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FOREWORD

This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned.**

AGRICULTURE

Paper 0600/01
Multiple Choice

Question Number	Key	Question Number	Key
1	A	21	A
2	D	22	D
3	C	23	B
4	C	24	C
5	A	25	C
6	B	26	B
7	C	27	C
8	B	28	D
9	D	29	D
10	B	30	D
11	D	31	C
12	B	32	D
13	D	33	B
14	C	34	D
15	C	35	A
16	D	36	A
17	D	37	A
18	D	38	C
19	A	39	B
20	B	40	A

General comments

Once again there was a marginal improvement on the previous year's results with a mean score of 25.972 (64.9%). The spread of marks ranged from 3 to 38. Most candidates had no difficulty with questions numbered **1, 6, 7, 11, 12, 18, 19, 22, 25, 26, 28, 29, 30, 31, 32, 34, 35, 39** and **40**. Over 60% of candidates gave correct responses to **Questions 3, 9, 10, 13, 14, 23, 24** and **30**, and little further comment is required.

There was generally a good understanding of plant physiology and crop production although it was surprising that only 44% of candidates correctly identified the styles on a maize plant (**Question 8**). Understanding of soil types was disappointing (**4, 5** and **17**), whilst plant diseases (**15, 16**) caused some difficulty as did some questions from Section 4 of the syllabus (**33, 37, 38**). Interpretation of drawings and data was often poor (**17, 21, 23**) and this is a problem which needs to be addressed. Candidates should be advised to pay more attention to the detail required.

Comments on specific questions

Question 2

It should have been appreciated that with so little grazing land available, zero grazing would provide the maximum amount of food with no losses due to spoiling by livestock. Furthermore, careful management of this system provides the best and quickest chance of pasture recovery.

Question 4

Only 27% gave the correct answer, **C**, whilst over 60% suggested **A**, clay. This points to a lack of practical work in handling soils. Moist clay is not crumbly and holds its shape very well.

Question 5

Although 41% gave the correct answer, **A**, almost as many gave **B**, loam. It should be clearly understood that clay soil is much heavier to work than loam.

Question 15

Candidates should have recognised that the presence of powder (spores) is a feature of fungal diseases. Although over 50% gave the correct response, 26% suggested a deficiency disease, signs of which are usually some form of leaf discolouration.

Question 16

These three named diseases are all specified in the syllabus and although only one has to be studied, identification should have been obvious.

Question 17

Only 40% gave the correct answer, **D**. 26% gave **C** suggesting that although they recognised a heavy soil, they did not appreciate that the crop had emerged. The remainder gave **A** or **B** suggesting they did not understand the term *heavy soil*.

Question 20

It was expected that most candidates would understand the function of the rumen in breaking down fibre but almost a third of candidates suggested that the animal would be unable to digest its food – functions of the abomasum and small intestine.

Question 21

Results suggested that most candidates assessed the whole graph and ignored the final part of the stem “between months 1 and 3”.

Question 23

Although about two thirds of candidates gave the correct response, **B**, many (28%) were careless and chose **A**, probably because it was the top line.

Question 27

Although 44% gave the correct answer, **C**, it appeared as though the others had simply guessed. In any study of genetics, it is essential to have a clear understanding of the terms *heterozygous* and *homozygous*.

Question 33

Since the making of concrete floors is quite clearly set out in the syllabus, the poor result (only 34% correct) suggests that the topic has not been widely studied.

Question 37

Incorrect choices were evenly divided between **B**, **C** and **D** and suggested a lack of experience with spanners. However, the clear diagrams should have indicated that the box spanner was the only suitable one.

Question 38

Careful examination of the diagrams would have indicated that knots **A**, **B** and **D** would have little shortening effect when pulled tight. **Item C** is essential to shorten a rope *when securing a load* as stated in the syllabus.

Paper 0600/02
Core Theory

General comments

This was the second year that this paper was an option to Paper 3. It is set on the Core Syllabus and designed to differentiate between grades G to C. Entries were down on last year – it appears that Centres are only entering their weakest candidates. Centres need to check their results closely for they may find that their projected C/D candidates entered for Paper 3 have not achieved their potential. Paper 3 is designed to differentiate between the higher grades and is not so accessible to the average candidate.

