

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 EXAMINATIONS
JUNE 2004**

**AGRICULTURAL SCIENCE
(DOUBLE-AWARD)**

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AGRICULTURAL SCIENCE (DOUBLE AWARD)

GENERAL PROFICIENCY EXAMINATION

JUNE 2004

This is a report of the Agricultural Science General Proficiency (Double Award) examination conducted by the Caribbean Examinations Council in May/June 2004.

The examination is intended to assess and evaluate the extent to which the syllabus objectives of the programme have been achieved.

Candidate performance is examined through four written papers, and a practical School-Based Assessment exercise conducted by the teachers themselves on the school farm. This last component carries 25 per cent of the total marks.

GENERAL COMMENTS

The overall performance of the candidates in 2004 was fair and stable when compared with the results of 2003.

Hereunder are some comments on candidate performance in the four written papers and the School-Based Assessment.

PAPER 01 – Multiple Choice

The 60 Multiple Choice items, worth 60 marks, covered General and Specific Objectives distributed over the four profiles of the syllabus.

Candidates performed best in Crops and Soils, Animal Science and Agricultural Economics, but were weakest in Profile 3, Agricultural Mechanisation.

A comparison of the available statistics on the mean and standard deviation of the performances of the candidates of Year 2003 with Year 2004, shows that the general level of performance of the Year 2004 cohort was just marginally lower than that of 2003, while the statistics on the Equating items indicate that the difficulty level of Year 2004 items was very similar.

PAPER 02 – Structured Questions

The paper consisted of 15 questions with a maximum of 3 marks each.

Candidates performed best in Crops and Soils, and Animal Science, but were weaker in Agricultural Economics and Agricultural Mechanisation.

Many candidates did not even attempt some of the questions. Whether this was because there were gaps in the syllabus coverage, or that adequate time and effort were not invested in those particular topics, it was difficult to determine. In other cases, the questions sought specific answers, but the candidates' responses were largely imprecise.

Following are some comments on individual questions.

Question 1

This question tested candidates' knowledge of the main factors of soil formation, and of how these contribute to the formation of soil profiles.

Most candidates were able to list one or more of the factors which accounted for the difference in the two soil profiles presented to them, but they were unable to briefly describe how each of the factors contributed to the changes in the structures of Profile II.

Some candidates correctly stated:

- That the factor, temperature, contributed to the changes because "the varying temperatures will cause rocks to expand and contract, and after some time it will disintegrate";
- The biotic factors operate as humans expose soil by cultivating; plants' roots enter crevices and split the rocks apart

Many candidates correctly listed factors like climate, but instead of explaining how climate can cause the changes in Profile II, they concentrated on describing climate, or giving such answers as:

- "Climate changes soil type"
- "Climate involves sunshine, humidity, rainfall, temperature"

Question 2

Candidates' knowledge of the effect of given environmental factors on the growth, development and production of crops was required in answering this question.

Most candidates provided evidence that they were aware that the environmental factors given had some effect on crop production, but many could not state the specific favourable, or unfavourable effects of wind, rainfall and light. Some correct answers included the following:

Environmental factor	Favourable effect	Unfavourable effect
(a) Wind	<ul style="list-style-type: none">- Pollination of flowers is facilitated.- The scent of flowers carried by the wind attracts pollinating insects.	<ul style="list-style-type: none">- Desiccation of leaves.- Soil erosion.- Blowing down of crops (bananas).
(b) Rainfall	<ul style="list-style-type: none">- This may help the crop to grow because water is needed to help crops grow.- Water is needed for dissolving mineral salts and nutrients.	<ul style="list-style-type: none">- Too much water may cause water erosion.- Soils become water-logged.
(c) Light	<ul style="list-style-type: none">- Light is needed for the process of photosynthesis to occur.- It is a source of energy to plants.	<ul style="list-style-type: none">- Light causes plants to bend if it is not overhead.- Light may prevent some plants from flowering.

Some candidates gave erroneous responses as:

- “The wind was needed to reduce air pollution”
- With too much rainfall “the plant will change its colour and may die”

Far too many candidates, however, interchanged the concepts of light with temperature, responding that “too much light can burn the leaves of the plant”, or “cause dehydration in the root of the crops”, or “will cause the soil to become hard”.

