

AGRICULTURE

Paper 5038/01

Paper 1

General comments

There were some candidates who showed a very good grasp of the principles of agriculture, gaining very good marks. However, candidates at all levels performed less well on **section B** than on **Section A**. This seems to be due partly to difficulty in organising information in a less structured answer, to give sufficiently detailed and relevant answers, and partly lack of knowledge of some syllabus areas in sufficient depth. It is very important that candidates read questions carefully and make sure that they are answering the question set, not the one that they would like to have been set or one that they have seen in a past paper. Where a number of reasons or points is required in an answer, candidates should adhere to this. If a list is given, a correct answer will not be selected from it. It is for the candidate to demonstrate knowledge of the correct response.

Comments on specific questions

Section A

Question 1

This question was well answered as a whole, with a good number of candidates gaining full marks.

- (a) (i) This was well known and most candidates were able to place the labels correctly on the stomach (P), the ileum (A) and the colon (W).
- (ii) Again, this was well answered. Candidates cited the single chamber stomach as the diagnostic feature for a non-ruminant.
- (b) Any two, from vitamins, minerals, fibre and water, gained two marks. When a question specifies two items for the answer, candidates will not gain extra marks for giving more than the required number and correct answers will not be selected from a list. Instructions in the question should be followed.
- (c) This proved the most difficult part of the question for many candidates. The arithmetic was not complex but some candidates did not take in the information concerning the daily maintenance ration or that the feed was given in two parts. The correct answer was obtained thus:

$$3 + (0.25 \times 12) \div 2 = (3 + 3) \div 2 = 3 \text{ (kg)}$$

- (d) Production of eggs (in poultry) and meat and breeding/pregnancy in animals were all correct examples given, where a production ration would be appropriate. Candidates could also have mentioned draught animals.

Question 2

The first part of this question was very poorly answered in many cases. Candidates seemed to have little knowledge of physical and chemical processes that form soil particles, although this is clearly required by the syllabus.

- (a) (i) The wind does not move rocks, as a number of candidates suggested. The abrasive action of already weathered particles, blown by the wind, causes further weathering.
- (ii) When water freezes it expands, thereby widening cracks by increased pressure and allowing further breakdown of rock. Many candidates confused this with expansion and contraction of the rock itself, in response to changing temperatures.
- (iii) Answers lacked accurate detail. Carbon dioxide forms an acid when it dissolves in rainwater and this acts on minerals in the rock to cause weathering. Simply referring to *carbonation* is not really sufficient. Candidates need to explain what this means.
- (b) (i) Candidates knew that humus is formed from organic matter, such as plant and animal remains but many failed to explain how it is formed – decomposition by the action of microorganisms. The question asked both ‘what’ and ‘how’. An answer covering both parts was needed for both marks to be gained.
- (ii) Two specific reasons were required. Again, it is important that instructions are followed as candidates will not gain and may lose from giving a list. There were many correct answers, however, commonly referring to improved soil structure and nutrient release. *Improves* or *adds fertility* is an insufficient answer. Candidates must state how this occurs.

Question 3

- (a) Most candidates gained full marks here. The correct order was *gene, heterozygous, allele, dominant*.
- (b) (i) Many candidates did not appreciate the significance of taking cuttings in producing new plants. This would result in 100% of the plants produced having the genotype Tt.
- (ii) Candidates who understood the significance mentioned asexual reproduction but needed to explain this in terms of lack of gametes and that offspring would be clones of the parents, in order to gain both marks. Too many candidates did not read the question carefully and drew genetic diagrams to show a cross, irrelevant in the case of cuttings.
- (c) Although there were few correct answers to (b), most candidates were able to choose the correct term for the genotype Tt, which was heterozygous.

Question 4

- (a) (i) Good answers mentioned the build up of pests and diseases, depletion of soil nutrients and the effects of similar rooting depths as being problems where a rotation contains plants from the same group. Again, just two clear, distinct reasons were required.
- (ii) Most candidates were able to complete the rotation plan satisfactorily, getting a correct sequence for the beds in each year. An example would be:

bed 2 – sweet potato, cabbage, beans
bed 3 – beans, sweet potato, cabbage.

Candidates could have suggested other crops from the appropriate groups, which would be accepted if the sequence was correct.

- (b) Most candidates knew that a legume adds nitrogen to the soil. A clear statement that nitrogen is required for leaf development (vegetative growth) was needed for a second mark to be gained.

