

AGRICULTURE

Paper 5038/01

Paper 1

General comments

Candidates must read questions carefully and answer the question set, not the one that they would like or expect. If a question requires a specific number of reasons, problems, methods, etc., to be stated, candidates should give the required number of distinct points. Giving more will not gain points and may lead to loss of marks as an Examiner will not select correct answers from a longer list. If a question asks for a reason, process, etc. to be described, rather than simply named, some detail will be required in addition to the name. Where candidates are reading from a graph or giving numerical answers, they should ensure that any relevant units are stated, as omitting them may result in lost marks. Candidates should be able to give sufficient detail, particularly in **Section B**. Many answers showed only the most superficial knowledge of topics. It is also essential that candidates have a good knowledge of the whole syllabus if a good mark is to be achieved. It was clear that some candidates relied on having learnt a few areas in detail, with high marks on one or two questions but scoring poorly elsewhere, gaining a relatively low mark overall. Extending answers with irrelevant material will not gain marks and may mean a candidate has insufficient time to complete other questions. Some candidates wrote out the text of the questions they answered in **Section B**, before giving the answer. This is unnecessary and it was clear that, in a few cases, candidates had insufficient time left to complete their answers properly, having wasted time doing this.

Comments on specific questions

Section A

Question 1

- (a)(i) The expected answer for substance **X** was *humus*.
- (ii) Candidates understood that **X** was formed from organic matter. Examples of this, such as dead plant material or animal waste or remains, were sufficient to gain a mark but, in order to be awarded the second mark, candidates had to explain that these materials were decomposed by microorganisms. Again, a suitable example of one of these was acceptable.
- (iii) Good answers about the importance of **X** included adding nutrients, improving soil structure, drainage and aeration as well as reducing erosion and leaching. Candidates should avoid answers that are too general, such as 'it makes soil more fertile'. This might be taken to imply that nutrient status is improved but could only be given as an alternative to that point and would not be given in addition to it.
- (b) Candidates who had identified **X** were able to suggest the addition of composted material or animal manure as a means of increasing its soil content. Ploughing in crop remains was acceptable, but mulching does not really serve this purpose as the materials are left on the surface and would need to be incorporated in the soil. Adding green material to the soil is not a very efficient means of adding humus, as the early stages of decay can deplete soil nutrients.

Question 2

- (a) The process at **A** was *percolation* or *infiltration*. 'Drainage' or 'absorption' were not accepted. For **B**, the correct answer was *transpiration*. 'Evapotranspiration' was accepted but 'evaporation' was not, as the diagram clearly shows the process emanating from the plants.

- (b) (i) Most candidates stated, correctly, that soil erosion would be a problem. Pollution of water by fertilisers could also be correct but not in association with leaching, as this could only occur if water percolated into the soil, which would not be the case with run-off.
- (ii) Many candidates suggested preventing run-off by ensuring that the ground was covered with plants. However, they then went on to describe how this would prevent soil erosion, not run-off. It is imperative that candidates ensure that their answers address the question set. An indication that it would reduce the rate at which water would reach the soil surface and, therefore, speed of flow over the ground, was needed. Other methods mentioned were terracing, contour ploughing and improving drainage. Each required some brief detail of method, e.g. ploughing across the slope rather than up and down, for contour ploughing.

Question 3

This question was very poorly answered in many cases, showing a lack of knowledge of plant anatomy and physiology, although the requirement for this is clearly stated in the syllabus.

- (a) (i) **A** was correctly identified as *root hairs* (or root hair cells).
- (ii) Tissue **B** was *xylem*.
- (b) (i) Tissue **B**, the xylem, should have been labelled **M**. Many candidates incorrectly chose the phloem.
- (ii) The correct answer was *osmosis*, given by a large number of candidates. A significant minority gave the answer as 'absorption', which was too imprecise to be credited.
- (iii) Good answers indicated that water uptake occurs down a water potential gradient so is passive but minerals are taken up by active transport which requires energy, as it takes place up a concentration gradient. Most answers that indicated some knowledge of the topic stated that water uptake was by osmosis and mineral uptake was by active transport, with no further detail. There were many incorrect answers, where candidates suggested that mineral uptake was by diffusion or that minerals were transported in the phloem and water in the xylem.

Question 4

- (a) (i) The correct answer was 3.3 tonnes per hectare. Units were required for the mark to be awarded.
- (ii) Answers between 160-170 kg per hectare were accepted. Again, units were required for the mark to be awarded.
- (b) Few candidates were able to give any explanation for declining yields at higher fertiliser applications. A few realised that a nitrogen fertiliser would promote vegetative growth at the expense of flower/fruit production and also that it would promote soft growth which would be prone to lodging/damage by wind or rain. Too much fertiliser could also result in root damage. Research does not support the idea that there are significant changes to soil pH. Suggestions that 'the crop had been harvested' or 'attacked by pests' showed that candidates giving these answers did not understand the graph.
- (c) Some candidates confused *organic* and *inorganic* fertilisers. Many candidates were unable to name an inorganic fertiliser - answers should be more specific than 'NPK'. Candidates should also try to avoid giving opposites as separate answers, for example describing an organic fertiliser as inexpensive and the inorganic one as expensive. Availability, known nutrient content, ease of handling are all alternative points. The question specified **one** advantage and **one** disadvantage for each example. Some candidates gave a list, some points in the list being incorrect. Correct answers will not be selected as it is not clear that the candidate knows the correct answer so candidates should follow the instructions in the question.

