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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

Candidates cannot demonstrate what they know if they do not understand the questions or cannot express themselves clearly. In many cases, candidates' poor knowledge of English was plainly hampering their performance in the examination. An inability to apply knowledge, rather than simply recall facts, continues to be a weakness, although poor comprehension undoubtedly exacerbates this impression. Answers in **Section B** often demonstrate a lack of sufficiently detailed knowledge in many areas of the syllabus. It is to be regretted that candidates often do not show much evidence of practical experience in agriculture or the science that can be applied to it. A number of questions were best answered by those who appeared to have had direct experience of practical skills, such as simple tap repairs, specified by the syllabus, or of general scientific methodology. Agriculture is a practical subject and the syllabus expectation is that it will be studied as such.

Comments on specific questions

Section A

Question 1

- (a) Maximising use of the land available was the advantage given by most candidates but some also mentioned that increased ground cover could help to reduce weeds. 'Increased soil fertility' was insufficient for a mark. Candidates needed to explain that the legume (groundnuts) could help to provide nitrogen for the cereal.
- (b)(i) There were too many vague answers referring to soil erosion. The construction of terraces helps to prevent this so the reason for each terrace sloping backwards needed more explanation if this point was to be accepted. The slope towards the back of each terrace would help to hold water and thus increase infiltration. This would then reduce run-off and so avoid washing soil over one terrace to the next. Since the question asked the candidate to 'explain', some detail was needed for two marks.
- (ii) This was generally rather better answered, with candidates explaining the role of grass in holding the soil.

Question 2

- (a) Many candidates seemed to struggle with what should have been a simple calculation. The answer was reached thus:

$$8 \times (10 \div 200) = 0.4 \text{ litres.}$$

Candidates who showed correct working but gave a final incorrect answer, through an arithmetical error, or an incomplete answer (2/5 litres) could still gain one mark. This demonstrates the importance of showing working.

- (b)(i) Most candidates gave 'face mask' or 'respirator' as the correct answer. A cloth tied over mouth and nose was not accepted, as this could become saturated with sprayed chemical and increase, rather than diminish, danger. 'Goggles' was also accepted.

- (ii) Candidates must answer the question set. A number of responses simply referred to general storage precautions, such as preventing children getting access to the herbicide. The importance of the original container is that it cannot be mistaken for another substance and that the container will have instructions for use.
- (iii) Most candidates realised that spray drift could be a danger to people, animals and other crops as well as polluting water sources.
- (c) This was answered poorly by the majority of candidates, who clearly found the application of knowledge to a hypothetical situation difficult. The syllabus makes it clear that knowledge with understanding is required – simple recall of facts is insufficient if candidates are to gain good marks. The lack of insect damage to the maize was understood as the reason for a good crop but candidates who pointed out that maize is wind-pollinated, whereas the fruit trees are likely to be insect-pollinated, were in the minority. The insecticide could, therefore have killed beneficial insects, thus reducing pollination, fertilisation and fruit set.

Question 3

- (a) Most candidates understood that transpiration would have occurred, from the leaves in the bag. Candidates must be precise in stating that this is the release of water *vapour*, not just 'water'. The vapour would then condense to form liquid water.
- (b) Few candidates mentioned the humid conditions that would arise in the bag, which could encourage *fungus* disease so the fruit would rot. This was another example of where candidates found it difficult to apply knowledge that they should have, in order to explain an unfamiliar situation.
- (c) Most candidates described some form of bird-scarer, which was acceptable, with a few mentioning the use of nets and fruit cages.

Question 4

- (a) Surprisingly few candidates were able to define *seed rate*, although this could have been deduced from the graph label.
- (b) Most candidates gave a correct numerical answer but many omitted the unit and so forfeited the mark. The correct response was 50 seeds per m².
- (c) Few candidates were able to calculate this value. The correct working was:

$$((4.2 \div 3) - 1) \times 100 = 40\%.$$
- (d) As seed rate was not understood by a large number of candidates, they were unable to offer a credible explanation here. Most correct responses referred to competition for nutrients, water etc. but few mentioned the overcrowding that would lead to this. Many candidates suggested that seeds would not germinate because of competition when it would actually be growth following germination that would be affected.

Question 5

This question was well-answered by many candidates, some gaining maximum marks.

- (a) Possible labels were mouth, stomach, pancreas and duodenum. Some candidates confused pancreas and liver on the diagram. A common misconception was that the gall bladder and/or liver produce digestive enzymes. The duodenum had to be shown as the region close to the pancreatic duct for the mark to be awarded – 'small intestine' was only accepted if it indicated this region.
- (b)(i) The majority of candidates understood that a young animal would need large quantities of protein for growth.
- (ii) Candidates realised that draught animals would need large amounts of carbohydrate for energy. 'Fat' was not accepted as this would not be the nutrient generally increased but candidates did gain credit for indicating that energy was the requirement.
- (c) This was not well-known. The correct answer was 'bean meal'.
- (d) The correct answer, 'calcium', was given by many candidates.

