did not refer to this fact could not be given credit.

Question 2

Generally, this question was well answered by the majority of students. In parts (b) and (d), only a few students completed their answers by providing the explanation that was required. In part (c), most students correctly identified a beneficial micro-organism and explained its role/function. Many chose yeast as a micro-organism used in wine or beer production and explained fermentation.

Question 3

Most students were able to correctly identify an insect, although a few then went on to describe a *beneficial* role when the question had asked for an insect with a *detrimental* role. Part (b) was generally well answered, with most students identifying segmentation as the difference between the earthworm and the nematode. In part (c), many students struggled to describe the effect of the virus. Too many students wrongly answered 'BSE as a virus'; although if they had read question 1, they missed the fact stated there – that BSE is caused by a prion, not a virus.

Question 4

In general, this question was poorly answered. In part (a), far too many students were not able to demonstrate a basic understanding of the different structures of monocotyledons and dicotyledons. In part (b), as in other parts of the paper, repeating the question itself as the answer gained no marks. Only a few students were able to correctly explain the relationship between *Rhizobium* and legumes (or more specifically, clover).

Question 5

In part (a) the majority of students were able to correctly identify fruit as being the product of sexual reproduction, but many then faltered and only named one month in part (b) when two were asked for. Part (c) was, typically, answered incorrectly with students providing a wide range of responses other than 'cambium'. Most students gave satisfactory answers to part (d).

Question 6

Students tended to struggle to identify basic plant anatomical features in a leaf as requested in part (a). Part (b) (i) was usually well answered, but in the explanation for part (b) (ii), few students made any mention of the role that the guard cells play in closing the stomates. The specific inclusion of identification of the guard cells in the earlier part of the question should have served as a hint to refer to them when answering this part.

Question 7

This question was generally well answered by a majority of students. Although not penalised if written incorrectly – when students used the chemical formulae for photosynthesis, the equation should have been correctly balanced.

Question 8

In part (a) about 80% of students could not correctly identify a macronutrient. This is one of the fundamental concepts in the plant science topic and students are expected to have a clear understanding of it. Part (b) tended to be similarly poorly answered, suggesting that students had not covered the key concepts in sufficient depth. In part (c), most students were able to gain at least 1 out of 2 marks for any reasonable description; but again the explanation needed to be included in the answer for the second mark. Similarly, reading the question was important as it referred specifically to *cereal* farmers. Some practices identified could not be given full marks as they were completely impractical for a cereal farmer to use.

Question 9

This question had the second highest mean mark percentage of the exam. Most students could correctly compare and satisfactorily explain the difference in earthworm populations, and then give a reasonable explanation of the effects of zero tillage on soil particle aggregation – though some gaps in understanding were evident.

Question 10

This question tended to have poor answers. The horizons in part (a) were not readily identified, while in part (b) few students gave reasons to explain why the root development occurs at the bottom of the horizon. In general, part (c) was answered better, with students having a much clearer understanding of CEC of the soil. Several students confused anions with cations, but these tended to be in the minority. In part (d) most students demonstrated that a higher CEC would lead to increased fertility and better plant growth.

Question 11

Students generally correctly explained the difference in water percolation between sand and clay soils in part (a), though they then tended to get part (b) incorrect, and could not demonstrate that clay soils tend to have a higher porosity than sandy soils. In part (d), students needed to demonstrate that they had read, understood and interpreted the information in the main question. Too few students recognised that in Horizon B of Soil 2 there was a layer of limestone at 500 mm and then drew a diagram taking this information into consideration. Similarly, in part (e), the question listed the crops to be discussed, however students discussed crops that were not

listed, e.g. tomatoes, lettuce, lentils, medics, banana tree seed. This indicated that too many students did not take sufficient time to read the question, but instead wrote a prepared answer. Overall, most students were able to give satisfactory responses to parts (f) and (g), with a generally good demonstration of understanding of soil pH.

Question 12

The majority of students answered this question satisfactorily. Students were able to correctly describe terms, identify stages in the oestrous cycle, and identify reproductive hormones and describe their role.

Question 13

This question was very poorly done by the majority of students, with 62% of students not able to gain more than 1 mark. Part (a) was simple recall of terminology taken directly from the curriculum statement. The majority of students were unable to demonstrate that they had this knowledge. Part (b) was marginally better, but again too few students were able to provide a satisfactory explanation of the statement.

Question 14

In this question, part (a) was generally well done. Many students did not fully answer part (b), possibly because they skim read the instructions. Students needed to identify *and* label the correct organ. Where students identified the organ incorrectly, but in part (b) (ii) gave the correct function for the organ, the appropriate marks were awarded. In part (c), often the description provided was sound, but the explanation lacked sufficient information for full marks to be given.

Question 15

This question had the second lowest mean mark percentage of the paper. Students in many cases displayed a poor understanding of ruminant digestion, and the processes and elements, more particularly of carbohydrate and protein digestion. In part (d) many feeding strategies were identified by the students, but again the question was specific, and the answer needed to focus on feeding ruminants.

Question 16

On average, most students had reasonable knowledge of the components of feed and how best to utilise them. In part (b), a majority of students correctly identified a vitamin deficiency, with vitamin D being the most popular. However, many students were then unable to go on and describe the symptoms of the deficiency. Students who identified vitamin problems, other than vitamin D, tended to give much better descriptions of the specific symptoms associated with it.

