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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

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## GCE Ordinary Level

<p>Paper 5038/01</p>
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<p>Paper 1</p>
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### General comments

There were some excellent scripts, where candidates gave consistently good answers throughout the paper and achieved a high mark overall. There were, however, a number of weaknesses that were seen on many scripts. The first of these was that candidates often did not read the questions carefully so that answers were not relevant and did not gain marks. This was coupled with the fact that some candidates clearly found taking an examination in a second language very difficult. It is important that candidates should be familiar with appropriate terminology in the language that they will encounter in the examination, as they will otherwise be unable to do themselves justice in their answers. It is also expected that candidates will have had some opportunity to experience practical work in stockmanship and in growing crop plants. This may be on a small scale but opportunities to visit larger agricultural enterprises should be taken if at all possible. Questions on the paper are intended to give candidates the chance to demonstrate real practical knowledge and experience, not simply facts learned from books. Practical experience generally produces much more informed answers.

### Comments on specific questions

#### Section A

#### Question 1

- (a)(i) This was a simple question to open the paper so it was disappointing to find candidates who could not only not name the parts labelled but confused the male and female reproductive systems. The question stated that this was a male mammal, so there should have been no confusion. The parts labelled were **A** – the vas deferens (sperm duct was an accepted answer but not sperm tube), **B** – testis and **C** – penis.
- (ii) Most candidates gave production of sperm as a correct function but few could give the second function – hormone production. Candidates should be aware of the difference between sperm and semen. Production of semen was not a correct answer.
- (b)(i) Most candidates appeared to understand the meaning of *artificial insemination* although explanations were not always clear. The collection of semen needed to be stated, as well as the introduction of the collected semen into the female reproductive tract.
- (ii) ‘Offspring are a better breed’ was insufficient. Candidates needed to state that the farmer can choose semen from a bull with selected qualities, without needing to own or keep the animal. There were many other correct answers, such as the use of semen after the death of a bull as it can be stored frozen and the reduced danger and costs when no bull needs to be kept on the farm.

**Question 2**

The details of the nitrogen cycle were poorly known. Candidates are not required to know the names of the bacteria – ‘nitrifying’, ‘denitrifying’ etc. are all that is required. However, if names are given they must be correct. Many candidates lost marks by giving incorrect names.

- (a)(i) **A** could be labelled ‘decomposition’, ‘death’ or ‘ammonification’.
- (ii) **B** could be labelled ‘nitrites’, ‘nitrification’ or ‘nitrifying bacteria’.
- (b)(i) **X** should have been labelled ‘denitrifying bacteria’ or denitrifying or denitrification.
- (ii) **Y** should have been labelled ‘nitrogen-fixing bacteria’ or ‘nitrogen fixation’.
- (c) Most candidates gave a correct answer, ‘legumes’ or an appropriate example, even though they may have failed to label **Y** correctly.
- (d)(i) Most candidates were able to identify the second month as the one in which most nitrogen was required.
- (ii) Expected answers were ‘maturity of the crop’ or ‘the crop had been harvested’.
- (iii) Answers needed to be precise to gain the mark. ‘In month 3’, ‘in month 4’ or ‘between months 3 and 4’ (ambiguous) were insufficient. ‘The end of month 3’ or ‘the beginning of month 4’ were looked for. A few candidates also identified that the conditions were also met in the first half of month 1. Any one of these answers would have gained the mark.
- (iv) Most candidates suggested the use of fertiliser or manure. A second mark was given for an example of an appropriate nitrogen fertiliser. Some candidates suggested growing a leguminous crop but this was insufficient by itself as it missed the point of the question. Candidates who suggested intercropping with a legume were, however, given credit.