Question 5

- (a)(i) **A** was the *penis*.
B was the *testis* (testes, testicle(s)).
C was the *seminal vesicle(s)*.
A and **B** were generally correctly identified, **C** less frequently. The diagram was identified in the question as a **male** so there was no excuse for those candidates labelling female anatomical features. Candidates must read questions carefully to avoid such basic mistakes.
- (ii) Most candidates recognised the function of **B** as the production of sperm and/or male hormones. It is, however, incorrect to state that it produces semen.
- (b)(i) Few candidates seemed to understand what was required here. It was expected that they would realise that wild pigs would be selected for specific traits and selective breeding amongst these animals would be carried out. Continued re-selection, via inbreeding and crossbreeding, would then lead gradually to a domestic-type pig. A few candidates described the initial process of selective breeding but were unable to take it further. A large number of candidates thought that providing good housing and 'better' food and care would have the desired result whilst many suggested crossing the wild boar with a domestic pig, which missed the point of the question.
- (ii) Again many candidates, who gave answers describing the advantages of AI, missed the point of the question. Answers should have been directed at how AI could be a useful tool to improve breeds. This would include points such as the wider range of male animals available since it would not be restricted to those on the farm and that these could be selected for a desired trait. Breeds from other countries could be used as semen is easily transported. Reading the question and answering it with relevant points is essential.

Question 6

This was often well answered with a good number of candidates gaining full marks for the question.

- (a) The correct responses were:

<i>compression</i>	closed	closed	upward
<i>ignition</i>	closed	closed	downward
<i>exhaust</i>	closed	open	upward

- (b) This was very well answered with many advantages and disadvantages of a tractor being given. Candidates should beware of giving a list for a single advantage. As before, correct answers will not be selected from other incorrect ones. The question required only advantages and disadvantages of the tractor, but some candidates did not read the question carefully enough and gave one advantage and one disadvantage for animal power. This was not relevant and so could not gain marks.

Question 7

- (a)(i) *Carrying capacity* is defined as the maximum number of livestock that can be supported by a given area of land or pasture without damage to the land. This final point was missing from many answers, making them incomplete.
- (ii) *Stocking rate* is the number of animals being kept (**not** 'that can be kept') on a given area of land or pasture.
- (b) 'Overgrazing' and 'erosion' were the commonest correct answers. 'Damage to grasses', 'poor yield' and 'lack of fodder' were others often seen. Two problems were asked for and again, candidates must ensure that they give **one** clear, unequivocal answer for each numbered point to avoid penalising themselves.
- (c) Some candidates still confuse rotational grazing with crop rotation so some answers were not relevant as they did not answer the question. However, there were many good descriptions, outlining the sequence in which the paddocks could be used to allow recovery of pasture and often including reference to resting one paddock, which could be used for fodder in the dry season. Use of fencing could have been mentioned but was only occasionally seen, as were references to

irrigation and the use of fertiliser on recovering pasture. The question did not ask for advantages of the system so marks were not gained for stating them.

Section B

Question 8

- (a) (i) Most candidates who answered this question referred to pollination as an example of how insects can be useful for crops, giving appropriate examples, such as bees. Some referred to honey production by bees, but this was not relevant in the context of the question so did not gain a mark. The other example, seen less often, was of predators, such as ladybirds, which feed on pests.
- (ii) Crop pests may cause direct damage to plants by feeding on them and candidates could give several different examples of insects which feed in different ways (piercing and sucking, biting and chewing). Incidental damage such as introducing pathogens was mentioned but few thought of contamination of the crop products that could occur.
- (b) (i) The best answers were given when a candidate was very specific in the naming of the pest, such as maize stalk borer or locust. Some referred to 'butterfly' without naming a species but generally gave a good account of the stages of the life cycle and knew that the larval stage ('caterpillar') was the stage that caused the damage. However, some candidates gave 'fly' or 'beetle' as examples. Without narrowing these down to specific pests, few marks were likely to be gained. Aphid was a popular choice and candidates were familiar with its mode of feeding and damage it could cause, but few were able to give a good account of the life cycle.
- (ii) Chemical control should be specified as *insecticide*, pesticide is too general a term. Good answers suggested suitable types for the pest named in (i), such as systemic or contact, but candidates should be certain that they are giving the name of the correct type of product if a named example is used. Some of the chemicals suggested were herbicides or fungicides, rather than insecticides. Other methods of control should be suitable for the named pest. Crop rotation is not a universal method as it would be ineffective against locusts and most aphids. Weed control, timing of planting and specified field hygiene activities could be general points for most pests. 'Use of a predator' should state the predator appropriate to the named pest in order to be credited.