Question 5

- (a) (i) Most candidates correctly selected D as the position in which the sprayer should be held.
- (ii) The question required reference to why each of the other positions was unsatisfactory. Most candidates did not do this but just stated why **D** was best, restricting the marks that could be gained.
- (b) A number of candidates listed items of protective clothing, when the question made it clear that other precautions were required. The question also referred to use of sprays so points related to storage were not really relevant. Candidates should read questions carefully in order to make sure that their answers fulfil the requirements specified.

Question 6

- (a) (i) Common errors were confusion of the outlet and inlet valves and labelling the crankshaft as the piston.
- (ii) A closed inlet valve and open outlet valve plus a rising piston were the diagnostic features, recognised by many candidates.
- (b) The commonest advantage mentioned was faster completion of work. 'Greater efficiency' is too vague an answer to justify a mark. Disadvantages mentioned were more varied but soil damage and cost were the two most frequently given. Only one advantage and one disadvantage were required. Candidates gain no advantage by giving a list, as a correct answer will not be selected. The candidate must answer the question set.

Question 7

- (a) (i) Most candidates recognised the value of a lock as giving security from theft but a few suggested, inappropriately, that it would prevent the livestock from escaping. The low walls would provide weather protection and durability. The mesh would allow ventilation and entry of light and the overhanging roof would also prevent entry of rain and provide shade. Again, only one reason was required for each feature.
- (ii) This was well answered. Candidates remembered to name the animal that they were providing for and features were generally well-chosen and relevant, such as feeders and water troughs, bedding or litter, lights or heaters, cages or stalls.
- (b) Advantages of cost or availability were common answers. Some candidates referred to the insulating properties of thatch - a valid point - but it is important that this is expressed correctly. Some candidates wrongly described thatch as a good conductor, whilst their description clearly showed that they understood its insulation value. Disadvantages are its lack of durability, vulnerability to strong winds and fire and harbouring pests. Only one advantage and one disadvantage should have been given.

Section B

Question 8

- (a) (i) Candidates remembered to state the chosen crop, so that marks could be awarded in (ii).
- (ii) Candidates must ensure that their answers are sufficiently detailed. References to appropriate temperature range and rainfall need specific figures to gain marks. This also applies to references to soil type or pH. Candidates also mentioned topography - again it needs to be described and related to the crop named - and a few cited local tastes and other marketing, processing or export opportunities as reasons for growing a particular crop – all good points.
- (b) (i) A specific pest must be named, appropriate to the crop. 'Beetle' is too general to be accepted.
- (ii) It was clear that many candidates were unsure about the precise nature of the damage done to the crop by the pest named. It is important that the candidates' knowledge is sufficiently detailed to answer questions of this type.

- (c) The question asked for prevention and control of insect pests in general, not necessarily the pest named in (b). If the pest named in (b) was not an insect (rats in sugar cane, for example), control of this pest would not be a relevant answer here, where insects were specified. Candidates must take care to read questions carefully. 'Chemical control' or 'biological control' are not sufficient to gain marks. Candidates must make clear what these could involve – the name and method of application of a named chemical, for example, or the use of a predator of the pest.

Question 9

- (a) Almost all candidates who attempted this question gave a correct definition – transfer of pollen from stamen to stigma.
- (b) Many candidates did not name examples of wind- and insect- pollinated flowers, so that only general points comparing structure could be given marks. All candidates should have studied maize and beans, as required by the syllabus, so should have been able to give these as examples and relate their answers, concerning features, to them. A few candidates continue to confuse pollination with dispersal of fruits and seeds.
- (c) Some candidates tried to give a great deal of detail about the various male and female nuclei involved in fertilisation, often rather inaccurately. This level of detail is not required but candidates should ensure that they understand the basic events and can use terms correctly. The pollen grain does not travel down the pollen tube. The pollen tube grows from the pollen grain, through the style and enters the ovule via the micropyle, so pollen grain and ovule nuclei can fuse – fertilisation. The ovules, not ova, form seeds and the ovary forms the fruit.

Question 10

- (a) A description of transpiration was needed here, not an account of how water moves from the soil through the plant. Candidates must be careful to answer the question set as many candidates gave detailed accounts of the latter, which gained few marks because they were not relevant. There should be an understanding that it is water as vapour which is lost, that this passes from cells into the air spaces in the spongy mesophyll and out through the stomata, controlled by guard cells, down a diffusion gradient. This basic understanding is needed for candidates to give coherent accounts in (b).
- (b)(i) Many candidates gained a single mark for stating that rate of transpiration increases as temperature increases but failed to explain why this occurs. Increased temperature increases evaporation. An increased rate of evaporation increases the diffusion gradient. There was little evidence that these points were known or understood.
- (ii) Candidates explained what the term 'humidity' meant and that high humidity would decrease transpiration but an explanation of why was again needed, as in (i).
- (iii) Candidates knew that increased wind speed would increase transpiration but again failed to explain this in terms of reducing the concentration of water vapour around the leaf and thus increasing the diffusion gradient.