The paper consists of nine structured questions set on topics in syllabus order. Each structured question starts with parts aimed at grades G to F, followed by a middle section aimed at F to D. The final part, that includes open-ended responses, is aimed at grades D to C. Some of the final question parts are common with Paper 3. The command words such as, 'state' and 'list' introduce low level question parts. 'Suggest' and 'explain' indicate that higher level answers are required. Diagrams are used to help key candidates into the questions.

Questions 2, 4, 5 and 6 contained parts that tested recall of knowledge and these gave the most correct answers. However, when these questions asked for local examples the responses were less good. **Questions 1, 4 and 9** included some data response. It was encouraging to note that most candidates attempted these but it must be emphasised that their answers should relate to the data given. Such questions are not testing the candidates' recall of knowledge. **Questions 3, 7 and 8** tested the candidates' practical experiences and these produced disappointing answers. Last year the candidates' practical knowledge of farm structures was poor, it was no better this year. **Questions 3 and 7** required extended writing and some accounts showed good knowledge and a useful command of English.

21. 2% of the candidates who took this paper were awarded a C grade.

Comments on specific questions**Question 1**

- (a) Most candidates correctly interpreted the graph and gave a population of 4 million for when wood ran out.
- (b) Using wire fencing as an alternative to wood was the popular answer, a few mentioned living hedges.
- (c) Storage tanks and dams (ponds or reservoirs) were the required answers. Many gave bore holes and wells, which are sources of water rather than a method of storage.
- (d) The majority of candidates could name a system of farming but rather fewer could explain why they were more efficient than shifting cultivation. 'Mixed farming because animals provide manure for crops', was a common answer. The fact that mixed farming provides income if one crop fails is an advantage but it does not result in improved production.
- (e) AIDS or disease were the expected answers but famine or lack of food gained credit. No one mentioned war.

Question 2

The diagram showing the water cycle targeted at grades G/F/E stimulated mainly correct responses in the first three parts of the question.

- (a) Evaporation was the name of the process labelled **A**. A few candidates named it transpiration.
- (b) Many alternative types of soil erosion were allowed including gully, rill, run off and mud slide.
- (c) Although not stated, the question implied that practices to prevent soil erosion by rain water were required, e.g. contour ploughing, terracing, planting and close cropping and diversion channels. Most candidates interpreted it in this way. Mulching, which prevents water loss from soil, was a common wrong answer.
- (d) Most candidates gained one mark for describing how water flow eroded rocks and river bed. Few included the action of material carried in the water such as logs or stones hitting rocks in the bed or banks to gain the second mark. Some described water entering cracks in the rocks and expanding on freezing which did not gain credit.
- (e) Those who knew about chemical weathering usually scored the two marks, one for describing the formation of acid rain, one for the concept of acid dissolving the rock.
- (f) Only the better candidates worked out from the figures in the diagram that evaporation from the land was high and then deduced that this indicated a hot, desert climate.

Question 3

This question tested knowledge that should have been gained from first hand practical experience.

- (a) The growing requirements of a named crop were known by the majority of candidates. A specific fertiliser had to be named in part **(iii)** e.g. nitrate. Organic fertiliser, unqualified, did not gain credit.
- (b) The descriptions of how to prepare a seed bed were well attempted. Digging and raking were the points made most frequently. The need for levelling and fertiliser were other marking points. Failure to read the question carefully cost some candidates marks as they described seed bed formation from un-cleared sites so included stumping, and burning.
- (c) Candidates found this one of the most difficult questions on the paper as it required them to know the planting procedures for a potato and cereal and relate these to a type of seed bed. Simply put, tubers have to be planted well below the soil surface so the bed has to be deeper than that required for cereals. Tubers have their stored supply of food and water so are not as dependent as seeds are on a supply of air and water that a fine tilth would provide. Credit was also given for suggesting that the soil in the potato bed should be ridged.

