C A R I B B E A N E X A M I N A T I O N S C O U N C I L

REPORT ON CANDIDATES' WORK IN THE SECONDARY EDUCATION CERTIFICATE EXAMINATION JUNE 2005

AGRICULTURAL SCIENCE (SINGLE- AWARD)

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GENERAL PROFICIENCY EXAMINATIONS
JUNE 2005

GENERAL COMMENTS

The Caribbean Examinations Council offered Agricultural Science (Single Award) General Proficiency Examination for the thirteenth year in 2005. The rationale for this offering in the area of agriculture is to make agricultural education available to a larger group of the secondary school population than is presently catered for by the Double Award. This increased exposure is desirable for improving attitudes to agriculture, promoting agriculture as a business, encouraging larger numbers of school leavers to enter fields related to agricultural endeavours, and for sustainability in selected agricultural commodities in the CARICOM region.

The examination is conducted with the assumption that there is compulsory exposure to the subject during the first three years of secondary education and a careful and systematic study of the requirements of the syllabus during the fourth and fifth years.

The 2005 examination was designed to provide a comprehensive test of candidates' knowledge and skills in all dimensions of the syllabus.

Specifically, the examination intended to test candidates'

(a) knowledge and understanding of the content of the syllabus

(b) grasp of fundamentals of Agricultural Science

(c) ability to make precise links between Agricultural Science theory and practice

(d) ability to perform a selected range of general agricultural skills from the core and the chosen option

(e) ability to communicate knowledge and understanding in the approach to answering the questions and solving problems.

Candidates can choose from two options: Option A - Crops and Soils (C&S), Option B - Animal Science (AS). Candidates choose an option at the beginning of the first year and complete the SBA component for that option during the two years. They are examined on the core of the syllabus and write an essay paper based on the previously chosen option.

Form of the Examination

The examination comprised three written papers as described briefly below and a School-Based Assessment (SBA) component.

(a)	Paper 01	Sixty Multiple-Choice items under the Knowledge and Comprehension Profile dimension and based on objectives on the core of the syllabus.
(b)	Paper 02	Ten compulsory structured questions based on the objectives in the core of the syllabus under the two profile dimensions – Knowledge and Comprehension and Use of Knowledge.

(c)	Paper 03	Four essay-type questions set on each option: candidates were required to answer three questions from the option chosen. These were also tested under the Knowledge and Comprehension and Use of Knowledge profiles.
(d)	School-Based Assessment	Candidates were assessed on a number of practical skill objectives, preparation of a Farm Diary and compilation of Farm Records.

SPECIFIC COMMENTS

PAPER 01

This paper consisted of 60 multiple-choice items distributed over the five units in the core of the syllabus.

PAPER 02

Question 1

This question tested the candidates' knowledge of the outbreak of hibiscus pink mealy bug which destroyed agricultural crops in the Caribbean and the role played by local, regional and international institutions in managing such outbreak. The question further tested candidates' knowledge of global warming and its effects on crops and livestock production.

In Part (a), candidates' responses suggested that this question was not clearly understood. They named institutions at random and were unable to associate them within their correct headings. The roles played by these institutions were also not known. Part (b) indicated that candidates understood the concept of global warming but were unable to link its effects on crop and livestock production. The most popular answers were extreme heat causing heat stress to animals and permanent wilting of plants, flooding, droughts and death of livestock and crops. A large number of candidates were unfamiliar with this question and gave unrelated responses.

Question 2

This question required candidates to name four types of agricultural co-operatives that may be found in the Caribbean and discuss two benefits and one managerial problem that are associated with them.

Most candidates were unable to correctly name agricultural co-operatives in the Caribbean. In Part (b) however, candidates knowledge of the benefits of co-operatives indicated to a large extent that co-operatives provide loans, agricultural supplies, and education and advice to farmers.

Section (c) presented greatest difficulties to candidates who were confused with problems associated with the management of co-operatives, such as, infrequent elections leading to monopoly of the cooperatives, proper records not being kept, unwillingness to hire staff, thus inefficient programme.

Question 3

This was a two-part question. Part (a), which was focused on marketing, simply required candidates to identify major stages in the marketing chain. This part of the question was generally well done. However some common incorrect responses indicated that candidates had difficulty differentiating between "marketing" terms and "economic" terms. The correct responses should have included sorting, collecting, storage, grading, transportation, processing, pricing.

Part (b) of the question, which integrated marketing and economic concepts, provided greater difficulty for candidates. Some of them also displayed confusion at interpreting the question, so that correct responses, such

as, appropriate packaging, avoid damage to crops, harvest at the correct time, advertising, processing and grading, were not explained by the candidates.

Question 4

Question 4 was a two-part crops and soils question. Part (a) provided candidates with the names of six pieces of equipment/farm machinery commonly used in farming. A table listing four farming activities followed. Candidates were required to choose the most appropriate piece of equipment/farm machinery to carry out each farming activity named.

