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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

The range of marks achieved by candidates was very wide but there was a disappointing number of very low scores. In questions where candidates needed only simple recall of facts, lack of basic agricultural knowledge was clear in many cases. Candidates must read questions carefully and ensure that their answers are relevant. It is often apparent that lists of facts have been learned and these are written down when they are not necessarily appropriate to the situation specified in the question. This indicates a lack of understanding within the subject on the part of the candidate. Application of information is one of the objectives tested in the examination. The importance of selecting relevant facts should be emphasised to candidates. There were few rubric infringements, with candidates answering more than the required number of questions in ***Section B*** and most candidates appeared to finish the Paper in the time allowed. Candidates should note that when a question specifies a number of points required, for example "State **two** advantages.....", there is nothing to be gained by giving a longer list. Indeed candidates may be penalising themselves as the first two advantages stated, in this case, would be marked. Examiners will not select correct points from a list - it is the candidate who should be providing the correct answer and not the Examiner.

Comments on specific questions

Section A

Question 1

(a)(i) Answers were **A** - *testis*, **B** - *vas deferens (sperm duct)* and **C** - *seminal vesicle*. These terms, especially **B** and **C**, were not known by a significant number of candidates. The question stated that the diagram was of a male animal so it was disappointing to find a few candidates trying to name female reproductive organs. Some also named digestive organs rather than reproductive structures, when the question had specified the latter.

(ii) Most candidates knew that the structure shown produces sperm, even when it was not named correctly. Some also referred to its role in producing hormones.

(b)(i) Answers were frequently too general and vague. "Better breeds obtained" is not sufficient as this could refer to any form of cross-breeding. The advantage of AI is that a bull can be selected for particular qualities because transporting semen is easy. Answers should make this clear. A common answer was that there is no need to keep a bull on a farm without indicating why this is an advantage (reducing costs or danger). Again, this needs to be clear.

(ii) Many candidates referred to the cost of AI but a few mentioned the difficulties of timing and access to AI services or the fact that a farmer may have a good quality bull on the farm.

Question 2

(a)(i) *Seed rate* refers to the quantity of seed sown over a given area. "The number of seed per hole" is incorrect. Many candidates associate the term, incorrectly with the rate of germination or the quantity of seed produced by a crop.

(ii) The idea of competition was the commonest correct answer together with the idea of allowing enough space for development, although this was not always well expressed. One or two candidates understood that incidence fungal disease could be reduced with sufficient spacing, that costly seed would be wasted by sowing too thickly and that spacing too far apart could have disadvantages. Many reasons given, however, assumed that *spacing* referred to sowing in rows, when spacing is equally important in broadcasting seed so answers referring to aiding weeding or harvesting were not really relevant.

(b)(i) Candidates must make it clear that a *cultivar* is a variety of a crop, not a type of crop as this implies a choice between a cereal or a legume, for example. A few candidates still believe that a cultivar refers to a piece of machinery, a farm labourer or even a piece of land.

(ii) Many candidates gained full marks here, mentioning suitability of the cultivar to local soil conditions and climate, its yield, cost or disease resistance, amongst other things.

Question 3

(a) Many candidates did not appear to understand the term *hygroscopic water* although this is specified in the syllabus. There were a few excellent answers but some candidates who had a clear understanding of the concept did not use the data provided. In questions of this type, it is expected that candidates will quote relevant figures from the information given, in support of their answers.

(b)(i) The only correct answer was *light sand*, as the question specified the soils shown in Fig. 3.1.

(ii) Whilst many candidates gave a correct answer, usually leaching causing lack of nutrients, a few candidates failed to notice that the question asked for problems other than the lack of water, giving this as their answer. Candidates must read questions carefully in order to avoid losing marks carelessly and unnecessarily.

Question 4

(a)(i) This question required candidates to apply knowledge to a potentially unfamiliar situation. Many candidates seemed intimidated by this idea. The diagram provided candidates with sufficient information to make sensible suggestions in their answers. These should have includes reference to the continuing life cycle of the liver fluke, which would therefore continue to infect the grass eaten by the cattle. Many answers were along the lines of “cow continues to eat grass”, which does not indicate an understanding of the life-cycle idea.

(ii) There were many answers which were variants on “spray grass with insecticide”, which were not appropriate. Some candidates suggested using zero grazing or using clean pasture, which were the commonest correct ideas. The best answers also referred to controlling snails as the secondary host or draining pastures.

(b)(i) Most candidates named an appropriate type of livestock and external parasite but a minority named internal parasites and some of the parasites named were inappropriate to the animal named.

(ii) Some responses were very general, with ideas linked to *unthriftiness* seen when animals have parasite infestations. Candidates should be able to show an understanding of the specific effects of a named parasite, such as spread of disease by ticks. There were also many answers which stated “it sucks the animal’s blood”, but few indicated the problem this would cause, such as anaemia or loss of production. This is needed to answer the question fully.

Question 5

This question, especially **(a)**, was badly answered by many candidates. There seemed to be little knowledge of either of the plants named, although asexual reproduction in both is specified in the syllabus.