Question 4

- (a) As might be expected, the labelling of the diagram of the non-ruminant produced the full marks.
- (b) Here marks were again lost for failing to read the question. It did not ask what a production ratio and a maintenance ration were or when they were used. It just asked how the nutrient content differed, e.g. production has high protein and carbohydrate.
- (c) This question purely tested the ability of candidates to respond to the data given in the table. It was not requiring knowledge of the fact that calcium is needed for making egg shells. Candidates need practice in how to analyse data accurately. In this case the need for calcium increased with the age of the poultry and the need for phosphorus decreased. Less phosphorus is required and the decrease is small. As the age of poultry increases, the proportion of phosphorus to calcium in the feed drops from approximately half to a twelfth.
- (d) This question did not elicit the expected responses from many candidates. Most candidates when asked to name a vitamin or mineral deficiency did so but they were unable to relate this knowledge to 'diet' and 'ill health'. Anaemia due to a lack of iron or rickets due to lack of vitamin D were the hoped for answers. The final part asking for the signs of infection was also poorly done. Many answers were possible, e.g. a high temperature, loose droppings, blood or parasites in droppings, inflamed udder of skin etc.

Question 5

- (a) This part required candidates to apply their knowledge of photosynthesis and plant nutrition to grass. Not difficult but not done correctly by many. Candidates need practice in applying their knowledge to explain novel situations as part of their examination preparation.
- (b) This part was particularly disappointing as very few candidates could name a local type of grass and legume.
- (c) This was not an easy graph to interpret. The **H** had to be placed before the digestible food steeply dropped and at a point of high mass i.e. just before flowering. Most candidates left harvesting too late, putting the **H** where the lines crossed.
- (d) Many suggested prevention of grazing would enhance grass growth for one mark but few suggested using fertiliser or irrigation for the second mark.

Question 6

- (a) Surprisingly few could name a local weed but the effects of weeds on growing crops were well known.
- (b) The clothing and precautions to be taken when using chemical sprays were very well understood.
- (c) The drawing showed an eel worm. A 'boring' pest was allowed but 'worm' was not. Some of the explanations as to how rotation helped control pests were poorly expressed but credit was given for the concept of 'no food for the pest'. For the second mark the idea that the life cycle was broken had to be made.

Question 7

- (a) The picture showed mating or mounting. Fertilisation was not given a mark as this occurs later within the animal when the sperm meets the egg.
- (b) The descriptions of birth were variable. Those candidates with first hand observations of the process were better able to provide the required detail. The second part of the question asked for tasks to be carried out **immediately** after birth not for details of how the young should be cared for. Ensuring breathing, checking the cord and applying antiseptic, making sure the young had bonded and had sucked were the type of answers required.
- (c) Genetics is not an easy topic but, for those who do understand it, the completion of a genetic diagram is not difficult. Candidates tended to score either 0 or 3. A common error was the failure to show the gametes as a single letter. Those who showed a Punnett square were given credit.

Question 8

- (a) This question, which tested knowledge of fence and gate construction, was disappointing. Candidates could not even name tools that might be used such as pliers, hammer, spade etc. A number of candidates listed poles, wire and droppers as tools. Drawings of gates were poor and methods of hanging and fastening were not known. The marking points for the drawing of the gate were; a suitable gap between struts and a method of strengthening, such as a cross strut.
- (b) The completion of the table of fence types was not much better. Candidates must be discouraged from referring to cost whenever asked for an advantage of an item or material. Readily available would do but not cheap. In this case the advantage of post and wire is their strength. Hedges require cutting and electric fences need checking for current flow – neither are difficult answers to work out even if the candidate had not used that type of fence. Candidates must expect to apply their knowledge, not just repeat what they have learnt.

Question 9

- (a) Record keeping is not often tested in this paper and some candidates were caught unawares. Records that can be kept include; breeding records, pedigrees, health details and treatments, yield and quality of product, and costs.
- (b) The reasons for keeping records are to ensure efficient management, to enable future planning and to demonstrate viability when applying for loans. Most candidates gained one mark.
- (c) The final data analysis was difficult. A simplified answer such as 'sell cattle because there will be less demand for meat' did not get credit. Sell beef cattle, yes, but not dairy cows as the return on milk is not set to decline. Increasing eggs and vegetables because the demand is up is not really viable as the cost of animal feed and fertilisers are set to increase. Growing legumes that do not require nitrate fertiliser, however, would be a profitable alternative.