Question 3

This question tested candidates’ knowledge on the process of layering as a method of plant propagation was required.

Candidates appeared to be somewhat hazy about the technique of layering and they did not fully understand the theory behind the practical process.

Too few candidates were able to correctly name two ornamental plants produced by layering or the type of layering used in the Caribbean.

Some candidates stated that the reason for scraping of the stem of the plant after “ring-barking” was

- “to remove unwanted flesh”
- “so that the new fertilized soil can blend with the plant and form a root”
- “so that the plant can have the characteristics that the gardener wants to have”

Few mentioned the correct response, which was “to cut off the flow of nutrients to the layered section stimulating it to form roots.”

Instead of naming a rooting hormone or auxin, candidates named “rum, ethanol and methylated spirits”.

Question 4

This question tested candidates’ knowledge of the use of herbicides, an understanding of their effect upon plant life, and of the necessary measures to adopt in the event of over-usage.

Many candidates were able to respond accurately to Parts (a), (b) and (e), but Parts (c) and (d), requiring application of knowledge were not well answered. Candidates were able to state that the effects of regular spraying of selective herbicides on pastures, were:

- Legumes were destroyed
- The residual effect was likely to be that the toxicity of the affected areas would render them unsuitable for the planting and growth of legumes in the short-term

Candidates, however, had difficulty in suggesting the following measures the farmer may employ to ensure that the legumes were not destroyed:

- Control the use of herbicides by careful spot - spraying of the weeds
- Mechanically or manually removing weeds in the vicinity of the legumes
- Allow sufficient time to elapse between spraying so that legumes could regenerate

Question 5

This question tested candidates' knowledge of the problems within the banana industry, and their ability to formulate appropriate solutions to these problems.

Not many candidates were able to respond to this question satisfactorily.

Many candidates concentrated on the marketing of bananas instead of the production. Some even included details on storage and packaging in response to "suggestions for the improvement of banana production." Some correct responses were:

- Avoid areas prone to flooding
- Use of suitable and improved varieties
- Use of suitable planting material
- Adequate control of pests and diseases
- Improved field sanitation
- Plant in wind-sheltered areas

Many candidates had no knowledge of the banana exporting countries like Jamaica, Dominica, Grenada, St. Vincent and the Grenadines and St. Lucia.

They listed instead "Guyana, Barbados, Trinidad and Tobago, and even Europe" as banana-exporting countries in CARICOM.

Question 6

For this question, candidates' knowledge and understanding of "swill" in the feeding regime of pigs were required.

This question was fairly well done. Most candidates were able to identify kitchen waste and table scraps as swill, and the farm animal which used this as its main diet as the pig.

In response to Part (c), dangers of using the feed, candidates correctly included:

- Digestive disorders
- Infection by human diseases
- Physical injury to animals through the swallowing of foreign materials (fish / animal bones)

Candidates' responses to the precautions the farmer should take before feeding kitchen waste were correctly stated as:

- Cooking
- Removing bones and other foreign matter
- Ensuring that swill was "fresh"

Candidates also correctly stated that an advantage of this feeding material was that it was inexpensive / cheap / not costly.

Question 7

Candidates' knowledge of the digestion of rabbits was required for this question.

The question was generally not well answered.

Many candidates could not state that rabbits were herbivores.

In terms of digestion, too many candidates referred to rabbits as ruminants, or described digestion in the bird rather than digestion in the rabbit.

Instead of listing the caecum as the main organ involved in digestion in rabbits, many candidates listed "the stomach, rumen, omasum, and small intestines".

Many candidates responded to Part (e) by referring to regurgitation, instead of coprophagy, or the reingesting of food material after being passed out of the rabbit for the first time.

While many candidates were aware that the herbage fed to rabbits was supplemented by other feeds they had difficulty in stating the term concentrates. Instead, they responded with "rabbit pellet, pellet, pellet rations, other rations" and even "bag food".

Question 8

Candidates' knowledge of the duration of the reproductive cycles of common farm animals was required for this question.

