

# AGRICULTURE

---

**Paper 0600/01**  
**Multiple Choice**

<i>Question Number</i>	<i>Key</i>	<i>Question Number</i>	<i>Key</i>
1	<b>B</b>	21	<b>C</b>
2	<b>C</b>	22	<b>B</b>
3	<b>C</b>	23	<b>D</b>
4	<b>A</b>	24	<b>B</b>
5	<b>A</b>	25	<b>D</b>
6	<b>C</b>	26	<b>A</b>
7	<b>C</b>	27	<b>C</b>
8	<b>C</b>	28	<b>C</b>
9	<b>B</b>	29	<b>C</b>
10	<b>B</b>	30	<b>B</b>
11	<b>A</b>	31	<b>A</b>
12	<b>D</b>	32	<b>D</b>
13	<b>C</b>	33	<b>C</b>
14	<b>B</b>	34	<b>A</b>
15	<b>D</b>	35	<b>B</b>
16	<b>B</b>	36	<b>A</b>
17	<b>B</b>	37	<b>C</b>
18	<b>A</b>	38	<b>D</b>
19	<b>D</b>	39	<b>D</b>
20	<b>D</b>	40	<b>B</b>

## General Comments

There was a pleasing improvement in standard with fewer candidates at the very bottom of the mark range.

There is still a weakness in interpretation of data from diagrams and tables - **Questions 26, 30 and 40**. There was a moderate understanding of digestive systems – **Questions 18 and 20** and this was perhaps reflected in the poor response to **Question 26**. There appeared to be some improvement in response to questions related to plant structure and physiology. Many questions require no further comment.

## Comments on Specific Questions

### **Question 1**

More than half of the candidates gave the correct response, although a significant number incorrectly selected shifting cultivation. In considering land use, it should be realised that this is a form of subsistence agriculture only suitable for feeding the family and the local community.

### Question 3

This question describes a standard method of showing soil texture which should have been demonstrated to all candidates, but only half of the candidates gave the correct response.

### Question 6

Less than half of the candidates appeared to understand that the main problem caused by waterlogging is a lack of air for root respiration.

### Question 10

Identity of maize flowers is a clearly stated syllabus requirement and candidates should have been aware that male and female parts occur in different flowers. It was expected that all candidates would be familiar with the appearance of the tassel (male) and silks (female).

### Question 13

Seed rate is a standard term used in the cultivation of many crops and it should be understood that it relates to the amount of seed sown on a specific area.

### Question 16

Approximately half of the candidates gave the correct answer (**B**). This should have been a well-understood topic since the control of eelworms could be related to both the control of pests and the principles of land use.

### Question 22

It should have been understood that high temperature was the only positive symptom - something that could be measured. Dull eyes and rough coat are simple observations, whilst pale yellow urine would be normal for a healthy animal.

### Question 26

Less than half gave the correct response. It should have been understood that the purpose of the ruminant stomach is to aid the digestion of cellulose found in fibrous material, the bulky food consumed by grazing animals.

### Question 29

Most candidates realised that drainage should be the first operation but too many followed this with adding manure. In fact liming should come next as it would need more time to become fully active. Manure should be applied shortly before planting.

### Question 30

It appears that many candidates did not take the time to make the necessary calculation, i.e. dividing the number of animals by the number of hectares.

### Question 31

It should have been recognised that an electric fence is more vulnerable to damage or failure than the other types of fence. It is essential to make regular checks to ensure that the wire is "live".

### Question 38

Spraying at high pressure tends to produce finer droplets which are easily blown about by even a gentle breeze. In addition, small droplets are more likely to bounce off plant leaves.

# AGRICULTURE

---

Paper 0600/02  
Core Theory

## Key Message

Candidates should understand that different command words require different styles of written answer; 'state', 'describe', 'explain' and 'suggest' all have specific and different meanings - see syllabus appendix, page 42.

## General Comments

Candidates should be trained to carefully read the stem of the question to avoid misunderstandings and to respond correctly; this was a problem in **Question 1(c)**, **Question 5(a)**, **Question 6(b)** and **Question 9(b)**. Many candidates did not place labels on diagrams as requested – this often happened when there was no answer line and so maybe candidates did not notice the question (see **Question 2(a)** and **Question 7(a)**).