Paper 0600/03
Extended Theory

General comments

This was only the second examination session in which this IGCSE subject was examined in this manner. Previously, there had been an element of choice for candidates in a 'Section B'. As in 2004, all candidates were expected to answer all questions on the paper this year. Regrettably there is evidence that in some cases the syllabus was not fully covered. Some candidates performed very well in some areas and equally poorly in others. Naturally there were some candidates who were well prepared for the examination and these are to be congratulated.

Looking at the entry for the 2005 examination, most Centres entered candidates appropriately for the more suitable tier, i.e. 0600/03 or 0600/02. Once more, there was evidence that some weak candidates were entered for 0600/03 and found the questions, especially those involving the analysis of data, too testing.

Nearly all candidates attempted all of the questions indicating that they had sufficient time for the examination.

Comments on specific questions**Question 1**

- (a)(i) Most candidates were able to use the data in Table 1.1 to calculate that there was a greater rate of evaporation in 2004 than 2003.
- (ii) The quality of the bar charts was much improved on charts that were produced by candidates in the past. Most candidates produced charts that were both accurate and clear.
- (b)(i) The concept of minimum tillage was understood by approximately half of the candidates. The most common mistake by candidates was to ignore the minimum reference in the question. The other mistake made regularly was to restate the question by stating that minimum tillage can conserve water, but not to describe a method by which it might be done.
- (ii) The most common correct response by candidates was a reference to mulching. The most common misconception by candidates was to describe a method of storing water for agricultural use, such as reservoirs or water barrels.
- (c) A significant minority of candidates provided an answer which referred to boiling as a method of making river water fit for human consumption, but invariably failed to describe how this might be done on a large scale. Better answers described how river water might be distilled. The best answers described how river water could be treated by filtering, settling and chlorinating. There were good reasons provided for each of these processes by many candidates.
- (d)(i) Generally this question was answered well with most candidates describing how the water flow caused collisions between rocks. Weaker candidates stated merely that the water flow itself caused physical weathering.
- (ii) There were relatively few candidates who earned both marks for this question. Candidates either described the formation of acid rain or the effect of rainwater on rocks such as limestone. The most common misconception was that the expansion of water owing to low temperatures was a cause of chemical weathering of rocks.

Question 2

- (a)(i) Most candidates were able to state an appropriate percentage yield.
- (ii) Few candidates answered this question well. The first error made by many candidates came from misreading the graph, stating that the lower figure for the pH range was 6.0, and not 6.1. The other error made by some candidates was to provide a single figure instead of a range.
- (iii) Very few candidates provided answers appropriate to an Extended Paper for this question. Candidates stated very simplistic responses referring to the preference of the crop. Only the most able candidates referred to the replacement of calcium ions by hydrogen ions in acidic soils.
- (iv) Most candidates stated how liming can increase the pH of a soil, but few qualified their answer by either describing how this might be done or to give a second method of increasing soil pH.
- (v) Many candidates were aware that sandy soils drain faster than other soils, but fewer of them were able to suggest that this would increase the leaching of soluble cations from them.

Question 3

- (a)(i) Most candidates were able to identify both the upper epidermis and the stomata on Fig. 3.1. The most common mistake was to label a guard cell rather than the opening.
- (ii) This was well answered by many candidates. The role of chlorophyll and chloroplasts were well understood. There were several quality references to appropriate products of photosynthesis. A small number of candidates stated incorrectly that photosynthesis is derived from the heat of the sun rather than the strength of the light energy.
- (b) This was answered less well by candidates. There were many statements describing the purpose of systemic pesticides and their effect on insects such as aphids, but such statements were not answering the question. The methods by which systemic pesticides enter a plant were not well understood. The movement of them around a plant by translocation was much better explained, but there was confusion between whether it was the xylem or the phloem which carried the pesticide.

Question 4

- (a)(i) This question was well answered.
- (ii) Few candidates were able to state more than one undesirable consequence of deforestation. Commonly, candidates provided answers which were superficial and/or simplistic e.g. unqualified references to erosion were not acceptable, statements describing how the removal of tree roots resulted in soil particles not being bound together so that they were more susceptible to erosion earned a mark.
- (b) This question was answered well by candidates who had undertaken such practical work. Candidates who had not, often failed to gain any marks for this question.
- (c) An increasing proportion of candidates are aware of the term cultivar, but still there is a widespread misconception that a cultivar is a type of agricultural machinery or a tool.

