AGRICULTURE

Paper 5038/02
Practical Coursework

Key messages

Candidates should consider the annotation of photographs and diagrams to enhance their work.

The level of demand should be considered when candidates choose their investigations.

Candidates should be made fully aware of the marking criteria for the investigation.

General comments

Almost all candidates produced strong coursework portfolios which were well organised and professionally presented. Most candidates used appropriate Practical Skill exercises. In most portfolios it was clear that sufficient teaching time had been allocated for candidates to carry out the necessary practical work, allowing them to collect good quality evidence which they used in their investigations.

The best candidates submitted Practical Exercise evidence which contained relevant evidence of the skills performed and included annotated photographs. In many cases annotations clearly identified the key skill points or problems illustrated in the photograph. In weaker portfolios photographs were often not annotated and sometimes not labelled at all. These were then of limited use as evidence of the performance. Many centres submitted video clips showing candidates performing their Practical Exercise skills. Some of these were supplied with professional and very appropriate commentaries. Such material not only provides good evidence but it can greatly enhance learning of all aspects of the syllabus content.

Candidates should be reminded of the marking criteria for each section of their investigations so that they are able to give as much detail as possible for each of these areas. When choosing practical exercises or topics for investigation it is important to identify the level of demand presented by the topic. Candidates can then ensure they are able to demonstrate the appropriate level of their ability in their work.

Practical exercises

The best work contained constructive critical reflections. Many candidates produce sensible comments on the procedure shown in their photographs or video clips and offered suggestions for further improvement. Any challenges encountered when carrying out skill tasks needed to be included in the evidence and discussed to demonstrate candidates' appreciation of the importance of these. The best candidates were reflective about their work and showed full awareness of such problems and discussed their impact fully.

Practical Investigation

The Investigations were generally strong. The topic for investigation needed to allow the candidate to collect their own first-hand data to investigate and this was generally evident this session. Most investigations were individual to the candidate and there was evidence of a variety of investigation topics.

1 The selection of relevant questions (hypothesis) for the investigation

Most candidates produced a hypothesis but too few developed or explained their hypothesis or related their hypothesis to the research. Sometimes weaker work took the form of copied information which was not used to support the formation of the hypothesis. Fully independent work

which included a selected hypothesis which was related to the chosen topic was seen in the best work. These candidates often collected a good range of background information and used this to support the formation of their hypothesis. This was then related to the underlying science and agricultural practice and underpinned the investigation. These candidates fully discussed the research and reasons for arriving at their chosen hypothesis.

2 The planning of the investigation and the principles on which it is based

Planning was often a weak area. Candidates needed to clearly link the plan to the hypothesis. The plan needed to be clear, allowing a reader to replicate the investigation in a scientific way. It needed to incorporate all the necessary steps required to carry out the investigation. It also needed to list the resources required, including the time scale needed to carry out the investigation.

Some candidates had been able to gain access to livestock or land to carry out their individual practical investigation, which often made their investigations stronger.

3 The handling of evidence

The data collected was often quite simple and only just sufficient to produce an appropriate analysis. If candidates are to produce meaningful data a minimum of five results need to be collected throughout the process. The best work used a variety of graphs and charts which were clearly labelled. Key features were identified from the graphs and used in the discussion of the evidence. Results were then recorded in detail and any particular procedures used were specified along with details of how the data was collected in an accurate and a reliable way. The sample size was addressed and any problems encountered were indicated and discussed in forming the conclusion.

4 The ability to make deductions from the evidence or data acquired

The strongest candidates fully explained the reason for the results, the data and the outcomes of the investigation. They drew conclusions and explained what their results and data showed and how they related to their research and hypothesis. Deductions were supported with relevant underlying science which was related to the initial research and their original hypothesis.

Too many candidates saw experimental error or natural events beyond their control as spoiling or limiting their ability to draw conclusions and evaluate appropriately. Stronger candidates were able to identify and explain how errors had occurred and had impacted on their ability to draw a firm conclusion.

5 The ability to recognise limitation of the investigation

In this area, candidates often made simplistic comments without an explanation as to why there were limitations which affected the work. Most did not explain how future amendments or alterations could help to overcome the problems encountered, but made general statements which were not explained clearly or developed sufficiently to fully address the marking criteria. Much more detail and clear explanation was needed to ensure the reader of the report could fully understand these limitations and how amendments would improve the outcome.