Question 6

This question was answered very poorly. There seems to be very poor knowledge of the terminology of simple genetics, with candidates simply assuming that all genetics questions will require a cross shown by a diagram (a number were drawn here and had no relevance at all) without any real understanding of the subject matter.

- (a) An *allele* is an alternative form of a gene, which will have a different effect on phenotype. This was apparently unknown to the majority of candidates.
- (b) The correct answers were:
 - 1. *genotype* AA *phenotype* light coat
 - 2. *genotype* aa *phenotype* dark coat
 - 1 and 2 could be in either order.
- (c)(i) It was disappointing that so few candidates could define *inbreeding*. Many seemed to think that it involved keeping animals indoors.
- (ii) It was inevitable that if candidates could not answer (i), then they would not be able to give correct answers here. Answers that simply stated that good characteristics would be passed on were not sufficient. The idea of increasing, or at least maintaining, the incidence of specific characteristics that are required was needed. Likewise the disadvantage needed to indicate an accumulation of undesirable traits rather than simply 'a bad characteristic may be passed on' as this could be said of any breeding cross.

Question 7

Candidates seemed to have little knowledge of fence construction to apply to the information provided.

- (a) Very few answers mentioned that this would enable the remaining posts to be placed in a straight line and to be evenly spaced. Many stated that this would provide information about the area of the fenced plot or how much wire would be needed. This was not accepted, as one would assume that the owner of the land would know its area and would have worked out the materials required before starting construction.
- (b)(i) Few candidates could give an account of the role of the posts that support the corner post, which allow for the attachment of bracing wires.
- (ii) In view of the poor answers in (i), a surprising number of candidates suggested, correctly, that this construction would also be used at the gate in the fence.
- (c)(i) 'The height of the post' and 'ground level' were among common wrong answers. The size of the animals to be enclosed or excluded was the expected response.
- (ii) This was the only section that seemed well-known by the majority of candidates. Sensible suggestions about the depth of the hole dug were made and means of securing the post with rocks or concrete were frequently described. Candidates should be careful to avoid confusing the materials *cement* and *concrete*.
- (d) 'Hedges' (living fences), 'post and rail', 'electric' were among appropriate answers given. 'Barbed wire' was not accepted as this is still a post and wire fence, as the example shown and a different type of fence was stipulated here.

Section B**Question 8**

- (a)(i) This was a popular question and most candidates named appropriate livestock and the products for which it is kept. Candidates should name main products rather than by-products, since the latter are not the reason for keeping that type of animal.
- (ii) Basic care was outlined by most who attempted the question but some did not confine themselves to routine daily care, mentioning veterinary visits, rather than the stockman checking health and cattle dipping rather than checking for parasites. Candidates must read the question carefully and ensure that their response answers the question set. Details of feeding and cleaning regimes were looked for. Some answers gave detail relevant to a particular type of livestock, such as collecting eggs, milking, taking animals out to pasture, which suggested some practical experience of livestock husbandry.
- (b) Many descriptions were of construction of the livestock house and the provisions that it should make rather than factors affecting choice of site. Again care in reading the question and giving an appropriate answer are needed. Good answers referred to topography, prevailing wind direction, access, power and water supplies and proximity to dwellings, amongst other points.

Question 9

- (a) Availability and cost were well-made points in most answers, with relevant references to soil improvement for organic manure and potential dangers of leaching for inorganic fertilisers. Points often missed were references to ease of use, accuracy of dosage and knowledge of nutrient content as well as bulkiness, or otherwise, for storage.
- (b) This was very poorly answered with candidates showing little knowledge of basic scientific procedure. Although most indicated using two plots, each growing the same crop, no-one suggested a control plot without fertiliser or repeating the experiment to verify results. Relatively few candidates described keeping conditions for both plots the same, such as size of plot or amount of water applied. Many candidates seemed to think that there was an expectation for them to predict a result – it seemed that some thought that they should have done this experiment as part of their course. It should be made clear to candidates that they should be able to apply basic scientific method to an unfamiliar situation. This question was an exercise in this sort of application, not in recall and predicting a result was not appropriate.

