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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

GCE Ordinary Level

Paper 5038/01

Paper 1

General comments

There were some excellent scripts from candidates, who demonstrated their clear knowledge and understanding of the subject. However, some candidates did not have sufficiently detailed knowledge to answer the questions in the depth required. It was disappointing to see that these candidates often had little practical knowledge of growing any specific crop plants or caring for livestock. Practical experience should be the basis of this subject and candidates should have this sort of "hands-on" experience on which to draw when answering examination questions. It was clear that some candidates found the Examination Paper difficult to understand but in some cases marks were lost through careless reading of the Paper, so that answers gave factually correct information which was irrelevant to the question being answered. Candidates should take time to read the questions carefully, before attempting to answer.

Comments on specific questions

Section A

Question 1

(a)(i) It was disappointing that so many candidates did not know the structure of the ruminant digestive system. This is the sort of basic knowledge that should provide candidates with easy marks. Some candidates confused the rumen with the reticulum but it was clear that some had no idea where, within the system as a whole, the reticulum could be found.

(ii) The comments for the previous sub-section also apply here. Labelling the liver as the abomasum was a common error.

(b) Many candidates stated that enzyme digestion ends here. Other common errors were to describe it as a storage area or the site of bacterial action. Candidates should know that the abomasum is the equivalent of the stomach in non-ruminants, where protein digestion begins.

(c)(i) Most candidates correctly named carbohydrates or fats.

(ii) There were more errors here although many candidates gave "protein" as the correct answer. "Fats" was the commonest incorrect answer.

(iii) Candidates could have chosen two from vitamins, minerals or water. Some candidates were unaware that "roughage" is an alternative description of fibre, so was already present in the feed.

Question 2

(a)(ii) Candidates who mentioned *chlorosis* or yellowing of leaves clearly knew the effects of iron deficiency in plants but references to stunted growth were not accepted, as this is too general and likely to occur with many nutrient deficiencies. "Pale leaves" was also not accepted as this could describe nitrogen deficiency.

(b)(i) Most answers simply repeated the question. References to a smaller surface area for transpiration or less exposure to agents that would increase transpiration were required. Simply stating that transpiration would be reduced was insufficient. Explanations specifically related to the responses mentioned were needed.

(ii) Candidates were not credited with marks for simply stating that photosynthesis would be reduced or that it would be affected "negatively". It was necessary to state that photosynthesis would be reduced and to explain why, in relation to the leaf responses described.

(iii) Many candidates stated that "bigger roots" would result or "a bigger crop" would be produced, missing the point that, in these circumstances, the effect would be simply to ensure continued growth of the cassava roots, so that there would be a crop.

Question 3

(a)(i) Disappointingly, few candidates could label the plough correctly.

(ii) The comment above also applies here.

(b)(i) There were some excellent answers, where candidates had read the question carefully and considered the data supplied. Common correct suggestions were the incomplete removal of weeds and damage to the crop brought about by having to pass up and down the rows several times and, therefore, pass close to the plants.

(ii) Candidates who answered **(i)** well also gave correct answers here, referring to the single pass needed and lack of hand weeding required. This information was easily extrapolated from the information given but a disappointing number of candidates did not attempt this section or other parts of the question. Candidates should be aware that application of knowledge, as well as recall of facts, is expected.

(iii) There were less correct answers here as fewer candidates knew the role of the mouldboard in turning soil and thus burying weeds.

(iv) Most candidates were aware of the adverse effects of weeds on crops, mentioning competition for resources and harbouring pests and disease, so marks were gained here although these may have been the only marks gained for the question, in some cases.

Question 4

(a) There are still many candidates who cannot define a *cultivar*, some believing it to be someone who cultivates crops and others that it is a tool used for cultivation. There were, however, some good answers mentioning varieties of the same species.

(b)(i) Candidates should have completed the boxes with D, D, d and d as gametes.

(ii) The genotypes would all have been Dd. The numbers of candidates able to answer simple genetics problems correctly is showing improvement year by year.

(c) Candidates with a good understanding of the topic realised that all the resulting plants would have drought resistance. Some noticed that cultivar 2 had much larger grains and so suggested that the next generation would have this beneficial characteristic as well as drought resistance. This shows excellent application of knowledge and use of information available.

(d) Again, candidates who understood the topic were able to show the results of crossing Dd with Dd. Marks were lost in the explanation, which needed to refer to the different phenotypes and genotypes.

Question 5

(a)(i) Overall the whole question was well answered. Some candidates were clearly not aware of conditions needed for storing grain so found this question difficult but most realised that the main requirements are dryness and the exclusion of pests. The prime reason for raising the building off the ground is to avoid damage by damp from the ground as, by itself, this would do little to deter crawling pests such as rodents or weevils.

(ii) The baffles deter crawling pests but many candidates thought that they were part of the building's support structure.

(iii) Most correct responses mentioned the effect of rainfall but other correct answers were flying insects or birds and one or two referred to fungal attack.