This question was very poorly answered. Candidates seemed to know only the length of the oestrus cycle of cattle (21 days), and the gestation period of the pig (114 - 118 days).

The correct responses are listed in the following table:

Reproduction factors	Farm animals		
	Cattle	Sheep	Pigs
1. Duration of oestrus	17 - 19 hours	<u>35 - 36 hours</u>	48 - 60 hours
2. Length of oestrus cycle	<u>21 days</u>	<u>17 days</u>	21 days
3. Time of ovulation	<u>10 - 12 hours after the end of oestrus</u>	12 hours before oestrus	Second day of oestrus
4. Gestation	270 - 280 days	<u>145 - 150 days</u>	<u>114 - 118 days</u>

Question 9

Candidates' knowledge and understanding of agriculture as practised by Caribbean farmers were required for this question.

This question was fairly well answered by the candidates.

Candidates were able to define aquaculture as the rearing / production of fish and other sea creatures.

Some candidates however confused agriculture with aquaculture, and defined that instead. Others mentioned "catching" instead of rearing or producing of fish.

In response to Part (b), candidates listed the following correct benefits:

- Provision of income
- Provision of employment / jobs
- Diversification of agricultural production
- Cheap source of protein / improved nutrition
- Productive use of available land

In Part (c) where candidates were asked to name two species reared in aquaculture in the Caribbean, they correctly named:

- Tilapia
- Lobster
- Crayfish
- Shrimp
- Cascadura.

Some candidates just indiscriminately listed any fish that they knew, including "red snapper, soloman, dolphin, gold fish, turtle" and even sea mammals like the "manatee".

Question 10

This question tested candidates' understanding of the term food conversion ratio and their ability to use this knowledge to make relevant farming decisions.

This question was fairly well answered by the candidates.

Most of them were able to state that F.C.R. was an abbreviation of feed conversion ratio but few were able to correctly define it as the ratio of a unit quantity of feed to produce one unit of meat.

Incorrect responses included the:

- Amount of feed converted to flesh
- Gain in weight
- The amount of feed eaten by the animal to gain weight

In response to Part (c), most candidates were able to identify "Speedo" as the better ration with reference to F.C.R., but when the higher price factor of "Speedo" was included, many were unable to determine why the feed with the F.C.R. of 2:1 was better to use than the cheaper feed with the F.C.R. of 3:1.

They failed to see that it costs less to produce a bird of marketable weight / a kg. of meat.

Some incorrect responses included:

- It costs less
- Higher profits using cheaper feed
- Feed has more nutrients
- Because it is more expensive
- Because it is less expensive and the farmer will be able to afford more

Question 11

Candidates' knowledge relating to egg fertility and the process of incubation of eggs was required for this question.

Candidates answered this question satisfactorily.

Most candidates were able to identify candling as the method used to determine the fertility of eggs, though some could describe the process fairly well, but could not name it.

In response to Part (b) most candidates correctly stated that a dark spot in the egg was indicative of the formation of a nucleus, and therefore fertility.

Candidates generally knew that the correct response to Part (c) was incubation though some candidates referred to it incorrectly as "hatching, ovulation, gestation, brooding, fertilisation" and "insemination".

Most candidates were able to respond to Part (d) as 21 days, though it was surprising to find candidates stating such times as "5 days, 1 week" and "3 months".

In Part (e), candidates knew that the two main methods used to produce chicks were:

- Natural Incubation
- Artificial Incubation

Question 12

This question tested the candidates' knowledge and understanding of how the internal combustion engine works.

This question was not satisfactorily answered by 94 per cent of the candidates.

Few candidates were able to correctly identify the spark plug in Part (a). Candidates incorrectly mentioned the "gas tank, hose, filter, radiator" or any other part of the engine that they knew.

Yet fewer candidates were able to identify the cylinder as the place where ignition occurs.

Candidates were unable to identify the power source for igniting the fuel as the battery (Part (c)), and to state the causes of poor performance of the spark plug (Part (d)) as:

- Corrosion
- Incorrect spark-plug gap
- Burnt electrode
- Inadequate contact between the distributor and the battery
- Flooding of spark plug with fuel / oil

With respect to Part (e), most candidates were unable to state that the farmer should adjust the spark plug.