**Question 3**

- (a) The question required an agricultural use for area **B**, so game parks and nature reserves were not appropriate answers. Many candidates correctly suggested grazing but such steep terrain would be suitable for sheep or goats, not cattle. Forestry was another accepted response and those candidates who suggested growing tea were also given credit as this showed an appreciation of the differences of terrain in the drawing.
- (b)(i) Many candidates failed to mention that cultivation would loosen the soil, so increasing susceptibility to erosion. The effects of rain and wind on a sloping area were, however, well understood as well as, to a lesser extent, the lack of permanent soil cover.
- (ii) ‘Terracing’ was the commonest correct answer. ‘Contour ploughing’ was less frequently seen. ‘Mulching’, ‘maintaining crop cover’ and ‘use of windbreaks’ were other correct answers but candidates needed to make clear that tree-planting would be around the crop area, so that this would act as a windbreak. ‘Planting trees’, without further explanation, was not sufficient as it did not answer the question.
- (iii) Wet, swampy ground would be unsuitable for cultivation so difficulty in growing crops was not given credit. The question required candidates to apply knowledge to a situation and those who did this successfully realised that this ground could be a breeding ground for parasites such as mosquitoes and liver fluke as well as being a physical danger to animals. Any of these ideas would have gained a mark.
- (c) Fig. 3.2 showed a soil that would be very free-draining. Correct advantages and disadvantages were based on soil type, as the question specified and not with the position of area **D** in relation to the river. Candidates must ensure that they answer the question set in order to gain marks.

**Question 4**

Answers to this question were disappointing, showing poor knowledge of the principles of asexual reproduction.

- (a) Few candidates noted the roots on the sweet potato tuber and the buds visible on the Irish potato. Knowledge of both species is required by the syllabus so this should not be unfamiliar material to candidates.
- (b)(i) Food production by leaves using photosynthesis was the expected answer and was given by many candidates.
- (ii) It was pleasing to see candidates refer to translocation of food materials through the phloem to the food stores, showing accurate use of correct terminology.
- (c) Many candidates gave the answer that asexual reproduction involves only one parent but this is not sufficiently precise for a mark, since sexual reproduction via self pollination could be described thus. Production of a new organism without gametes or fusion of gametes (fertilisation) should be stated.
- (d)(i) Candidates needed to realise that asexual reproduction would mean that all the banana plants would be genetically identical. This would then mean that they were all equally susceptible to the disease. Since diseased material would not generally be used for propagation it does not mean that *the disease* is passed on, only the susceptibility. A grasp of the principles and consequences of asexual reproduction appeared to be lacking in most answers.
- (ii) Correct answers, of which there were many, generally referred to reducing costs or environmental risks. This item was well answered.

**Question 5**

- (a)(i) Candidates were told that the insect fed by piercing and sucking and all should be familiar with at least one example so it was disappointing that a significant number named inappropriate insects, such as locusts. The commonest correct answer was aphid.
- (ii) The question required candidates to 'describe and explain' two ways that damage is caused. Candidates need to be more precise in describing the feeding method. The insect sucks *sap* from the *phloem* – the description. This has the effect of weakening the plant – the explanation. Answers that referred to the insect acting as a vector of disease needed to indicate what this involves to gain full marks for another way that damage is caused. Candidates seemed unaware of the production of honeydew by such insects, which encourages the growth of sooty mould on leaves – this is another form of damage.
- (b) The correct answer was **A**.
- (c)(i) Many candidates did not understand that *systemic* describes a substance that is absorbed by the plant and is present in the sap, carried by the phloem.
- (ii) Candidates who could explain the meaning of the term 'systemic' were usually able to give a good explanation here.