Question 10

- (a)(i) Candidates did not seem to understand the concept of *pasture*. In some cases, the plants named could be considered to be fodder crops and some credit could be given, but many were simply field crops. In addition many were described by candidates as legumes when they clearly were not, indicating a significant gap in candidates' knowledge.
- (ii) As so few candidates named appropriate pasture plants, there were few correct answers here. Characteristics such as habit, palatability and nutrient value were looked for.
- (b) Again, candidates simply misunderstood or misread the question and referred to weeds in crops rather than their relevance in pasture, where the effects on livestock would be of paramount importance. Factors such as effects on nutrient value, palatability, toxicity and tainting of milk were looked for here.

Question 11

- (a)(i) Candidates were able to list water sources although some were not very clear. If 'rainwater' was mentioned, it should have been made clear that this is collected by some means, for example from a roof. Equally 'tap water' was not accepted as a source since a tap could be attached to pipe systems from a number of sources – the tap is not the source. More varied responses, about use of water from the sources mentioned, could have been given. Some uses were not really appropriate to the source specified.
- (ii) Filtration in water treatment involves sand filters, which destroy harmful organisms by the action of bacteria. Few candidates seemed aware of this although many mentioned *chlorination*, which is the process used to destroy remaining pathogens *after* filtration.

- (b) It was clear that very few candidates had any direct experience of changing a tap washer. The few who had, gave excellent accounts, including correct tools used, but this was rare. This is an example of a syllabus area where practical work during the course would be of benefit.

Question 12

- (a) There were some very good, accurate and detailed accounts of ignition in the petrol engine and a few equally good accounts of diesel ignition but many candidates were unsure of the latter, with confusion over the initial intake and compression of air only, with fuel then being injected. A number of candidates drew diagrams of the four strokes in one or both engines, but whilst these were often accurate, they did not necessarily answer the question set. Candidates must ensure that answers are relevant if many marks are to be gained.
- (b) The question did not ask for advantages and disadvantages of farm mechanisation, but this was the way in which many candidates answered, so that some parts of their answers were irrelevant and did not gain marks. Answers looked for included economic considerations, availability of machines, spares and skills, land topography and size and types of crop grown.

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 more Centres to provide 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. This was especially noticeable in the candidate's responses to **Question 2**.

No Centre described any difficulty in providing the necessary apparatus or reagents.

Comments on specific questions

Question 1

All candidates attempted this question.

- (a) Most candidates were able to describe a difference in texture between the two soil samples and some went on to describe the effect of adding a small amount of water to them. After this, weaker candidates described differences between the two samples that could not be observed by handling tests. An example of this was reference to the possible rate of drainage of the samples.
- (b) This test was performed well by all but the weakest candidates. Most candidates were able to describe the results of soil settling tests from their two soil samples. A large minority of candidates chose either to sketch the results – without the use of a rule and/or made drawings of containers that were not boiling tubes, in some cases candidates even had two different shaped containers for the two soil samples.
- (c) Most candidates were able to suggest correctly one appropriate property of soil sample 1, usually this referred to either drainage or aeration. Stronger candidates referred to both drainage and aeration and then elaborated by reference to leaching problems that might arise. Only the strongest candidates referred to any effect that a difference in the amount of floating organic matter might make to the properties of the soil.

Question 2

All candidates attempted this question, but it was clear that some candidates attempted the question without undertaking any of the practical work. The evidence for this was found in the responses to the results questions. It was common that the observations claimed by such candidates came from something they expected to see rather than what happened in reality. Examples such as iodine tests turning brick red or milky or violet were too common.

- (a) Most candidates were able to determine appropriate conclusions from the results of their Benedict's tests.
- (b) Fewer candidates were able to cope as successfully with the iodine test for starch. Even fewer were able to make appropriate conclusions from the results.
- (c) However, more candidates were able to produce accurate results from the test for protein. It was not common that candidates were able to perform the test properly without being able to make suitable conclusions from the results.
- (d)(i) Only the strongest candidates were able to link the presence of protein in AS3 to increased production, despite the fact that most candidates had found the presence of protein in the previous question.
- (ii) Again only the strongest candidates were able to suggest a method of providing a supplement to a farm animal. Although all candidates attempted the question, there was a great deal of confusion over the term 'supplement'.

Question 3

All candidates attempted this question.

- (a)(i) There were some high quality drawings of flowers by candidates of all abilities. The question did not require candidates to label the flower parts, but all but the very weakest candidates provided a number of accurate labels on their drawings.
- (ii) The drawings of the stamen were not of the same quality. Weaker candidates were not able to identify a stamen, consequently they drew a variety of other objects. Other candidates drew a stamen with a degree of accuracy much lower than that they had demonstrated when drawing the full flower.
- (b) This question was answered well by most candidates. Most of them referred to the petals and the scent. Weaker candidates were confused between nectar and nectaries. There were some candidates who believed, incorrectly, that such flowers contained honey to attract insects.