This part of the question was generally well done. The majority of candidates scored high marks in this part of the question.

Part (b) of the question provided candidates with a description of the appearance of tomato seedlings experiencing growth problems. Candidates were then required to provide plausible explanations for the poor growth.

As with Part (a), Part (b) of this question was also well done.

Question 5

This question tested candidates' knowledge and comprehension of soil forming factors along with their understanding and knowledge of a typical soil profile in terms of being able to recognize different horizons and their characteristics.

Responses to this question were fairly well done, with most candidates showing an understanding of soil forming factors, like parent material, climate, temperature, time and biotic factors.

In Part (b) candidates were required to identify from an illustration of a typical soil profile the horizon that was of importance to the farmer and give reasons for selecting the identified horizon. Most candidates were able to answer this question. Finally, most candidates were also able to correctly state that the removal of the vegetative cover for a prolonged period, will result in the erosion or reduction of Horizon A.

Question 6

This question tested candidates' knowledge of fertilizers used in crop production.

Part (i) required candidates to name the nutrient elements represented by the letters N,P, and K, and also to name an example of a NPK fertilizer.

Generally the responses to this part of the question were correct.

Part (ii) of the question required candidates to indicate the benefits plants derive from each of the nutrient elements named in Part (i). The responses to this part of the question were also good.

Of concern, however, is the realization that many candidates are unable to correctly spell terms in agriculture such as nitrogen, phosphorous, potassium, and nutrient. It is important for us to appreciate that all-round academic development of an individual is incomplete when that individual spells poorly, constructs sentences poorly, displays grammatical incompetence, and generally writes badly.

Question 7

This question required candidates to list factors affecting soil fertility and also to explain measures that can be practised to reduce soil erosion on a hillside.

In Part (a), candidates demonstrated a good understanding that soil erosion can be caused due to climatic factors. However, other factors associated with soil erosion, for example, the physical conditions of the soil, chemical properties, biotic factors, soil management and crop management, were addressed by a limited number of candidates.

Part (b) of the question indicated that candidates had difficulties in explaining practices used to effectively control soil erosion.

Generally candidates responded to this question satisfactorily. In conclusion, therefore, it is necessary that agriculture content be reinforced by practical activities and thorough observations during candidates' instructional exercise.

Question 8

The question was intended to test candidates' knowledge of the external and internal structure and function of plant stems. This question was poorly answered. In Part (a), candidates experienced difficulty in naming the labelled parts as epidermis, xylem, vascular bundle and phloem.

In Part (b), many candidates were unable to recall the structure of the xylem.

Question 9

Part (a) of this question required candidates' knowledge of food groups. This part of the question was generally well done, with most candidates correctly listing the required number of essential food groups.

Part (b) of the question was more challenging, as it required candidates to discuss how "housing and equipment" could contribute to "proper management" of birds. Candidates struggled with the application of knowledge required by this question. That struggle manisfested in the following ways:

- Many candidates mentioned a function of housing and equipment but were unable to relate it to the proper management of broilers. For example, poultry houses prevent the entry of rain and direct sunlight.
- Many candidates described housing and equipment as a single unit rather than describing the specific individual contributions to management of broilers.
- Some candidates mentioned management practices for layers rather than broilers, for example, use of battery cages and laying boxes.

Question 10

Candidates were asked to name three kinds of bees found in a hive and to state the function of any one of the bees. Part (c) tested the candidates' knowledge of swarming. The positive and negative effects from the use of antibiotics were required in the final part of the question.

Part (a) was fairly well done with a high percentage of the candidates correctly naming the types of bees and identifying their functions. However, many candidates were unable to describe swarming of bees.

Part (c) was very poorly answered, as many candidates interpreted antibiotics to mean vaccination. Therefore, greater emphasis should be placed on explaining the term antibiotics and its functions.

PAPER 03

OPTION A - Crops and Soils

Question 1

Part (a) of this question asked candidates to define the term asexual reproduction. It also required candidates to differentiate between the terms asexual and sexual reproduction and explain three advantages of propagating plants using vegetative methods. Part (b) of the question asked candidates to explain three managerial practices recommended for cultivating yams to obtain healthy growth and high yield. Candidates were guided by the following: Selection and preparation of planting material, planting of crop, cultural practices for management of the crop and storage of the crop.

Part (a) of the question was widely known by candidates, particularly Part (iii). However, candidates encountered difficulties responding to Part (b), which dealt with management practices.

Candidates were required to state that asexual reproduction is a plant propagation method using vegetative parts of plants rather than using one gamete or one partner as candidates incorrectly stated.

Candidates should be able to use similar features as they relate to both things when making comparisons. This was not manifested with competence in their responses and hence needs attention.

Emphasis should be placed on practices relating to the land management and also cultural practices associated with management of the crop.

Due to the amount of the non-scientific responses given by candidates in relation to storage, it is necessary that storage of individual crops must be dealt with separately throughout the candidates' instructional exercises.