**Question 6**

- (a) Most candidates named a suitable type of livestock.
- (b) Candidates should try to avoid giving too many vague symptoms, such as 'moving well' or 'behaving normally'. Although these would form part of a diagnosis of good health, there are other more specific points that could be made, such as good appetite, bright eyes and shiny coat and normal temperature, faeces and urine.
- (c)(i) The question asked for a disease so naming an ectoparasite, such as the tick, was not appropriate. The question also looked for a disease affecting the type of livestock already named so, for example, Newcastle disease for cattle was not correct.
- (ii) Again, candidates should try to avoid too many vague or general answers such as 'looks dull' or 'animal stands apart'. The question looked for knowledge of a specific disease that a candidate is familiar with – this was often not evident in answers given. Whilst some diseases may not produce many very definite symptoms, there is generally at least one that would cause a stockman to suspect a particular disease.
- (iii) The question looked for measures to prevent the disease already named so candidates should be sure that the measures they listed were appropriate. For example, vaccination would not be used against mastitis but would be suitable for Newcastle disease. The question also asked for 'measures to prevent', not for control when an outbreak has occurred. Thus quarantine for newly imported or acquired animals was appropriate but isolation of sick animals did not address the question set. Candidates should read questions carefully so that they give answers that are relevant.

**Section B**

Most candidates answered the correct number of questions and appeared to have time to answer. All questions were well represented with answers, none appearing to be particularly popular or unpopular with candidates.

**Question 7**

- (a)(i) The accurate definition for *cultivar* is 'a variety of a type of crop plant', not simply 'a type of crop'. For example, maize is a type of crop (a cereal) but could have many cultivars (varieties). Answers seen did not always make clear that this was understood. There are still many candidates who think that a cultivar is a piece of cultivation equipment.
- (ii) Candidates gave some good answers, particularly with reference to soils and climate. For example, the height of a cultivar where strong winds are prevalent was mentioned. Quality, yield and consumer preference were other common correct answers.
- (b)(i) It was essential that candidates had named the crop for credit to be given here. A minority forgot to do this. Signs will vary for the crop named but colour change, moisture content and size would be the type of features looked for as appropriate. Candidates should try to give accurate descriptions. Knowledge of a crop that has been studied, preferably in a practical way and in some detail, is looked for.
- (ii) A brief but clear description of harvesting, either by machine or manually is needed, in the context of a crop studied as outlined above.
- (iii) There were some good descriptions of one aspect of dealing with the crop after harvest (either processing, preparation for sale or storage) but many answers lacked the detail that showed sufficient knowledge and familiarity with the chosen crop.

**Question 8**

- (a) Candidates gave insufficient detail and references to specific measurements, for example, depth of holes for posts and height of posts or spaces between posts, were often unrealistic. The type of fence was not clearly stated in many cases, with little detail of materials used or the sequence of events in construction. Most candidates mentioned a gate to provide access and a few gave details of construction and the supports that would be needed.
- (b) There were some excellent answers, mentioning hedges as windbreaks and fences as a means of marking boundaries, avoiding disputes of ownership, preventing theft and the entry of wild animals as well as a way of controlling grazing and separating groups of animals. However, many candidates were unable to suggest more than two or three uses, often repeating information from the question in (a), so not giving a convincing demonstration of their knowledge.

**Question 9**

- (a)(i) A broad range of crops was named here.
- (ii) Many candidates gave great detail of cultivations and soil preparation before planting, which was not required by the question but they then went on to describe the planting material (seed, cuttings etc.) and details of planting, such as broadcasting, holes or drills, depth and spacing and use of fertilisers. In some cases, however, it was clear that candidates were not drawing on practical experience for their answers, as details of spacing etc. were totally unrealistic for the crop named. Agriculture is a practical subject and questions are designed to allow candidates a chance to demonstrate their practical experience in growing crops, even if this is on a small scale so it is a pity that some candidates do not appear to have had this opportunity.
- (b) The question asked for the basic requirements that livestock housing would meet, such as protection from the elements, predators and thieves as well as sufficient space, light and ventilation. Other good points were made but some candidates described the care of livestock, which did not address the question and so lost marks. Candidates must read the questions carefully and make sure that their answers are relevant.
- (c) Some candidates did not think out the records that would be needed, suggesting that diseases that *might* attack should be recorded, for example, rather than actual events, such as vaccination dates for animals or dates of spraying of crops. However, most realised that records would be needed to determine profit or loss and indicated at least some of the factors that should be recorded for either type of enterprise.

