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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 must read questions carefully to ensure that their answers are relevant. **Questions 1 (b)** and **3 (a)** are examples of where a number of candidates failed to do this. Candidates should take note of instructions to *describe* a process or action, as this will need an answer giving some detail, as in **Question 2 (c)(ii)**, for example. An instruction to *explain* means that reasons are required for why a process occurs. This was seen in **Question 1 (b)**. Candidates may benefit from being made aware of the significance of question wording, as marks were often lost in this examination where answers were either inappropriate or insufficient. **Section B** revealed a lack of detailed knowledge from many candidates and in both sections it became apparent that there is sometimes a lack of practical experience of agriculture. It would be of great benefit to candidates if they could draw on real experience of growing food plants and keeping animals in answering questions, whether this is by working in a school garden or livestock house or by visiting farming enterprises locally. Agriculture is an applied science and the assumption, in the syllabus, is that it will be studied as such so that it has as much local relevance as possible.

Comments on specific questions

Section A

Question 1

- (a) The answer required was 'transpiration'. 'Evapotranspiration' was accepted but 'evaporation' was not, as the arrows were clearly coming from vegetation and there were others indicating evaporation from the water.
- (b) When the correct answer was given in each case, most candidates did not gain full marks as they stated the effects of changes in humidity, wind strength and temperature but did not explain them. For example, an increase in atmospheric humidity would reduce the level of transpiration and vice versa. To gain an additional mark a candidate would have to refer to the effect on the concentration gradient of water vapour between the inside and the outside of a leaf. Some candidates misread the question and tried to explain how transpiration would change humidity, wind strength and temperature.
- (c) Some form of shading was the response given by most candidates.

Question 2

- (a) The labelled parts were: **A** – phloem, **B** – xylem and **C** – root hair. A common error was to confuse phloem and xylem.
- (b) Answers that indicated part **C**, either by name or letter, gained a mark.
- (c)(i) 'Osmosis' was the correct answer. 'Diffusion' and 'absorption' were common incorrect answers, the former being too imprecise and the latter merely repeating the question.
- (ii) Many candidates described osmosis in terms of water movement between 'high concentrations' and 'low concentrations' without further qualification. The meaning is unclear; osmosis should be described in terms of concentration of *solutions* or, better still, water potential. Reference to a partially- or semi-permeable membrane is required for full marks.

Question 3

- (a)(i) Most candidates gave sensible suggestions, such as not spraying in wet weather to avoid drift and not washing out sprayers in waterways. A few candidates either misread or misunderstood the question and gave general points related to safety when spraying. Candidates must take care to ensure that their answers are relevant to the question.
- (ii) Good answers generally related to the loss of labelling and lack of instructions if the original container was not used. A few candidates gave general requirements for safe storage. As before, answers must be relevant to the question set to gain marks.
- (b)(i) The correct answers were 'paraquat' and 'atrazine', respectively. It was pleasing that so many candidates were able to work out the correct choice using the information given.
- (ii) It was disappointing that few candidates seemed to have a clear idea of what these terms mean. Correct answers indicated that a selective herbicide affects only a certain type of plant, a systemic herbicide is absorbed and moves through plant tissue and a contact herbicide kills plant parts that it comes into contact with but is not translocated. Answers that simply repeated information from the table did not gain marks.

Question 4

- (a)(i) **F** should be clearly shown on one or both oviducts.
- (ii) **D** should clearly indicate the uterus.
- (b) Correct answers were production of eggs/ova/female gametes and the production of hormones (appropriate named examples were accepted). 'Ovule' instead of 'ovum' is incorrect, as ovules are produced by plants. Correct use of terminology is important.
- (c)(i) 'Pregnancy' should have been marked on the diagram between 'mating' and 'birth'. Most candidates did this correctly.
- (ii) 'Lactation' should have been shown between 'birth' and 'weaning'. It was accepted where candidates showed it continuing beyond weaning, as this would be the case in livestock kept for milk production. No mark was given, however, if it was shown after weaning only.
- (d) Candidates should make clear that colostrum is the milk produced immediately after birth, for the first few days. Its importance, particularly with respect to its role in providing immunity, was well known, with good detail being given. The high levels of protein, vitamins and minerals needs to be emphasised, 'rich in nutrients' is insufficient for a mark.

Question 5

- (a) The appropriate use of these tools seemed to be unfamiliar to many candidates. The question specified the production of a seedbed from land left uncultivated for a season so, for example, using a spade for 'digging planting holes' was not correct in the context of the question. The expected answer was that the spade would be an implement for primary cultivation, turning the soil, the fork would then break the soil down further and the rake would be used for levelling and producing a fine tilth.
- (b) This was generally answered well. Candidates described care of the tools with sufficient detail, indicating the importance of drying and dry storage in rust prevention. Good answers also referred to the care of the wooden handles and to sharpening spades or straightening bent tines on forks.