(a)(i) It was expected that candidates would know that the sweet potato is propagated by runners which root at nodes and that the Irish potato uses the stem tubers which contain buds.

(ii) A common error was to state that sexual reproduction requires two parents whereas asexual reproduction requires only one. Self-pollination is sexual reproduction requiring one parent. The definition of sexual reproduction should refer to fertilisation or fusion of gametes.

(iii) Many candidates referred to the more rapid maturing of plants produced asexually but fewer could gain a second mark by stating that the new plants would all be identical and identical to the parent.

(b) There were some excellent answers, which mentioned photosynthesis, its site and translocation of its products via phloem. An omission was the conversion of soluble sugars to starch for storage but the best answers also included this.

Question 6

(a)(i) It was necessary for candidates to show that they understood the need to prevent pollen transfer to or from other flowers. "To prevent pollination" was not sufficient, reference to *cross-pollination* was needed.

(ii) Candidates were able to gain a mark by referring to obtaining better breeds or new varieties. It was important that answers made further points that were specific to cross-breeding, not general points that could also be a purpose of in-breeding.

(b)(i) Some candidates have a good understanding of the principles of simple genetic crosses and gained full marks here and in the next sub-section but there are still some candidates who clearly have no knowledge of this area. The correct response here was **Rr**.

(ii) Candidates should have shown the cross **Rr** x **Rr**, producing **RR**, **Rr**, **Rr**, **rr**. The proportion of disease resistant plants is then 75% or $\frac{3}{4}$. The answer "3:1" alone does not give the proportion - candidates must indicate how many of the plants are disease resistant.

Question 7

(a) The question involved a comparison between the land before and after cultivation so answers should have reflected this. "Roots hold the soil" does not do this, whereas "Trees have deeper roots" does. Other good answers referred to the increased soil cover before cultivation, interception by the tree canopy, the effect of trees as a windbreak and the effects of cultivation in loosening the soil or removing permanent cover.

(b)(i) Most candidates understood the idea of run-off washing soil down the slope but did not clearly explain how the interception of this soil by the ridge or the washing of the ridge into the ditch would cause the levelling.

(ii) Candidates suggested planting grass or using hard materials such as rocks to stabilise ridges, both good answers.

(iii) Suggestions should have referred to methods specific to preventing erosion on slopes, such as contour ploughing or using grass bunds. Some candidates did not notice that the question required a method other than terracing.

Question 8

(a)(i) Many candidates had little knowledge of the principle of centre of gravity. However, those candidates who understood, often made this clear where they drew the vertical line from the centre of gravity on the diagram, showing that it fell outside the wheel-base. This enabled a mark to be awarded, in some cases, where the written explanation lacked some clarity.

(ii) Candidates who had gained a mark in **(i)** generally realised that widening the wheel base would overcome the problem, as would lowering the engine, and consequently its weight, in some way.

(b) This was well-answered by more candidates, with costs, fuel consumption and the size of the land area to be cultivated all being mentioned. A few candidates did not notice the comparative nature of the question - listing advantages and disadvantages of cultivator and tractor was not asked for.

Section B

Question 9

(a) Answers to this sub-section were very disappointing, with many candidates doing little more than repeat the question. Candidates did not make it clear *how* each factor would affect crop production, simply stating that it would do so. Many candidates knew, for example, that plants may have a preferred soil pH in which they grow but few mentioned that pH affects the availability of nutrients in soil. The question specified the effect of soil temperature but many answers were in terms of atmospheric temperature and climate generally. Candidates listed the components of soil but gave little indication of how air content and drainage would affect plants. Many candidates thought that *micro-organisms* includes earthworms and termites. There were a few very good answers on this, however, where candidates showed familiarity with the actions of micro-organisms in the nitrogen cycle as well as those causing disease in plants.

(b) Most candidates named an appropriate method of irrigation and there were some good, clear descriptions of these. Advantages and disadvantages of the method described were not asked for, however, so no marks could be gained where this was stated. Candidates should make sure that the information they give is relevant to the question asked. The question also asked for the importance of irrigation but many candidates described the importance of water generally, again not answering the question set and often gaining few marks.

Question 10

(a) *A named type of livestock enterprise* means beef production, egg production or similar, not the name of a local production establishment or farm. A few candidates drew an example of a typical record, which was a good way of explaining their answer. Other answers were not very well organised, with aspects of breeding, feeding, treatments and costs, production and income, in a rather muddled list of possible items to be recorded. Most candidates mentioned the importance of record keeping in establishing profit and loss but few mentioned year on year comparisons and financial planning.

(b) Answers here were much better. Aspects of hygiene were well understood, precautions taken when disease is suspected were described as were the use of vaccination, quarantine and regular checks in prevention of disease. A few candidates limited their answers to describing the action taken for a single disease, also limiting the marks obtained. It appeared that these candidates had either not read the question carefully or not understood it.