**Question 10**

- (a)(i) This was well answered by virtually all candidates who answered the question.
- (ii) The question asked about weed control in a crop, rather than in general – a point ignored in some answers but most candidates mentioned a good number of methods, from manual weeding to the use of hoes, machinery and herbicides.
- (b)(i) Candidates seemed unable to give clear reasons for the use of a mouldboard plough, which is an implement for primary cultivation. Turning and breaking up soil, thus burying weeds and trash were expected answers.
- (ii) Reasons for use of the harrow, as an implement for secondary cultivations, were equally unclear. Expected answers here involved further breaking of soil to produce a fine, level seed bed.
- (c) There were good descriptions of maintenance, although candidates should distinguish between the use of grease or oil for rust prevention and for the lubrication of moving parts.

**Question 11**

- (a)(i) Carrying capacity was not very well defined, in most answers, although the principle appeared to be understood. Candidates failed to mention that the maximum stocking rate would be that which did not cause pasture damage or reduced yield.
- (ii) The idea that exceeding carrying capacity would result in damage to pasture was made clearer in answers here.
- (b)(i) Candidates could have made better use of diagrams here. A square subdivided into four has little meaning without detailed labels. However, the principle was generally understood, although aspects of the importance, such as breaking the life cycle of parasites and enabling easier observation of the animals, were not mentioned as often as would have been expected.
- (ii) Again, the process was understood and aspects of the importance of zero grazing were dealt with rather better than those in (a)(i).

<p><b>Paper 5038/03</b></p> <p><b>Practical</b></p>
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**General comments**

Once again, 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.

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 candidates' responses to **Question 1**.

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

**Comments on specific questions****Question 1**

- (a) The majority of candidates were able to provide answers that demonstrated that they were able to measure length accurately, and nearly all candidates were able to state the appropriate units. The most able candidates provided five responses which reflected the care and accuracy with which they had conducted the experiments. Weaker candidates were able to provide three suitable measurements.
- (b) Most candidates were able to describe the results of the experiments in dishes 1 and 4, but only more able candidates explained their descriptions, usually by a reference to the process of osmosis. There were a few candidates who were able to provide a correct and accurate description of how the movement of water in or out of the cells in the potato strips would cause the changes in the length of the strips.
- (c) There was not a widespread appreciation of the notion of the fair test by candidates.
- (d) The more able candidates appreciated that equal concentrations of sugar solution would cause similar changes in the length of potato strips. They were able to provide logical reasons for their answers. Weaker candidates appeared to guess their response and their responses tended to be derived from extrapolating the given data in the results table, rather than from their own results.

### Question 2

- (a) Few candidates were able to provide a description of how they conducted the experiment. The most common mistake was to rewrite the information in Table 2.1, without selecting the correct tests, and very rarely describing any details of how they performed the tests themselves.
- (b)(i) Most candidates were able to carry out the test for nitrate in both AS2 and AS3 accurately and state their results in Table 2.2. Only the more able candidates were able to carry out the tests for calcium ions accurately. It was apparent from their responses that a significant minority of candidates had performed the wrong procedure for the calcium ion test.
- (ii) Most candidates were able to provide a credible response to this question as a result of their tests.
- (c) The most able candidates were able to provide appropriate responses to both parts of this question. The most common mistake made by candidates was to ignore the statement in the question that referred to the solubility of calcium nitrate. Hence such candidates provided true statements describing the advantages and disadvantages of using calcium nitrate as a fertiliser, but did not refer to its solubility.

### Question 3

- (a) In general, this question was answered well. The standard of drawing was commendable. A few candidates produced drawings of the seed which were not magnified and so the detail was hard to determine.
- (b) This question was answered well also and again the standard of drawing was high. The drawings were labelled appropriately and clearly. A very few candidates drew and labelled structures that they could not have observed.