Question 6

A substantial number of candidates gained full marks but many candidates lost marks because they were clearly unfamiliar with terms such as 'allele', 'genotype' and 'phenotype'. The terms that should be learned are listed in the syllabus.

- (a) The correct responses were: homozygous black bull – **BB**, red cow – **bb**.
- (b) The allele in the sperm of the homozygous black bull was **B**, that in the ova of the red cow was **b**.
- (c)(i) The genotype of the offspring was **Bb**.
- (ii) The phenotype of the offspring was 'black'.

Question 7

- (a)(i) No mark was given for naming the crop but it is essential that candidates do give a name when required as this enables marks to be awarded appropriately for the rest of the question.
- (ii) The name of a microorganism, such as 'fungus' or 'virus' is insufficient. The disease named must be specific and appropriate for the crop named. Some candidates named an insect pest, rather than a disease. Candidates must take care that the answer is appropriate to the question.
- (iii) Symptoms listed were often incorrect or too imprecise for marks to be awarded. It was clear that many candidates had never seen the crop disease that they had named. It should be remembered that agriculture is a practical subject and candidates will be expected to demonstrate practical knowledge in a local context.
- (iv) The commonest correct answer was the removal and/or destruction of affected plants. If candidates suggest use of a chemical, it should be appropriate. For example, if a fungicide is suggested, the disease named must be caused by a fungus. If the candidate then goes on to name a specific chemical but this is an insecticide rather than a fungicide the mark will be lost.
- (b) If candidates read the question carefully, it would have been clear that this referred to crop diseases generally and not just the one named in (a). This would then give greater scope for possible answers. Good answers included use of resistant varieties, weed clearance, crop rotation and controlling insect vectors, amongst others. The question specified reducing risk of occurrence, rather than action taken when disease had occurred so answers repeating actions given in (iv) were not generally appropriate.

Section B**Question 8**

- (a)(i) A mark was given if the animal named was a ruminant, as the question required. The mark was awarded in all but a handful of cases.
- (ii) A few candidates named a disease but the majority named an appropriate parasite. Candidates should be cautious about naming the tsetse fly, as their answers to subsequent sections of the question may confuse the effects and symptoms of the fly itself with those of the trypanosome parasite, of which it is a vector.
- (iii) Candidates should make their answers specific to the parasite they have named. Whilst most parasites will produce general symptoms of poor condition and unthriftiness, the marks available for such general points will be limited, as candidates are expected to have some detailed knowledge of at least one parasite in relation to a type of livestock that they have studied.
- (iv) There were some good answers here, especially those related to prevention and control of ticks and liver flukes, where candidates gave details of dipping regimes for the former and control related to the life cycle of the latter, involving pasture drainage and killing snails.
- (b) Candidates understood the importance of *clean* water in the prevention of water borne disease and some mentioned the importance of a water supply for cleaning animal quarters but often failed to explain an animal's bodily need for water beyond stating that it prevents dehydration. Some indication of the ways in which it is used in the body were looked for, such as blood formation and transport, secretions such as digestive juices, excretion and production such as milk or eggs.

Question 9

- (a) Candidates generally noted the requirement for diagrams, although a few drew only one diagram. Labels showing the valves and their relevant positions, the spark plug and piston including the direction of down movement, on a series of diagrams depicting the strokes in correct order, meant that a minimum of description was needed for full marks to be awarded. There were some excellent answers, with candidates gaining full marks for this question.
- (b) This was much less well answered. Candidates seemed to have little idea of the principle of centre of gravity, although most understood that it is important in the stability of a tractor, particularly on sloping ground. Diagrams showing the action of gravitational force, when the centre of gravity is high and when it is low, were expected. A few candidates attempted this but the diagrams seldom showed the principle correctly.

Question 10

- (a) There were some good, detailed answers outlining problems such as dangers that the animals might face, disputes that might arise between farmers, problems in controlling disease and breeding and the difficulties in maintaining pasture quality.
- (b) Again, there were some good answers, where candidates mentioned weed control, irrigation and the use of fertilisers and legumes, amongst other points. The question required ways that did not involve the use of fencing, so rotational grazing was not a valid answer.