Question 13

Candidates' knowledge of the housing requirement of dairy goats was required for this question.

Forty-nine per cent of the candidates answered this question satisfactorily.

Many candidates were able to answer Part (b) reasonably well, but were weak in responding to Parts (a) and (c).

Correct responses for Part (a) should have included the following:

- Near the homestead to protect from predators and to guard against theft.
- High ground / well drained area
- Leeward side of homestead

Many candidates instead incorrectly stated that pens should be sited:

- Far away from houses
- Near the source of food / pasture and water

With reference to Part (b), many candidates did not focus on sloping / slatted floor, or on the importance of a solid base of compact clay or concrete.

In response to Part (c), few candidates correctly listed the following:

- Feeding Racks
- Milking Stands
- Waterers
- Milking Equipment
- Facilities for ration / mineral licks

Most candidates listed tools such as "hammer, saw", and materials like "nails, bricks, galvanized iron", for which they were not credited with marks.

Question 14

This question tested candidates' knowledge of international bodies which have a close relationship with agricultural pursuits of CARICOM countries.

This question was not well answered by candidates.

Candidates were unable to state what the abbreviations, W.T.O., F.T.A.A., and A.C.P. represented.

In response to Part (b), too many candidates could not correctly name two member states of CARICOM.

Some candidates listed:

- England
- United States of America
- Venezuela

They were unable to state that bananas and sugarcane are crops given preferential treatment in Europe.

Many candidates were also unable to state one measure which the Caribbean Community was mandated to adopt under the Agricultural Marketing Protocol. These included:

- Establish regional agricultural marketing information systems
- Strengthen producer associations
- Facilitate joint venture marketing
- Facilitate niche marketing
- Facilitate enhanced food quality / security

Question 15

This question tested candidates' understanding of the term, budget, and their ability to relate this to given situations.

This question was poorly answered by most of the candidates.

Many candidates did not recognise that a budget was a plan of the economic activity of an enterprise projecting income and expenditure for a specific period of time. They likened it to an economic analysis that would indicate profit or loss made. A significant number also referred to a budget as a record of income earned and expenses made.

In response to Part (c) few candidates correctly stated the reasons for preparing a budget. These are to:

- Project / forecast income and / or expenditure
- Facilitate the accessing of loans
- Provide information on the management of the enterprise
- Plan for a successful enterprise

Clearly, more attention needs to be paid to this aspect of the programme.

Some candidates knew that the type of budget referred to in Part (b) was a partial budget, but many responded incorrectly with answers like "Price Budget, Farm Budget, Financial Budget" and "Split Budget".

PAPER 03 – Extended Response

Candidates were required to respond to seven of ten essay-type questions based on three of the four profiles of the syllabus. The profile, Animal Mechanisation, is not tested in this paper.

Candidates performed best in Crops and Soils, but were weakest in Animal Science.

There was evidence that candidates had information related to the topics evaluated, but not a full grasp of the basic concepts, ideas and practices. In addition, when asked to describe, explain or discuss, as should be expected in an essay-type paper, many just listed points. Detailed comments on the questions of this paper follow.

Question 1

This question tested the candidates' application of knowledge with respect to seedbed preparation in a given location under four main headings:

- Selection of site
- Land Preparation
- Seeding
- Care of Seedlings

This question was fairly well answered by 40 per cent of the candidates, though many wrote about the production of seedlings in a nursery shed, instead of in the field.

In terms of Part (a) candidates correctly stated that the area should be:

- Flat, or gently sloping
- Within easy access of the river (water)
- So located as to avoid flooding
- Of good internal drainage
- In an area with a good depth of top soil (about 10 cm)
- Away from heavy overhead shade.

Many gave vague responses like “need for good soil,” “area that is moist,” “free from pests and diseases.”

Others focused on closeness to home, although the question itself stated that the area to be considered was 5 km away.

In response to (b), the majority of the candidates correctly identified

- The cleaning of weeds and foreign matter
- Primary and secondary ploughing
- Rotovating and improving tilth
- Treatment of the soil for pests and diseases
- The addition of organic and inorganic manures
- Raking and levelling of the seedbed.