(b)(i) Cheapness and availability were two advantages mentioned by a number of candi… majority made reference to its insulating qualities. Few, however, used this term and e… were often poor. Candidates should attempt to use appropriate terminology as this wou… answers much clearer.

(ii) The advantage mentioned should relate specifically to the material shown. Consequently, "letting in light" was not an acceptable answer as this could be said of most window materials. Most candidates realised that ventilation was the important factor.

(iii) The commonest correct advantage stated was that concrete is easily cleaned, although reference to its long-lasting qualities or resistance to burrowing pests were also accepted. Disadvantages, however, were less often correctly stated. The major disadvantage is cost. Although concrete can be slippery, floors in animal housing should be made with a rough surface to avoid this. Equally, animals would not be sleeping directly on a concrete floor – some form of bedding would be used so references to cold or hardness were not accepted.

Question 6

(a) It was clear that many candidates had not seen a soil experiment like the one shown. This is disappointing as it suggests that agriculture is not the practical subject, for many, that it should be. Candidates should have been capable of identifying the soil as a clay type and stating characteristics associated with this type of soil.

(b)(i) The majority of candidates identified the soil as acidic.

(ii) In spite of this a substantial number of candidates did not realise that lime can raise the pH of an acid soil. Although a good number of candidates did state this, only a very few knew that lime also flocculates clay particles. A common error was to assume that it acts as a fertiliser.

(c)(i) Most candidates were aware that organic matter is important but it must be incorporated in the soil so "mulching" was not an acceptable answer. Improving drainage is too general an answer – a specific method would be needed for a mark to be awarded.

(ii) All parts of the question referred back to "soil **X**" which was a clay type. "Improved water retention" would not, in this case, be an improvement. The addition of organic matter would improve the drainage of a clay soil. "Improved fertility" is also too general an answer – reference to the addition of nutrients must be made.

Question 7

(a)(i) There were some excellent answers to this question, with full marks being gained for all sections. The answers to this section were: **A** – spark plug, **B** – exhaust/outlet valve, **C** – piston.

(ii) The stroke was the exhaust stroke. This was sometimes confused with the induction stroke but the direction of the piston was the clue to the correct answer. During this stroke the piston rises and the exhaust gases are expelled. Answers were generally clearly stated.

(b) A number of candidates clearly had no knowledge of the internal combustion engine and gained few marks for **(a)** but were still able to gain marks here, with the advantages and disadvantages of mechanisation being well known. Only one advantage and one disadvantage were required and candidates should state only one where the question demands it. Only the first given will be marked, correct answers will not be selected from a list.

Section B

Question 8

(a) Virtually all candidates remembered to name the crop but many accounts described sowing or planting, rather than soil preparation, as required by the question. Candidates must take care to answer the question set.

(b)(i) A few candidates named diseases rather than pests. Some pests were not specific. For example, "caterpillar" or "beetle" is not a specific pest for a crop.

(ii) Candidates should have studied one crop in sufficient detail to be able to specify the part of a attacked, the damage caused and its consequences for a named pest of that crop.

(iii) Some candidates mentioned inappropriate chemicals, such as named fungicides or herbicides and there were surprisingly few references to aspects of field hygiene or non-chemical methods of pest control, such as early planting. Where methods such as crop rotation were mentioned, these should have been appropriate to the pest named. For example, this would not work in protecting against aphids as it is designed to deter soil born pests and diseases.

Question 9

(a) There were good answers here, with candidates mentioning general signs of health or ill health as well as specific signs for named diseases in named types of livestock. Candidates should, however, avoid simply naming body parts or similar and indicate what is looked for, for example "eyes bright and not dull" rather than "eyes" and "abnormal faeces" rather than "faeces".

(b) Correct terminology is important, for example "vaccination" rather than "injection" as a means of preventing disease. Where control of parasites was mentioned it should have been made clear that these are vectors of disease, in order to make this relevant to the question. Candidates should also distinguish between quarantining imported animals, to establish their health status, and isolating animals showing signs of disease, in an existing flock or herd.

Question 10

(a) Some candidates did not read the question carefully and answered in terms of safety when using and storing chemicals rather than specifically when using a sprayer. Candidates must ensure that their answers are relevant to the question set.

(b)(i) The question specified hand tools for use in a school garden, so large implements, such as a plough, were not appropriate. Most candidates listed suitable tools, however.

(ii) This was well answered. Candidates' answers concentrated on preventing corrosion on the metal parts of tools but some also mentioned care of wooden handles to prevent rotting or insect attack and many also referred to dry storage. When water is used to clean metal tools, they should then be dried and not simply left to dry – an error seen in many answers.

Question 11

(a)(i) Most candidates understood that overstocking pasture means grazing more cattle on it than it can support without damage to grassland and reduction in yield, but they did not express this very clearly.

(ii) Again, ideas were not always clearly expressed but the compaction of soil, loss of vegetation, erosion risk and lack of food for stock were generally mentioned. A little more detail in expanding these ideas could have been given. Surprisingly few answers used the term *overgrazing*.