Question 5

- (a)(i) Some candidates were able to identify the pest as a nematode.
- (ii) The concept of crop rotation to destroy the life cycle of soil-based pests was understood by many candidates, but fewer candidates were able to explain how crop rotation would prevent such pests from feeding, leading to their eradication from the soil.
- (b)(i)(ii) Few candidates were able to name a viral disease and a crop it affected and state how the crop became infected. There was great confusion between fungal, bacterial and viral diseases and the vectors of each. Consequently the symptoms of infection were often either confused, vague or wrong.
- (iii) Methods of prevention of viral diseases were not well understood by most candidates.
- (c)(i) In general, most candidates were aware that many farm chemicals could be hazardous to health. However, too many candidates simply stated this. The better answers described the circumstances under which farm chemicals would be hazardous. For example, spraying herbicides can be hazardous if inhaled.
- (ii) Similarly, many candidates provided too superficial a response to how farm chemicals might harm the environment. Good answers included the effect of leaching soluble fertilisers by rainwater or washing agricultural equipment in rivers.
- (iii) This question was answered well by most candidates.

Question 6

- (a)(i) Many candidates did not realise that the reason that growers need more calcium than chicks is due to them being larger. The most common misconception was that growers needed calcium for bone development and chicks did not.
- (ii) This question was answered well.
- (b) Most candidates were able to explain why chickens may need different rations depending on whether they were in production mode or not. However, very few were able to explain any other factors which might affect the necessary rations at any time. A large minority of candidates stated factors which related to mammals rather than birds, such as the production of teeth, or answers referring to lactation and weaning.
- (c) There was widespread confusion between notifiable and "easily noticeable" diseases. Those candidates who understood the former produced good answers, those that did not understand the term produced vague responses describing general ill health amongst livestock.

Question 7

- (a) The question was answered very well with candidates using a number of appropriate terms. There has been a great improvement in the way that candidates understand this important area of genetics.
- (b) There remain a large number of candidates who mistake artificial selection with artificial insemination. Consequently, this question was answered either very well, or very poorly.
- (c) Few candidates understood the importance of controlling breeding cycles in increasing the yield of livestock. There were some very clear and appropriate answers but most candidates referred to selection of parents rather than timing of mating.

Question 8

- (a) Most candidates provided a suitable method of maintaining a hedge and an advantage of a post and wire fence. Only the most able candidates were able to state how they might maintain an electric wire fence.
- (b) Some candidates provided very detailed factors as to the selection of a site for a new farm building. However, some other candidates produced very vague responses usually involving building near a market, but they did understand the need for a water supply. Some candidates incorrectly described the construction of a new farm building including materials and tools.

Question 9

Some candidates provided very sophisticated yet clear balance sheets and scored all of the available marks. It appeared that some candidates had not prepared at all for such a question, and consequently they either made no attempt to answer or rewrote the table in Fig. 9.1. For those candidates who attempted the question properly, the standard of arithmetic was good.

Paper 0600/04
Practical

General comments

The Centres offering this option this year had done so previously and demonstrated much good practice.

Teachers should check the Assessment Criteria, which are included in the current year IGCSE Syllabus, before starting to prepare candidates for practical tasks. Each year there are some candidates for whom special consideration has to be given because teachers have not provided the required opportunities for assessing the work. This year was no exception.

Candidates should be told how they are going to be assessed.

The tasks selected for assessment should provide opportunities for candidates from the whole ability range to demonstrate their practical skills. One way of achieving this is to construct worksheets that offer options and extension work. The work is then assessed using mark schemes that recognise different levels of achievement.

Mark sheets can differentiate the levels within the criteria by means of a graded tick list for the elements of an exercise, or by descriptors that relate performance in a task to a mark. The descriptors used should be positive so as to encourage positive achievement from the candidates.

A common criticism at external moderation this year was the failure of Centres to demonstrate how they recognised and graded candidates of varying abilities. Too many exercises tested basic skills only.

Both the work sheets and mark schemes used should be included with the candidates' work sent for external moderation.

Ideally, Centres should provide one task from each of the syllabus sections; soil, growing crops, husbandry, farm structures and agricultural economics.

It is not essential to test all candidates on the same exercises. Nor is it essential that every task should be used to assess all of the criteria.