6 Description of investigation, presentation, layout and originality (candidate's own work)

In general the investigations were well presented across the full ability range of the candidates.

Strong candidates presented their work using appropriate subheadings and made full use of diagrams and charts to fully explain their work. Annotations and references supported the discussions in producing deductions and conclusions. However, many candidates made basic errors such as failing to produce a list of contents, page numbers or bibliography and few linked the references within their text.

Where some of the evidence for Practical Exercise skill tasks is taken from the investigation, candidates need to clearly identify this within the investigation. The evidence needs to identify any specific page numbers where this can be found.

AGRICULTURE

Paper 5038/11
Theory

Key messages

Some multiple choice questions are located within ***Section A*** of the paper and candidates are advised to check that they have attempted each question.

Section B requires longer answers involving extended writing with the choice of essays. There were many excellent accounts which showed a high level of knowledge. Candidates would be advised to take note of the mark allocation for each question part and to use this as a guide to show how much information is expected in their answer.

General comments

Candidates' responses to the questions were generally good. There was no evidence to indicate that candidates did not have sufficient time to complete the paper.

Many answers to ***Section B*** questions were detailed and well organised. A large number of high quality responses were seen to **Questions 9** and **12** in particular.

Comments on specific questions

Section A

Question 1

(a) (i) This question was well answered by the majority of candidates.

(ii) This question was well answered by the majority of candidates.

(b) This question was well answered by the majority of candidates, with many practical maintenance suggestions.

(c) This question was well answered by stronger candidates who interrogated the table successfully.

Question 2

(a) (i) This question was well answered by stronger candidates, many of whom discussed the use of cover crops and shade. Weaker candidates often gained partial credit for describing the use of mulching techniques. Few candidates introduced the concept of minimum tillage.

(ii) This question was well answered by the majority of candidates.

(b) (i) This question was well answered by the majority of candidates.

(ii) The majority of candidates correctly identified that nutrients would be removed but fewer linked this to the removal of soil during erosion.

(c) (i) This question was well answered by stronger candidates.

(ii) This question was well answered by the majority of candidates.

Question 3

(a) This question was well answered by the strongest candidates. Many good descriptions of a maintenance ration were given. Understanding of the additional feed given in a production ration was generally less clear.

(b) (i) This question was well answered by the strongest candidates..

(ii) Good answers were seen from the strongest candidates.

(iii) Some candidates suggested the difference of vent and anus. The very best candidates successfully described the combination of urea and faeces as a single solid in the non-ruminant, compared to the separate urine and faeces in the ruminant.

(c) This question was well answered by stronger candidates who explained that excess carbohydrate would be stored as fat and explained the potential health implications of this.

Question 4

(a) This question was well answered by the majority of candidates.

(b) This question was well answered by the majority of candidates. Many answers clearly described how the lack of tree roots binding the soil increased the risk of soil being eroded by wind and/or water run-off.

(c) This question was well answered by the majority of candidates.

(d) (i) This question was well answered by the majority of candidates.

(ii) This question was well answered by the majority of candidates.

Question 5

(a) This question was well answered by almost all candidates.

(b) (i) This question was well answered by the majority of candidates. A small number of candidates added the costs incorrectly.

(ii) This question was well answered by the majority of candidates

(iii) This question was well answered by almost all candidates.

Question 6

(a) (i) This question was well answered by the majority of candidates.

(ii) This question was well answered by the majority of candidates.

(iii) This question was well answered by the majority of candidates.

(b) This question was well answered by the many candidates. A small number of candidates simply stated 'by pests' without giving further detail.

(c) This question was well answered by the majority of candidates.

Question 7

(a) This question was well answered by stronger candidates. Weaker candidates referred to contact pesticide action.

(b) This question was well answered by the majority of candidates who accurately calculated the pesticide volume required and also provided correct units. Some candidates referred incorrectly to 'centilitres cubed'.

(c) This question was well answered by the majority of candidates.

Question 8

(a) This question was well answered by stronger candidates. Some weaker candidates described an allele as 'pairs of genes' or 'chromosomes'.