Question 9

- (a) Most candidates gave the name of both livestock and parasite but a few forgot to mention the livestock, thus forfeiting a mark. Tick and cattle was the commonest choice. A few candidates named an internal parasite, having obviously not read the question carefully, and some described a disease rather than a parasite, which failed to address the question completely.
- (b) Life history of the parasites was not particularly well-known or described in many cases. Lack of detailed knowledge cost some marks here. It is reasonable to expect candidates to be able to describe an animal parasite in some detail – where eggs are laid, the stages of the life cycle, moulting, feeding, etc.
- (c) Many of the symptoms described, particularly in the case of the tick, were for tick-borne diseases rather than infestation by the parasite, so were not relevant in the context of the question.
- (d) For the tick, dipping or spraying were commonly mentioned, with a good number of candidates mentioning *acaricide* as the chemical used. It was surprising that rotational grazing was not often mentioned, as candidates had described this in **Section A**. As in (c), some methods given of prevention and control, such as vaccination and isolation, were for disease rather than the parasites that might transmit them, so were not relevant.

Question 10

- (a) The availability of increased amount and variety of fresher foods, less expenditure and the possible generation of income by sales of products were all well-made points. A few also mentioned reduced dependence on imports and transport. Answers generally gave clear, precise points.

- (b) This section was less well answered. Candidates thought of problems caused by noise but few suggested that the real problem would be the disposal of animal wastes, which is difficult in an urban environment. Disease risks were mentioned but whether to animals or humans (it could be both) was not clear. A few candidates mentioned lack of or cost of veterinary care but lack of knowledge by owners but few answers contained more than one or two points.
- (c) Answers to this section should have been comparative – simply repeating points from (b) would not gain marks. Nuisance problems would be **greater**, as would problems of waste disposal. Lack of sufficient space or sufficient grazing were points seen in most answers and some also referred to the much greater capital cost of the animals.

Question 11

This question was poorly answered by most candidates who attempted it. There was insufficient detailed knowledge shown in answers. 'Treatment of posts' should have stated the substance used and the reason. Wooden posts had been specified in the question so references to preventing rust were clearly incorrect. Positioning corners first and how they would be braced was given in the best answers but missed by most. A few described use of a line between corners to get the alignment of the remaining posts but again this, with equal spacing of posts and ensuring that they were vertical, was not seen in many answers. Depth of the hole for the posts, when given, was usually appropriate, but the height of posts, spacing between posts and spacing of wires was frequently less suitable. Candidates should note that **cement** is used to make **concrete**. It is the latter that is then used to hold the posts in the ground. A list of tools used is not sufficient for a mark to be given. Their use should be made clear within the rest of the description. Some candidates were credited for remembering that a gate or entrance to the enclosure would be needed.

Question 12

- (a) This was well answered by many candidates. Use of protective clothing (with items specified), reading and following instructions for timing, dilution and correct crop or situation were all good points. Candidates knew about the importance of weather conditions in avoiding wastage, damage and pollution to people, animals and other crops as well as water supplies. Although disposal of chemical containers was mentioned, how this should be done **safely** was not generally stated clearly.
- (b) There were many good answers dealing with the storage of farm chemicals. Cool, dry conditions in the original, labelled containers were described, with the reasons given for these requirements. Candidates were less clear about security of storage, however. 'Keep them out of reach of children' is not enough. Keeping them in a locked store or making it clear that access to others was not available should have been stated.

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Paper 5038/03

Practical

Most Centres prepared candidates well for this component and candidates gave clear and positive responses, with most candidates attempting all questions. The weakest area was interpreting and carrying out wet tests for ammonium, where some answers suggested little knowledge of the procedure.

Centres provided helpful information and even where they had been short of time for preparation, the information given allowed marks to be awarded appropriately.

Question 1

- (a) Almost all candidates gave descriptions that were clearly a leaf tested for starch having been exposed to light and not exposed to light.
- (b) (i) Almost all candidates were aware that starch is produced.
(ii) The link between light and starch production was generally understood.
- (c) (i) Quite a few candidates failed to appreciate the reason for removing chlorophyll from the leaf.
(ii) Pleasingly almost all candidates gave a clear and detailed reason for removing the heat source from ethanol.
(iii) Many candidates found it hard to give two other environmental conditions which needed to be controlled.
- (d) Candidates were able to give good answers and understood the way plants use the products of photosynthesis.

Question 2

- (a) Some erratic answers were given even within Centres suggesting candidates might have mixed or mislabelled their samples.
- (b) Most candidates gave two suitable precautions, although many were original but credit worthy and showed that candidates had thought about the procedure.
- (c) The application of the knowledge and the effect of ammonia and water pollution was not well understood.

Question 3

- (a) Not all candidates removed petal and sepals, however they were not discriminated against provided they had drawn four other structures. The quality of drawings was not as high as in previous years. Few candidates gained full marks for quality of drawing and some candidates failed to give a scale for their drawings.
- (b) Candidates made a good attempt at cutting the ovary in half, however drawings tended to lack clarity but it was possible to identify correctly labelled parts.