(b) Most candidates mentioned control of grazing and some gave detailed descriptions of rotational grazing, to the exclusion of any other method. This was not what was asked for in the question and, again, candidates must make sure that their answers are relevant to the question set if they are to gain many marks.

Question 12

(a) Answers here were disappointing. "Climate" refers primarily to rainfall (both season and amount) and temperature (*not* sunshine). The effects of these on land use should be illustrated with examples of crops grown in specific conditions, in order to describe the effects, as required by the question. This was not often seen. Soil factors should include depth, type and pH and limitations could again be illustrated with examples. Most candidates referred to topography as the slope of the land but few could indicate the limitations this might have on land use, where cultivation of crops might be difficult but animals might be grazed or land could be used for forestry or game reserves.

(b)(i) *Mixed farming* refers to the raising of livestock and crops on one farm. Some candidates still confuse this with growing more than one type of crop so there were some inappropriate descriptions of crop rotation here.

(ii) This was well answered in many cases. Candidates understood the inter-relationship of animals and plants, with the former providing fertiliser in the form of dung, for the plants and the latter providing by-products to feed the livestock. The effects of this on farm costs and the reduced economic risks of having more than one enterprise were also understood. A few candidates also pointed out that this could make better use of land, thus relating this back to **(a)** and demonstrating good understanding of the topic.

Paper 5038/03

Practical

General comments

All candidates attempted all parts of every question, indicating that there was sufficient time allocated for the examination. There were no cases of candidates infringing the examination rubric.

It would be useful for candidates to receive increased instruction regarding examination technique with regard to taking account of the mark allocation for each question in their responses. Again, some candidates continue to provide responses for practical questions by stating what they thought should be the outcome, as opposed to describing their actual observations.

A few Centres found difficulty in providing some of the apparatus necessary for some of the practical work. In particular, a few Centres were unable to provide small metal trays for the purpose of heating soil in **Question 1**, other containers were used with differing degrees of success. Additionally, a few Centres were unable to provide powdered protein for **Question 2**, but in this case, the Centres were able to use powdered milk, which allowed candidates to undertake the question without disadvantage.

Comments on specific questions

Question 1

(a) Approximately half of candidates were able to determine that soil moisture would have been removed by warming the soil at 100^{o}C for two days. The most common misconceptions were that such warming would remove soil humus or minerals.

(b) Candidates were required to heat the soil strongly in order to remove the organic component of the soil and describe the soil sample before and after heating. Many candidates described the colour changes associated with strong heating, others described changes in texture. However, some of the responses described the expectations of the candidate implying that they had not completed the experiment.

(c) There was a wide range of appropriate safety precautions described by candidates. The use of safety glasses and the use of some type of apparatus to remove the hot tray were the most common correct responses. Appropriate references to use of the Bunsen burner and the stability of the tripod were also rewarded. However, a significant minority of candidates appeared unaware of the necessity to work safely during practical work.

(d) Most candidates described a weight loss caused by burning within a reasonable range. A small number of candidates provided a weight loss that included the metal tray. More than half of the candidates who described an appropriate weight loss, were able to perform the required subtraction successfully. There were few candidates who were able to determine a correct percentage calculation and show the necessary workings.

(e)(i) Around half of the candidates described an appropriate method of increasing the organic matter content of soil. The most common misconception by candidates was to state that the addition of (inorganic) fertilisers would fulfil the role.

(ii) Only a minority of candidates appreciated the role of organic material in improving a soil. General vague answers such as 'improving the soil', 'increasing the yield' or 'making the soil more fertile' were not accepted.

Question 2

(a) The food tests were performed well by the vast majority of candidates. In particular, tests for starch and reducing sugar were performed particularly well. The negative test for protein caused most problems for candidates, possibly due to candidates failing to shake the sample.

(b) Approximately half of the candidates were able to derive appropriate conclusions from their own results. However, despite the accuracy of the practical results in this question, a significant number of candidates concluded what they expected to have seen. In particular, the presence of reducing sugar in both samples appeared to confuse such candidates even when they had observed exactly the same colour change in the practical work for both samples.

(c) There was a wide range of appropriate storage precautions suggested by candidates. Suggestions that were not accepted included those that clearly applied only to other chemicals, e.g. regarding flammability or the use of inappropriate containers.

Question 3

(a) All candidates attempted to draw AS4, a spark plug. Most candidates were able to draw the external features of the spark plug. A few candidates attempted to draw a cross section of the spark plug; some drew an outline of the spark plug or drew around the spark plug – in both cases preventing the candidate from showing any of the external features. The most common labels labelled by candidates were the gap between the electrodes (but not the electrodes themselves), the cap and the screw thread.

(b) Few candidates seemed aware of the function of the spark plug in the ignition of the petrol/air mixture. Many candidates provided a general answer that a spark was produced, but also many of them were confused between the role of the cylinder, piston and the spark plug.