(b) (i) This question was well answered by the majority of candidates.

(ii) This question was well answered by the majority of candidates.

(c) This question was well answered by stronger candidates.

(d) This question was well answered by the strongest candidates. Weaker candidates did not describe the selection of suitable animals to subsequently cross.

(e) This question was well answered by the majority of candidates who suggested a wide range of potential benefits.

(f) This question was well answered by the majority of candidates. Candidates should note that desirable characteristics can also be introduced by the active choice of sire for natural service.

Section B

Question 9

(a) The concept of photosynthesis was well understood and described by almost all candidates.

(b) Many excellent answers to this question were seen. The majority of candidates identified two environmental factors which could affect transpiration rate. Weaker candidates described the actual impacts less clearly.

(c) Many excellent answers were seen. This question was very well answered overall but the most common misconception was the suggestion that water moves through a plant by active transport.

Question 10

(a) The concept of lactation was well understood, described and explained by most candidates. Weaning was less well explained and few candidates described young animals beginning to take solid food.

(b) The majority of candidates identified appropriate care provided to a mammalian farm animal for all parts of the question. Many excellent answers were seen.

(c) This question was very well answered overall. However, weaker candidates did not explain that colostrum is a good source of fluids and antibodies, conferring passive immunity to the infant.

Question 11

(a) Stronger candidates provided good descriptions of genetic modification. The best candidates provided technical details as to how this could be achieved such as ‘splicing’, ‘sticky ends’ and/or ‘using bacteria’.

(b) This question was well answered by the majority of candidates who demonstrated particularly good understanding of the potential advantages and disadvantages of genetically modified crops.

(c) Some candidates identified valuable plant characteristics but only the very best candidates offered an answer with sufficient detail.

Question 12

(a) Most candidates correctly described the contribution of legumes within crop rotations. The most common misconception was to confuse nitrogen fixation with nitrification.

(b) This question was well answered by almost all candidates.

(c) This question was well answered by stronger candidates. Explanations of how soil becomes acidic were detailed and of high quality. Explanations of the impact of this on fertility were often less detailed.

Question 13

(a) This question was well answered by the majority of candidates who offered precise and detailed answers. Some candidates confused biological control and cultural control.

(b) This question was well answered by the majority of candidates, many of whom gained full credit.

(c) This question was well answered by the majority of candidates who identified a wide range of practical, environmental and economic benefits.

AGRICULTURE

Paper 5038/12
Theory

Key messages

Some multiple choice questions are located within ***Section A*** of the paper and candidates are advised to check that they have attempted each question.

Section B requires longer answers involving extended writing with the choice of essays. Candidates would be advised to take note of the mark allocation for each question part and to use this as a guide to show how much information is expected in their answer. Some candidates should be reminded not to rewrite the question as part of their response as this wastes time.

General comments

Candidates' responses to the questions set were generally good. There was no evidence to suggest that candidates did not have sufficient time to complete the paper.

Section B was generally approached well. There were many excellent accounts which showed a high level of knowledge and a good use of specialist terms. Some candidates need to be advised to take note of the mark allocation for each question. The more able candidates dealt best with data interpretation questions, although most candidates attempted them.

Comments on specific questions

Section A

Question 1

(a) This question was well answered by almost all candidates.

(b) This question was well answered by the majority of candidates.

(c) (i) This question was well answered by stronger candidates. Most candidates referred to water loss. Many did not completely answer the question by making it clear that this loss was from a plant or appropriate plant feature. The most common misconception was that transpiration occurred in animals.

(ii) This question was well answered by the majority of candidates.

Question 2

(a) Only the strongest candidates correctly described a cereal crop and product.

(b) (i) This question was well answered by the majority of candidates.

(ii) This question was well answered by the majority of candidates.

(iii) This question was well answered by stronger candidates.

(iv) The majority of candidates suggested an appropriate harvesting method and were able to justify this choice.

(c) This question was well answered by the majority of candidates. One problem for weaker responses was to refer to the importance of pest-free storage and not the three points in the question.

Question 3

(a) This question was well answered by almost all candidates.

(b) (i) This question was well answered by almost all candidates. Many showed their working.

(ii) This question was well answered by stronger candidates.