Some candidates merely said that the beds should be well-prepared without stating how, while others concentrated instead on the dimensions of the seedbed.

Candidates answered Part (c) reasonably well, but many failed to include light covering of the bed with grass until germination begins.

Some candidates stated that the seeds should not be sown too deeply, and went on to suggest the ridiculous depth of “3 - 10 cm” for cabbage seeds. These seemed to have a problem with the metric system.

For Part (d), most candidates were well aware of the need to remove weeds, to irrigate as required, to control pests and diseases, and to provide limited shade.

Few candidates used the terms thinning or hardening off, but they correctly described the process.

Question 2

This question tested candidates’ knowledge and understanding of the negative effects of excessive use of insecticide on the environment.

This question was poorly answered by most of the candidates.

Many stated that excessive use of insecticides could be injurious to their health but were not specific in describing clearly how the practice affected their health through the air or the soil, as required by the question.

Some candidates correctly stated that:

- Chemicals may cause respiratory problems to man and animals
- Chemicals may cause skin / eye irritation
- Insecticides may have a deadly effect on useful insects and birds

Very few mentioned the part played by spray drifting into pastures and affecting grazing animals, or affecting aquaculture enterprises, or the destruction of fish, which feed on the poisoned insects that fall into small rivers and ponds.

For Part (b), the few candidates who scored reasonably well mentioned the following points:

- Destruction of microorganisms, and the consequent imbalance in the ecosystem
- Build-up of toxic chemicals in the soil
- Residual effect of insecticides in plants which may be eaten by man / animals and be negatively affected
- Run-off water may take chemicals to water courses causing pollution

Many candidates did not have a clear idea of how the environment could be harmed, so they ventured responses like:

- Insecticides cause soil to be acid
- Insecticides break down nutrients in the soil
- Fertility of the soil is reduced
- Insecticides cause plants to die

Question 3

This question tested candidates' knowledge and understanding of the processes of harvesting and storage of dry peas (Cajanus cajan).

Candidates seemed to know very little about the harvesting of dry pigeon peas (Cajanus cajan).

Candidates' response to Part (a) should have been:

- Pods should be dry
- Seeds should be mature
- Harvest during dry / sunny weather
- Reject diseased / insect damaged pods

Many candidates had a better idea of storage procedures, but too many candidates listed incorrect responses, such as

- Wash the peas
- Cook the peas
- Refrigerate
- Wipe with a dry cloth.

This aspect, harvesting and post-harvesting, seems to have been neglected.

Question 4

This question tested the candidates' knowledge and understanding of the difficulties associated with hillside farming, and their ability to suggest appropriate solutions.

Most candidates were able to discuss Part (a) fairly satisfactorily.

Their correct responses included:

- Depth of top soil
- Soil erosion
- Inadequate soil moisture
- Wind damage
- Access to holding
- Movement of harvested produce

However, some candidates listed problems which were not at all specific to hillside farming, such as, praedial larceny, sunlight and increased pest and disease problems.

Generally, the solutions suggested (Part (b)) were quite appropriate.

Question 5

This question tested candidates' knowledge of the digestive system of a ruminant and a non ruminant.

It was surprising to find that many candidates were not aware that the sheep is a ruminant.

Most, however, were able to identify the four parts of the ruminant stomach, and at least one correct function of two of the sections.

Many candidates were aware of what takes place in the digestive tract of the ruminant, but had difficulty in associating the functions with the specific segment of the stomach.

In response to Part (b), many candidates found difficulty in identifying two reasons why pigs were unable to benefit from a meal of grass. The response should have been:

- Pigs have a simple, one-compartment stomach not designed to cope with large quantities of grass
- Grass contains a high percentage of cellulose, which cannot be broken down by the digestive juices produced in the stomach of the pig
- The stomach of the pig does not contain the bacteria which digest the cellulose in the grass

Many candidates gave incorrect reasons why the pig could not benefit from a meal of grass, such as:

- Pangola was a very hard grass that was difficult to digest, and had little nutrients
- The pig does not chew its cud and regurgitate its food

Question 6

This question tested candidates' knowledge of the brooding of layer chicks.