Question 11

- (a)(i) Many candidates gave the correct definitions. The definition for mixed farming should indicate that the animals and crops are *on one farm*. The definition for monoculture should indicate that the same crop is being cultivated *on the same piece of land over a number of seasons*. Some definitions missed these points so did not demonstrate complete understanding.
- (ii) The uses of by-products of animals and crops, to the mutual benefit of each, was the most commonly-made point. Good answers also included reference to reduced costs as an advantage of this and of reduced risk, should one part of an enterprise fail.
- (iii) Candidates found this more difficult. Greater risk, build up of pests and diseases and depletion of soil nutrients were commonly-made points. Candidates could have expanded on these, in terms of the increased input of sprays and fertilisers that would be required, with consequent increases in costs.
- (b)(i) Candidates recognised the importance of crops being grown in an ordered sequence *on the same piece of land*. Some definitions given, however, could have been describing shifting cultivation.
- (ii) The question stipulated that three vegetables should be used and it was expected that these would be of different types. Some answers gave excellent, detailed explanations, with reasons for using a legume and following it with a leafy crop as well as using crops of varied rooting depth to make best use of soil nutrients. A set of clear, well-labelled diagrams could gain full marks. Diagrams showing the crop sequence should have shown whether rows and columns represented the bed or the year in the rotation, so that it was clear whether the pattern was correct.

Question 12

- (a) Answers to this question were disappointing. Detail in answers was often either lacking or inaccurate. For example, candidates mentioned the action of wind and running water in soil formation but many seemed unaware that it is the abrasive effect of the material that they carry that weathers rock. Too often, answers were simply lists, rather than descriptions, of weathering processes.
- (b)(i) It was not clear, in some cases, that candidates knew the difference between organic and inorganic fertilisers. Good answers referred to the known composition of inorganic fertiliser so that its use could be tailored to meet the needs of a specific crop at a given stage. There were seldom references to its ease of use and storage, however.
- (ii) Most candidates mentioned improving soil structure by using organic material but its low cost and ready availability were mentioned less frequently. Generally candidates assumed that it must be of animal origin, whereas composted plant remains can also be an organic fertiliser.

<p>Paper 5038/03 Practical</p>
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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. Centres did not indicate any problems with providing the apparatus or specimens for the practical examination, other than a few Centres stating that they were not given access to the Confidential Instructions until the day of the examination.

It would be useful for more Centres to remind candidates of 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.

Comments on specific questions**Question 1**

- (a)(i) This question was answered correctly by most candidates. The most common error made by candidates was when they missed the word “each” in the question, and stated an answer five times too large.
- (ii) This question was answered well only by the most able candidates. Few were aware that a solvent would have an impact on the pH of a sample, and even fewer appreciated the appropriateness of ensuring that the same total volume of each sample would result in a fair test. The most common incorrect responses described how water could be used simply as a solvent.
- (b) Nearly all candidates were able to produce a table of results, but some were not able to prepare a table at all. However, there were some high quality efforts from a majority of candidates, clearly labelling columns and using units appropriately.
- (c)(i) The majority of candidates answered this question appropriately. However, some candidates provided the results of pH tests for all of the samples, rather than those which had cleared.
- (ii) Most candidates were able to conclude appropriately from their results in the previous question.
- (iii) This question was answered well.

Question 2

- (a)(i)(ii) All candidates produced two drawings from AS3 and AS4. Most candidates should be congratulated for the clarity of the drawings. However, some of the drawings were too small. A minority of candidates produced drawings of the entire plant rather than the required leaves, consequently the detail about the leaves was not clear enough on occasions.
- (b) Only the most able candidates were able to describe three observable differences about the leaves. Most candidates described a single difference between leaves correctly. There were many differences between the whole plants which were described, or even differences between the two leaves which would be observable with the use of a microscope.
- (c) There was confusion by many candidates between pollination and dispersal. As a result, a large minority of candidates were not able to deduce that a plant with obvious coloured flowers would be pollinated by insects, and the subsequent reason given was spurious.
- (d) Only the most able candidates were able to give an appreciation of the method of dispersal of fruits with hooks on them. Many candidates provided an incorrect response referring to a possible method of pollination for this plant.

Question 3

- (a) Most candidates were able to provide a suitable description of the two soil samples. candidates provided statements regarding possible properties of the soils, but this did not how the question was marked.
- (b)(i) This practical test was performed well and the description of results by nearly all candidates was of a high standard.
- (ii) This practical test was also performed well by the majority of candidates and their results were clearly described. A few candidates made no reference to rolling the samples into a ball, only the effect of holding the samples with moistened hands.
- (c) Only the most able candidates appreciated the requirement to comment on both soils or to make two suggestions about one of the soil samples. Consequently most candidates made a single suggestion of the effect of one of these soil samples on the growth of plants.