(iii) Only the strongest candidates correctly linked their responses to specific negative impacts on the farm business in sufficient depth.

(iv) This question was well answered by stronger candidates.

(v) This question was well answered by stronger candidates. The most common problem was to describe general records not related to breeding.

Question 4

(a) (i) This question was well answered by the majority of candidates.

(ii) This question was well answered by the majority of candidates.

(b) (i) This question was well answered by stronger candidates, who typically identified examples of both root and legume crops well.

(ii) Only the strongest candidates correctly explained how crop rotation maintains soil fertility. The strongest candidates accurately described different crops using different nutrients or taking nutrients from different soil depths.

Question 5

(a) (i) This question was well answered by stronger candidates. Weaker candidates did not demonstrate a correct genetic cross.

(ii) This question was well answered by stronger candidates. Weaker candidates confused the terms phenotype and genotype.

(iii) This question was well answered by stronger candidates. Weaker candidates did not show an understanding of dominance.

(b) Only the very best candidates offered a response worthy of full credit that accurately described selective breeding.

(c) Only the very best candidates gave a fully correct response to this question. Weaker responses often showed confusion over the use of nutrients.

Question 6

(a) The majority of candidates correctly compared to the simple, single stomach of the non-ruminant. Only the strongest candidates identified further differences.

(b) (i) This question was well answered by stronger candidates.

(ii) This question was well answered by the majority of candidates.

(c) This question was well answered by the majority of candidates.

(d) This question was well answered by the majority of candidates.

(e) Only the very best candidates offered a response worthy of full marks, typically identifying the production of methane or carbon dioxide and an impact on global warming.

(f) Very few candidates offered a response which identified the ability of ruminants to digest cellulose and access grass and other forage as a major food.

Question 7

(a) This question was well answered by the majority of candidates.

(b) (i) This question was well answered by stronger candidates. Weaker candidates were commonly able to describe a deficiency symptom of nitrogen more effectively than a deficiency symptom of potassium. Some candidates simply stated how plants use these nutrients.

(ii) This question was well answered by stronger candidates. Weaker candidates often suggested inorganic fertilisers.

(c) (i) Only the strongest candidates offered a correct answer.

(ii) Only the strongest candidates offered a correct answer.

(d) This question proved challenging for many candidates who struggled to define this term accurately.

Question 8

(a) This question was very well answered by the majority of candidates, many of whom earned full credit.

(b) This question was well answered by the majority of candidates. Some candidates gave an incorrect unit or offered no unit at all.

Section B

Question 9

(a) Many candidates accurately described properties such as water retention, drainage and workability. Stronger candidates linked this to particle size for both clay and sandy soil types.

(b) Some very good answers were seen from the strongest candidates, demonstrating clear understanding and recall of the nitrogen cycle. These answers were rare and overall this part of the question was not well answered. Many candidates demonstrated a lack of detail and partial knowledge often resulting in incorrect explanation.

(c) Stronger candidates described the impacts of high temperatures on plant growth, both positive and negative. Very few candidates explored the impact of low temperatures.

Question 10

(a) Only the very best candidates accurately described what is meant by the term production ration. Weaker candidates confused this with a maintenance ration.

(b) Many candidates gave detailed answers for this question.

(c) This question was well answered. A significant number of candidates gained full credit.

Question 11

(a) Few candidates were able to describe what is meant by the term intensive grazing.

(b) Only the strongest candidates were able to explain strategies to increase the stocking rate of a pasture, often not linking to knowledge of, for example, rotational and/or paddock grazing.

(c) Very few candidates demonstrated an understanding of the advantages of zero grazing.

Question 12

(a) This question was well answered by many candidates.

(b) This question was well answered by many candidates. The role of root hairs was particularly well explained.

(c) This question was well answered by many candidates who accurately explained how soil nutrient availability could be increased through both inorganic and organic methods.

Question 13

(a) This question was well answered by many candidates. Some candidates could not identify a biting and chewing pest. Few candidates fully explained damage to the crop in detail, such as linking to reduced area for photosynthesis or the potential for disease entry.

(b) This question was well answered by many candidates. The most common misconception was to confuse the terms pesticide and herbicide.

(c) This question was well answered in general and especially by stronger candidates, who accurately explained a range of economic, practical and safety issues.