Five per cent of the candidates answered the question satisfactorily.

Part (a) was answered reasonably well by most candidates, but many wrote about the housing of layers, and not about housing in the brooder, as the question required.

They missed the important points of:

- Concreted floor
- Rat-proofing of the area
- Provision of heat and light
- Provision of litter, and paper on which to introduce feeding
- Protection from draughts

In response to Part (b) candidates suggested the correct activities, such as, sanitation, debeaking, and vaccination, but many were unable to name the vaccinations correctly, or to match them with the disease they were intended to control.

Some candidates, unsure of the correct procedure, suggested debeaking “continuously”, or “as often as possible”.

Most candidates were weak in their responses to Part (c). They failed to state the

- Type of feed to be used (Starter Rations)
- Method of feeding chicks in the brooder
- Adjustment of the height of the feeding hoppers
- Importance of not over-filling the hoppers

Question 7

This question tested candidates’ knowledge of the formation of the hen’s egg from the ovary to the point of lay.

Generally, this question was not well answered.

Many candidates were able to identify the parts of the reproductive tract of the hen, but could not associate the corresponding process of egg-development with the part named. Some candidates had a general idea of what occurred but no grasp of the specifics. These resorted to statements like, “The yolk is formed, and then it moves down the tract where the white is added, then shell.”

Many candidates just did not know, as they related the reproduction of the bird to that of a mammal, referring to the Fallopian tube or to parts of the digestive system of the bird.

Question 8

This question tested candidates’ understanding of the marketing factors affecting the demand for ornamental crops by the Caribbean farmer, as well as their knowledge of the reasons why some plants may be unacceptable to the consumer.

Many candidates were unable to correctly name four ornamental plants produced by local farmers for export and therefore included food crops like pepper, tomato and corn.

Candidates clearly found difficulty in differentiating between production and marketing factors, and in dealing with the former were unable to identify the factors that would render ornamentals plants unacceptable to the consumer. The correct factors, malformation of blossoms or foliage, pest and disease damage, blemishes and physical damage, and unsuitable variety, size or colour were not common responses.

Some candidates instead gave answers that had no agro-economic bases. These included:

- Persons prefer natural rather than ornamental
- The farmers were not well known
- Some persons expect farmers to grow vegetable crops only
- The consumer may tell the farmer that he would never plant the crop, so the farmer will destroy his farm

In response to Part (c) some candidates mentioned correct factors like “market price, consumer preference, reliability of supply, quality and presentation”, but failed to develop or discuss the factors as required by the question.

Question 9

This question tested candidates' knowledge of, and experience in record-keeping.

Candidates' responses to this question were fairly satisfactory.

Many candidates were unable to identify characteristics of a good record-keeping system. They interpreted this to mean the benefits / advantages of record-keeping, and responded thus:

- Predicts profits
- Tell the type of crops that gave most profit
- Loan could be obtained
- Keeps track of cash; and
- You can record milk production, equipment / labour

Few candidates listed correct characteristics like:

- Accuracy
- Completeness
- Simplicity
- Easy interpretability
- Easy accessibility / retrievability
- Up-to-date

In responding to Part (c) some candidates did not understand what was a mixed fruit orchard. They confused it with mixed farming, and therefore included livestock record information in the mixed fruit orchard record.

Those who interpreted the question properly listed correct types of information like:

- Inventory of plants
- Variety of plants
- Propagation methods used
- Establishment dates
- Date of first bud
- Date of fruit set
- Fertilizer regimes
- Date of harvest
- Care and maintenance
- Yields
- Costs

Question 10

This question was intended to test candidates' knowledge and understanding of subsidy and price support measures, and their effects on farmers.

This was a fairly popular question, selected by about 60 per cent of the candidates, but fairly well answered by only about 4 per cent.

Many candidates merely listed situations in which subsidies and price support mechanism were provided, but did not describe them.

Some others, however, had incorrect ideas, stating that these measures were provided when:

- There was hurricane or flood damage (compensation for crop-damage)
- There were low interest rates
- One wants to go away to study

Candidates again had correct ideas for Parts (b) and (c), but many failed to discuss the advantages and disadvantages. Just stating, “Greater Production”, or “Better Quality Produce” did not satisfy the demands of the question.