It is important that some of the tasks should generate written work that can be used as proof of individual involvement and provide an indication of quality. Descriptions, for instance, of how a garden plot is cultivated or how cement blocks are made are suitable for this purpose.

The candidates should refer to any problems encountered in their work and emphasise any safety precautions taken.

Measurements on plants' growth, crop yields or production figures from animals provide data that can be tabulated and then represented by a graph or pie chart. Such pieces of work are used for grade comparison when carrying out external moderation.

Photographs of candidates carrying out tasks are useful evidence of their involvement.

Internal moderation only needs to be carried out by teachers when there is more than one teaching group in the Centre.

Paper 0600/05

Project

General comments

This paper continues to attract a small entry of above average candidates.

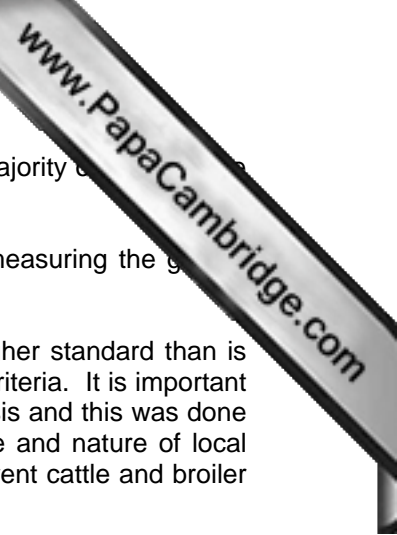
It is important that teachers new to this component check the Assessment Criteria before starting to prepare candidates for the project. These criteria are included in the current year IGCSE Syllabus. Each year there are some candidates for whom special consideration has to be given because teachers have not provided the required opportunities for assessing the work. This year was no exception.

It is expected that prior to the selection and carrying out of the project, candidates will have been made aware of the assessment criteria and given general teaching on how to decide on a hypothesis, design a questionnaire, control variables, collect data and select suitable graphs. The nature of limitations should be discussed and the required layout of the project should be described.

Assessment criteria that caused problems this year were the 'background study', 'planning' and 'limitations'. The background study should include relevant details about the materials being used and make reference to the facts supporting the science or ideas of the project. Sources should be noted and listed in the bibliography. The plan put forward must clearly provide answers to the hypothesis (questions posed), relate to the science of the background study and indicate how variables are to be controlled. It should be a detailed account of the experimental method and the procedures to be followed. Under 'limitations' any flaws in the experimental plan that became apparent should be commented on as well as describing the things that went wrong due to unforeseen circumstances and human failings. Suggestions as to how the limitations may be overcome should be discussed.

The regulations for Paper 5 allow teachers to monitor candidates' progress and to offer advice. In some assessment criteria the amount of help given will affect the mark awarded. The nature of the help given should be recorded on the individual pupil record card.

Group projects are quite acceptable but the individual contribution of each candidate has to be assessed. This is made more difficult if the projects are produced on a word processor. It is important in such situations that the teachers monitor each individual's progress and record marks with explanatory annotation on their record cards. There were instances this year of candidates having too much teacher direction in the production of the background studies and the copying of common information from the Internet. Candidates in group projects should be encouraged to put their own 'stamp' on common sources.



The layout and presentation of the majority of the work was of a high standard. The majority of work is now produced using a word processor.

As usual, experimental comparisons provided successful projects. Those involving measuring the growth rate or yield of plants and animals in different situations were popular.

This year, some Centres provided opportunities for surveys and these achieved a higher standard than is normally the case. By designing questionnaires, the candidates fulfilled the 'planning' criteria. It is important that sufficient questionnaires are sampled to collect enough data for subsequent analysis and this was done in the successful projects. Topics included: awareness and local effects of Aids, use and nature of local veterinary services, use and importance of trees in local economy and surveys of different cattle and broiler enterprises.

Internal moderation only needs to be carried out by teachers when there is more than one teaching group in the Centre.

Most Centres are now sending all the required information for external moderation. The sample should consist of ten projects – the one awarded the top mark, the one given the lowest mark and others that represent the full spread of marks. The annotation by the teachers of the candidate record cards is appreciated and is of great help. Comments that indicate how much guidance has been given and the problems encountered help the External Moderator understand how the teacher has awarded marks and has applied the assessment criteria.