Question 11

- (a) All candidates attempting this question remembered to state the type of livestock – important if all possible marks are to be awarded later in the question.
- (b) Generally an appropriate parasite was named for the livestock specified in (a).
- (c) Candidates generally did not show good knowledge of the parasites that they had named. Basic information, such as hosts, feeding, where eggs are laid and other stages in the life cycle, was often wrong. If candidates use the terms 'endoparasite' and 'ectoparasite', it is essential that they do not confuse them. It would be safer and quite acceptable to state that the parasite is 'internal' or 'external'.

- (d) Without a good basic knowledge of the parasite chosen, accounts here were again often inaccurate. The body organs damaged, how this occurs (method of feeding, burrowing etc.) and the effects on the animal should be stated. It should be noted that ticks do not **cause** disease such as redwater but are **vectors** of them.
- (e) Answers were again disappointing as they concentrated on general animal hygiene and welfare rather than effective measures against the parasite named in (b). Ticks require an acaricide, not an insecticide and method of application (regular dipping or spraying) should be mentioned. Cleaning feeders and drinkers is unlikely to be of importance in controlling ticks but may be very important if the parasite named is internal. There were some good answers referring to control of liver fluke, as candidates were aware of the Role played by wet pasture and snails in transmission and that addressing these issues could effect control. Surprisingly few candidates using ticks as an example mentioned rotational grazing as a control, perhaps because they had already shown poor knowledge of the life cycle of this parasite in (c).

Question 12

- (a) References were generally made to insufficiency of rainfall, either amount or regularity and to drought but few mentioned extending the growing season or improvements to crop yield and quality as reasons for irrigation.
- (b) Methods of irrigation were poorly described. Diagrams, even if not specifically asked for, can often clarify written answers and thus increase marks. Water sources often seemed to have been named at random rather than for their appropriateness in a given circumstance.
- (c) Common answers referred to timing of sowing or planting to take advantage of rains and using drought resistant crops. Good answers also mentioned the use of mulches and shading as well as reducing soil cultivation to avoid evaporation from the soil.

AGRICULTURE

Paper 5038/03

Practical

All Centres appear to have prepared candidates for the examination, with almost all candidates at least attempting all questions. In the case of a few Centres there did appear to be some disparity and candidates could conform well with either pH testing or the use of wet tests.

Candidates answered well, writing clearly and using correct punctuation and spelling. It was pleasing to note that most candidates attempted all questions even if they were unable to provide a correct answer.

Question 1

- (a) (i) Almost all candidates were able to access full marks, with clear diagrams.
- (ii) Good diagrams were again produced with a diverse range of names for the parts inside a tomato fruit. Positive marking allowed most candidates to score full marks. The internal features of a potato produced some unusual answers and only a few candidates identified the interior as a food store.
- (b) (i) Testing for glucose was well understood by most Centres.
- (ii) Testing for starch presented few problems for candidates.
- (iii) It was pleasing to note that candidates were able to detect slight changes in colour and for **AS2** where traces of protein were identified marks were awarded.
- (c) Candidates either understood the need to chop food to increase the surface area or did not appear to understand this at all.
- (d) This question was interpreted in two ways with candidates responding to either hazards associated with the procedure OR procedures necessary to obtain accurate results. Either interpretation was awarded full marks.

Question 2

- (a) Most candidates could identify the correct pH although in some Centres the colour and pH of the sample bore no relationship to each other.
- (b) Less able candidates were unable to relate the application of knowledge applied to a soil sample when relating the pH of a soil to a lime hating plant.

Question 3

- (a) Most candidates were able to answer this correctly but in a few Centres candidates clearly did not understand wet test.
- (b) Many candidates produced confused answers, and did not appreciate that water without ammonium and sulphate ions would be better for human consumption.

The accurate completion of the Supervisor's report is essential and where Centres had problems with supplying samples of the correct pH marks were awarded based on the Centre Supervisor's report. It was good to note that no major problems were encountered by Centres in providing samples required.