Candidates needed at least to state that “the accession of the subsidy would enable the farmer to better maintain the area under cultivation, or to increase it and thereby produce more”.

Some candidates seemed to have acceptable ideas for Part (c), but often, these were very vaguely expressed, for example, “Rich farmers may take advantage over the low prices of machinery and tools.”

They should have said that “Farmers with larger farms, who may not really have needed State assistance, may benefit to a greater degree than the small farmers who need the help to survive.”

There is a great need for teachers to assist their students to express their views both orally and written, in standard English. Language should be simple, but clear and precise.

PAPER 04 – PRACTICAL PAPER

This paper, a supporting element of Paper 05, the School Based Assessment, is a substitute for a hands-on practical examination, and aims to assess the candidates’ capability in the field / farm.

It attempts to transport actual and / or simulated agricultural field / farm situations indoors into the examination room, and then requires the candidates to make appropriate written responses to the stimuli presented.

Ten stations are set up, and the candidates are required to answer a given question on each.

All questions are compulsory, and the paper carries a total of 30 marks. Agricultural Economics is not tested in this paper.

Inadequate exposure to field activities will certainly hamper candidate performance in this paper. Many were unable to perform better because they apparently had little or no contact with the equipment on which they were tested, or with the crops in the field. They apparently never saw a bee-keeper’s smoker, were unclear on the basics of debeaking of poultry, had difficulty identifying common external parasites like the common tick, and were unable to correctly describe the best time to harvest crops like ochros, yams, rice and coffee.

Detailed comments on Paper 04 follow.

Question 1

This question was intended to test candidates' knowledge and understanding of the physical properties of soil, and of the relation of this to the cultivation of crops.

Some candidates were able to identify the soil samples, based on the water retention or drainage characteristic, demonstrated in Part (a).

In Parts (b), (c) and (d) many candidates appeared to be unfamiliar with the limitations of the soil type for cultivation. Candidates should have stated that incorporation would render the soil more suitable for crop production.

Many candidates did not attempt this Part (d). It appears that they did not know the best soil type required for the growing of carrots.

Question 2

This question was intended to test the candidates' ability to use weather records to make appropriate farming decisions.

Many candidates were able to accurately obtain information from the given histogram.

In Part (a) some candidates were unable to name the four-month period when bananas were most likely to be affected by leaf spot disease. They apparently disregarded the given data, and gave responses based on the real situation - as they knew it.

In response to Part (c), candidates should have given March - April as the best time for clearing drains and water courses.

Question 3

This question was intended to test candidates' practical knowledge of the best stage for harvesting a given range of crops.

This question was not satisfactorily answered by the majority of the candidates.

Many candidates stated a time factor rather than the visual signs of readiness for harvesting. Some candidates incorrectly stated the stages of plant growth and development, choosing at random "vegetative stage, productive stage, senescent stage".

One incorrect response to (d) which was frequently repeated was that rice was ready for harvesting when "the paddy showed signs of rupture". This was so significant as to raise the suspicion that this was taught to them.

Candidates' responses to this question seem to suggest that candidates were not at all familiar with the practical activity of harvesting.

Question 4

This question was intended to test the candidates' knowledge of the germination of a dicotyledonous seed (bean), and their understanding of the production of nitrates by these legumes.

Generally, about 60 per cent of the candidates answered this question satisfactorily. They were able to identify the parts of the germinating seed, though some candidates referred to the "cotyledon" as the "seed coat". Candidates also knew that the nodules in the roots were responsible for the production of nitrates.

In Part (e), some candidates did not know the correct plant nutrient, nitrates, so they listed "carbohydrates, proteins, calcium, manure".

Question 5

This question was intended to test candidates' knowledge and understanding of how plants take in nutrients from the soil as demonstrated through an experiment on osmosis.

Most candidates recognised the experiment as one demonstrating the process of osmosis, and in Part (b), the purpose of the pin was to mark the height of the solution at the beginning of the experiment.

Many candidates were unable to explain that the height of the solution was above the pin because water was being drawn from the bowl into the depression in the potato, that is, from a region of higher concentration of water molecules to a region of lower concentration of water molecules.