Question 17

This question had the lowest mean mark percentage of the paper, with only 15 students able to get better than half marks. Too many students did not attempt this question, and of those who did, few discussed the role of hormones in the oestrous cycle and the effect a pseudo-hormone may have on the cycle. The students who did get full marks covered the issues in a very comprehensive manner.

Part 2 Extended-response Questions

Each extended-response question was marked out of 20, with 16 marks allocated for content and 4 marks for communication.

In awarding a communication mark the following factors were taken into account:

- clarity and expression
- organisation and relevance
- correct use of Agricultural and Horticultural terminology.

The markers felt that student answers to the extended-response questions were, on average, of a better standard this year. Answers tended to be much more to the point and addressed only the specific dot points rather than rambling over a range of material. Basic grammar and correct spelling of agricultural terms is an aspect that needs improvement. It would be useful for students to have as much practice as possible in writing this style of response prior to the examination, using questions from past papers. Students should be able to fully answer an extended-response question in about two to three pages of succinct writing. It is unnecessary for students to re-write the question, or to provide an introduction to their response. Both of these practices are time-wasting and receive no credit.

Question 18 was marked for 72 students, with a mean mark of 12.70, while 42 students attempted Question 19, with a mean mark of 10.99. One student attempted both questions, but only the first question answered was marked. Three students did not attempt either of the extended-response questions this year. Where students feel that they are short of time, or lack confidence in answering the question, they should put down a set of relevant dot points which may gain them some marks for content only. It is also very important for students to identify which question they are answering. In at least two responses, the question number had not been recorded, and the answers given were close to matching either question. The content marks are allocated differently according to the question.

Question 18

A much higher proportion of students chose this extended-response question, perhaps feeling that it was the easier of the two. The question was slightly broader and provided a good opportunity for students who knew their work well to demonstrate their learning. Students frequently tended not to use correct agricultural terminology. Where examples were given, too often the follow-up explanation was non-existent or lacking in detail. Students need to read the questions carefully; several students wrote responses relating to *intensive* plant production when the question asked for *extensive*. This simple error resulted in a reduction of marks.

Question 19

Fewer students chose this extended-response question. Marks for communication for this question tended to be slightly better than for Question 18. Better students read the question closely and provided succinct answers without duplicating their response in other dot points. Where the two extended-response questions are similar, as they were this year, students need to make sure that they are answering the right part from the right question. It was noticeable that many students answering Question 19 provided the answer to the fourth dot point of Question 18. As the questions were subtly different, the answers required were substantially different, so many students lost marks unnecessarily.

ASSESSMENT COMPONENT 2: PRACTICAL ACTIVITY

Work submitted generally consisted of three assessment activities. Practicals ranged across the topics and often reflected the facilities available to students and schools. This year, it was felt that some of the practicals tended to be at the lower end of a Stage 2 standard, although they had been marked appropriately. Students in most cases had the opportunity to demonstrate their ability in respect to all the assessment criteria, and this was demonstrated across the range of grades. Teachers need to ensure that the assessment tasks allow for all criteria to be covered. In several cases, moderators felt that the tasks were not of sufficient rigour to warrant being included in a Stage 2 subject. Again, teachers may also wish to note that practicals, and the investigation and research report, should be sorted 'by student', rather than by assessment task, as this aids the moderators in their task.

ASSESSMENT COMPONENT 3: EXPERIMENTAL INVESTIGATION AND RESEARCH REPORT

Experimental Investigation

Students generally chose investigation topics that linked directly to agricultural and horticultural production issues – which was pleasing to see. The majority of students presented their work in the traditional scientific report format, and carried out their research in a competent manner. Most students were able to develop their research question, collect data, satisfactorily analyse it, and draw some meaningful conclusions. Several students struggled with the discussion of their results and observations, and omitted this vital aspect of a scientific investigation. Teachers are advised to stress to students the importance of this aspect of research, and provide guidance as to the best way in which to present and interpret the experimental data they have collected.

A reminder for students is to link their research findings back to their original hypothesis. Students should be directed to reflect on what their results indicate in light of their original hypothesis. This will in turn enable them to address the issue of making feasible recommendations. This year a number of students attempted to carry out some statistical analysis on their data, but few discussed their experimental design in terms of controls, replication, and randomisation. The experimental investigation is the prime opportunity for students to demonstrate their learning in Topic 1: Key Concepts and Understandings. Some students need extra guidance in the ways in which they can adequately demonstrate this.

Where students have chosen to carry out the experimental part of the investigation in a group, they need to clearly identify, in their report, which aspects of the tasks they carried out, and how they contributed to the successful outcome of the experiment. An entire class undertaking the experimental investigation does not allow the students to effectively demonstrate their selection of a topic of interest and develop an experiment to examine it further. It also makes it very difficult for the teacher to appropriately assess each student's contribution to the research outcome, as well as their individual skills in carrying out the experimental trial or investigation.

Research Report

Generally, moderators were impressed with the standard of the work viewed, and they felt it was on a par with last year's. The majority of students approached this task as an in-depth essay on a topic or issue of current concern. Teachers are advised to remind students that the research report needs to address either an issue in, or an aspect of, a topic in agricultural and horticultural production, with a specific question to be addressed. It should not be merely an exercise in information collation to produce a report on a topic.

Students were able to display a sound ability to gather research materials, develop opinions and make informed judgments based on a wide range of research information. In general, the standard presented was of high quality befitting Stage 2, with marking standards that tended to be at an appropriate level. It was noted that there remains a lack of in-text referencing, and in many cases students did not sufficiently discuss any background material relating to their topic. This background material should then be linked to any conclusions or recommendations that the student makes.

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