Question 11

(a) Most candidates used the aphid as a correct example of a piercing and sucking pest of plants but few knew anything about its life cycle, so few marks were gained in this section. There was a very small number of candidates who produced excellent, detailed answers, however. Some candidates named inappropriate pests, with grasshopper and stalk borer being common errors. A few candidates again misread or misunderstood the question and named an animal parasite such as the tick, thus losing all the marks for this section.

(b) Candidates explained that the pest sucks sap, thus weakening the plant and reducing yield but few mentioned the transmission of disease and none referred to the development of fungal growth on honeydew from aphids.

(c) There were some good descriptions of the mode of action of a systemic pesticide, showing that some candidates understood the importance of appropriate methods of control for the pest named. However, crop rotation does not control attacks by aphids or similar pests as it works largely on those pests which are found in the soil. Candidates should resist the temptation to include every method that they have learned but try to select relevant information. It was encouraging to see candidates refer to the importance of natural predators of pests and indications that methods other than chemical can be used.

Question 12

(a) Candidates were able to name a number of sources of water, such as boreholes, rivers, dams and collected rainwater. "From a tap" does not describe the source of water but "from the public supply" is acceptable. Few candidates linked each source of water to a suitable use, taking into account cleanliness and treatment facilities or accessibility, although most could list several uses for water generally, such as consumption by humans and animals and cleaning. A few candidates mentioned irrigation, when the question had asked for uses other than this.

(b) There were some good descriptions of types of fencing, with helpful diagrams showing construction methods. "Wood fence" or "wire fence" do not accurately describe types of fencing, however. Candidates should specify *post and rail*, *wire mesh*, etc. Some candidates also made good links between appropriate usage and a particular type of fence, such as electric fences for controlling grazing but others seemed to have little idea of this. There were many rather vague answers along the lines of "used for cattle". This does not demonstrate sufficient knowledge on the part of the candidate to be credited with a mark.

Question 13

(a) Candidates did not seem to understand what was required here. It was hoped that candidates would be aware of the constraints that different degrees of slope, rockiness or wetness of terrain and soil fertility would impose on the uses to which land could be put, whether for growing crops, raising livestock, forestry or wildlife reserves. Many candidates did little more than repeat the question. There was a little more detail when referring to climatic factors but again references were not very specific or detailed, along the lines of "a lot of rain" or "hot" with reference to crops that could be grown. A few candidates did try to give specific examples of crops that would grow in different conditions to illustrate their answers but this was not common.

(b)(i) Some candidates were aware of the need to feed growing populations and many mentioned the pressure on land availability for housing and industrial development, reducing the land available for agriculture, although this was not always well expressed.

(ii) The best answers referred to the development of new varieties and breeds of crop, which are more resistant to pests, disease and adverse climatic conditions or which produce higher yields, as well as new disease and pest controls plus machinery and techniques which can enable previously uncultivated land to be used. Relatively few candidates answered in these terms, however, with many simply stating that the farmer should check the pH of soil or its fertility before planting a crop - not what the question asked.

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 candidates to be aware of good 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.

No Centres described any difficulties in providing the necessary apparatus or reagents.

Comments on specific questions

Section A

Question 1

(a)(i) Most candidates completed the results tables with their findings from their experiments. A small, but significant number, failed to complete the tables, but still answered other parts of the question, implying that they had not completed the experiment. It was commendable that candidates used units consistently.

(ii) This question was marked according to the candidate's results table. Most candidates scored this mark.

(iii) Many candidates described how they failed to measure the temperature of the soil samples, instead their description described methods of recording air or bulb temperature. Few candidates kept the thermometer in place during the experiment, instead they removed and replaced it repeatedly, which would not allow the thermometer to record temperature accurately.

(iv) This question was not answered well by most candidates. Most responses involved candidates describing how they failed to follow the instructions. Few candidates understood the idea of repeating and averaging results.

(b) Most candidates described how covering the soil would affect soil temperature. Stronger candidates described a material which could be used to cover the soil.

Question 2

(a)(i)(ii) Candidates produced diagrams of a higher quality than in previous years. Weaker candidates failed to label the diagram. There were several examples of candidates describing microscopic features, invisible to the naked eye.

(b) This question (parts **(i)** and **(ii)**) was answered well by most candidates. A few candidates described similarities and differences that were not observable.

(c) Weaker candidates did not attempt this question. Most candidates were able to relate the characteristics of each seed to a method of dispersal. Viable suggestions were awarded marks, even if they were not totally biologically correct.

Question 3

The responses of a significant number of candidates indicate that they had not attempted the practical tests, but attempted to answer the question from their previous knowledge.

(a) Most candidates described appropriate colour changes and concluded correctly that reducing sugar was present in both samples.

(b)(i) Most candidates described appropriate colour changes and concluded correctly that starch was present only in **AS5**.

(ii) This question was answered well.

(c) Only the strongest candidates were able to undertake this test accurately. The range of described colours of the tests, indicate incorrect practical procedures, or inadequate cleaning facilities or procedures by candidates.

(d) Weaker candidates did not attempt this question. There is confusion over the difference between animal feed and animal supplements.