Part (e) was particularly weak. Candidates were unable to describe two situations in farming, when osmosis would be harmful to crops. They should have described situations such as, when too much fertiliser is applied, concentrated fertilisers comes in contact with leaves, undercomposed pen manure is applied to plants and fertiliser is applied too close to the base of the plant.

Question 6

This question was intended to test the extent to which candidates could identify the symptoms of foot and mouth disease, their knowledge of the cause and method of control.

Fifty-three per cent of the candidates answered this question satisfactorily.

Most candidates correctly identified the disease, and were able to name parts of the body, other than that shown in the diagram, affected by it.

Candidates were aware that the causative agent was a virus, but many were not clear as to the recommended procedure for dealing with affected animals, Part (d). Some candidates mentioned slaughtering, but they did not include burning of the carcass to complete the answer.

Question 7

This question was intended to test candidates' knowledge and practical experience in the debeaking of chicks.

Most candidates were able to correctly identify the management practice carried out on A.S. 13 as debeaking, and to state the reason for this – to prevent cannibalism, or feather-pecking.

However, not many candidates were able to correctly state the earliest age at which this practice was carried out on poultry (day-old), how often it should be carried out on broilers (once), or that bleeding should be treated by cauterising the wound.

Many candidates did not specifically state that about 1/4 of the beak was cut off.

Question 8

This question was intended to test candidates' ability to identify major external parasites, in this case, the tick, and the best methods of controlling this pest.

Sixty-two per cent of the candidates answered this question satisfactorily.

Most candidates were able to identify the pest as a tick, the livestock which it affects as cattle, goats, sheep, pigs and horses, and the best method of control as spraying or dipping.

Many candidates, responding to Part (c), did not know that hand-picking of ticks was not advisable because the heads break off and remain attached to the body of the host, later decompose and may be a source of infection to the livestock.

Few candidates were able to state that the group of chemicals used for destroying ticks, Part (e), was called acaricides.

Question 9

This question was intended to test candidates' practical knowledge of tools and equipment for bee-keeping.

Many candidates did not recognise the smoker, A.S. 16, and were unable to state that its main function was to pacify the bees.

In response to Part (d) many candidates correctly stated that if the equipment was not used the result would be:

- Bees would be excited causing the farmer to have difficulty completing his task
- Bees would attack and sting the farmer

Question 10

This question was intended to test candidates' knowledge of the main parts of a knapsack sprayer.

This question was satisfactorily answered by 93 per cent of the candidates.

Most candidates were able to identify the knapsack sprayer, its main parts, and their functions, though many were unable to state clearly that the function of the trigger was to release the liquid contents up through the lance, to the nozzle.

PAPER 05 – SCHOOL-BASED ASSESSMENT

The School-Based Assessment is the practical component of the programme. It carries 25 per cent of the total marks of the examination, and a passing grade in this, is a requirement for success.

It consists of three elements, and these are performed by the candidates, at their schools and school farms, and assessed by their teachers in the field.

The three elements of the SBA are:-

- (i) Fifteen practical agricultural skills
- (ii) The preparation of 10 farm records and
- (iii) Diary entries of the practical agricultural activities engaged in, on the school farm.

Generally, candidates' performance in the School-Based Assessment component was very satisfactory.

RECOMMENDATIONS

These recommendations are repeated again this year in the hope that all personnel involved in the preparation of candidates for future examinations, will redouble their efforts to raise performance levels.

1. Teachers should ensure that students engage in adequate, meaningful field activity, together with effective guidance in the techniques of observation.
2. During the learning / teaching exercise, there be more careful attention to specifics, and to relevant details.
3. There should be greater use of strategies that would ensure students understand ideas and concepts before attempting to memorise them.
4. Teachers should ensure that students receive adequate practice in identifying and responding to precisely what they are being asked in the questions before them.
5. Students should receive generous practice in responding to questions which request them to “explain”, “describe” or “discuss”.
6. Serious and continuous efforts should be made to assist students in improving their communication skills.
7. Every effort should be made to ensure full syllabus coverage by teachers and students.