Question 2

In Parts (a) and (b) of this question, candidates were asked to explain the benefits of using certified planting material in crop production and to identify planting material used in the production of sugar cane, sweet potato, banana/plantain and cucumbers. In Part (c), candidates were required to describe photoperiodism and to give an example. Part (d) required candidates to describe post-harvest management practices of sweet potato and tomato.

The response to this question was satisfactory. Many candidates confused 'planting materials' with tools, equipment, fertilizers and propagation techniques. The concept of photoperiodism was not understood by candidates even though the stimulus material was provided in the question asked. Photoperiodism is a plant's response to daylength.

Many candidates discussed the agronomy of sweet potato and tomato instead of post-harvest management practices for the crops.

It is evident that agricultural terms and examples need revisiting and candidates must be provided with the situation to understand and obtain relevant concepts.

Question 3

In Part (a) of this question, candidates were asked to describe three different field operations required to prepare the field for planting root and tuber crops. They were also required to state two benefits of land preparation for crop production. In Part (b), candidates were asked to discuss three benefits of cultivating crops

in soils with high organic matter content and the management practices that may be used to retain organic matter in the soil.

There was a satisfactory response to this question. Candidates knew that the first step was clearing the land but how it should be done, posed some level of difficulties.

On the other hand, difficulties emerged among candidates to explain how organic matter could be retained in the soil and they were unable to recognise that adding compost or organic matter is the same.

It is advisable that concepts relevant to this question, when taught theoretically, must be reinforced with a high level of practical activities.

Question 4

Parts (a) and (b) of this question required candidates to describe three ways in which soil may be eroded and list four ways in which water is lost from the soil. In Part (c), candidates were required to identify measures for soil conservation practices that can be applied to new farm lands in preparation for the cultivation of vegetables.

The responses obtained from candidates were generally good.

It is suggested that candidates must be made to understand the term water conservation and techniques used for conservation. On the other hand, distinguishing methods for water conservation and soil conservation need attention and must be adequately taught to candidates.

OPTION B - Animal Science

Question 1

Part (a) (i) required candidates to name breeds of goats and breeds of sheep. Most candidates across the region were quite familiar with the common goat and sheep breeds reared in the Caribbean.

Part (a) (ii) of this question required candidates to describe desirable characteristics of the breeds named. This was poorly done. Many candidates described the physical features of the breed and the breed's country of origin, rather than describing the breed's milk and meat production potential, and adaptability to the tropics.

Part (b) (i) of the question, which required candidates to describe signs of heat in cows, was very well done. However, Part (b) (ii) which required candidates to provide a detailed description of management practices used to ensure the cow on heat becomes pregnant, was a bit more challenging for candidates. Actually, candidates had difficulty in describing either of the processses (artificial insemination or natural services) in detail.

Part (c) of the question required candidates to discuss management practices for rearing layers. This part of the question was poorly done also.

Question 2

Part (a) of the question provided a table with various species of livestock and common internal and external parasites that affect them. Candidates were required to indicate the symptoms of infestation as well as common control measures. This part of the question proved extremely challenging to candidates, and generally candidates' responses were mainly inaccurate.

Part (b) of the question was well done. This part of the question asked candidates to discuss common diseases that affect cattle in the Caribbean.

Part (c) was a question on aquaculture. Generally it was poorly done. Overall, this was a very low response question that was not properly answered.

Question 3

Part (a) of the question required candidates to discuss the benefits, advantages and disadvantages of artificial insemination for reproduction in cattle. This topic was very popular with candidates from around the region. Not only did most candidates answer the question, but most also answered it well.

Part (b) of the question required candidates to discuss recommended practices for housing reproductive cows. This was also a very popular question with the candidates from around the region. However, the question definitely posed the greatest difficulty for candidates. Many candidates even misinterpreted the question and discussed management practices for farrowing rather than housing characteristics.

Part (c) of the question concerned castration in piglets. Some candidates were able to explain that castration at two weeks of age was better because the animal will heal faster and it is easier managed by one person.

Question 4

The question required candidates to describe the structure and functions of parts of the digestive systems of poultry. In Part (b), candidates were required to name four local ingredients that could be used in the form of livestock feed. Candidates were also asked about the importance of plant quarantine and the final part of the question focused on candidates' knowledge of zero grazing.

Part (a) of this question was done fairly well by candidates. However, many candidates were unable to state the structure of the named parts of the digestive systems. In Part (b) candidates were unable to supply local ingredients, such as rice, corn, coconut meal, molasses, used in the formulation of livestock feed.

Part (c) of this question was done fairly well by candidates. In Part (d) of this question, many candidates gave the correct definition of zero grazing; however, many referred to the concept simply as continous grazing and did not mention that grass was cut and taken to the animal. The advantages and disadvantages of zero grazing were fairly answered by the majority of candidates.