## Comments on Specific Questions

### Question 1

This question tested general agriculture. It included some data analysis and an understanding of some farming practices

- (a) This was a straightforward data response question which posed no problems for most candidates.
- (b) The answers to this part were disappointing. Organic farming was added to the syllabus a few years ago, so the topic should now be well established in teaching programmes. Organic farming requires no use of artificial fertilisers, pesticides or herbicides. Antibiotics and growth promoters cannot be used as part of routine care.
- (c)
- (i) The use of a legume crop in a rotation was appreciated by most candidates. Some, however, ignored the instruction to use only one term to complete the table.
  - (ii) The benefits of rotation to the farmer are financial as the crops need less fertiliser or herbicides and produce a higher yield. Mention of financial gain without qualification did not gain credit. The benefit that rotation gives to the soil is by maintaining soil structure and fertility. It also prevents nutrient depletion.
  - (iii) Answers here were very encouraging. Suggestions for why pigs might be included in a rotation system were; 'pigs add fertiliser with their dung and urine', 'pigs eat the stubble' and 'turn over (cultivate) the soil'.

## Question 2

- (a)
- (i) Candidates were required to place a **P** on a diagram of the weathering of rocks to show where physical breakdown was taking place. Many candidates did not make any response (see general comments above).
  - (ii) This part of the question asked for an explanation of the processes that caused rock breakdown. It was not enough to state, 'acid rain' or 'temperature change'.
  - (ii) The role of trees in soil formation was better understood. Most answers concerned falling leaves decomposing to produce humus; fewer mentioned the action of roots.
- (b) Many ways of preventing soil erosion exist. Planting, construction of wind breaks and contour ploughing were commonly listed. Avoiding overgrazing and using crop rotation, rather than monoculture, were awarded credit. Mulching was not awarded credit as this is a practice used on a small scale for preventing water loss from around individual plants.

## Question 3

This was a straightforward question about the properties of soil and soil drainage.

- (a)
- (i) Most candidates successfully completed the table comparing the properties of clay and sandy soils.
  - (ii) Here and in (iii) required understanding the implications of the differences given in the table. Cultivation of a clay soil is not made easier by wetting, a common answer, as this would convert it to a sticky mass. Adding fertiliser, another frequent answer, would have no effect unless it was FYM (Kraal manure). This would help separate the clay particles as would sand and lime - the expected answer.
  - (iii) As sand particles are large there is space between them for warm air to enter during the day which is replaced by cold air at night. Sand particles do not themselves absorb heat, they reflect it.
- (b)
- (i) Drainage is a topic not frequently tested so, perhaps, it has not been given emphasis in teaching programmes. Candidate's responses were most disappointing. Mention of digging open ditches around plots and paddocks would have gained credit as would the laying of porous pipes below the soil surface.
  - (ii) This part was more demanding as it required an explanation of how pasture might be improved by drainage. Excess water fills the soil air spaces so reducing the oxygen intake of pasture plants from their roots. This in turn affects the rate of respiration and plant growth.

## Question 4

This was a straightforward question testing the principles of plant growth. Such questions usually elicit good answers but this did not. Candidates need to know where osmosis, active uptake, translocation and transpiration occur in plants.

- (a) The uses of water by the plant for cooling, transport of materials and turgor were largely ignored; its use in photosynthesis was the main response given.
- (b) Water enters the plant roots by osmosis.

- (c) Water leaves the plant by transpiration. Evapo-transpiration was given credit.
- (d) Wilting occurs when the input of water to a plant is less than the output. This can be caused by lack of water supply or, very hot and dry conditions.
- (e) A suggestion was required here and the candidate's responses were encouraging, most linking loss of water to high rates of transpiration before the water reached the plant roots. It is also a fact that water droplets on the leaves magnify the heat from the sun and 'burn' the leaves

### Question 5

This question tested crop production and farm buildings which was done best by candidates with practical experience of these topics. Many candidates did not read the question carefully enough in (a)(i).

- (a)
  - (i) The most commonly chosen cereal crop was maize. As the stem of the question asked how to prepare a seed bed in a 'garden plot', the use of plough and harrow did not gain credit. Digging and raking with hand tools were the answers expected. The question stated the plot was last used two years ago, so felling trees and stumping were not credited.
  - (ii) The fertilisers varied with the crop chosen, for maize compound D and LAN are used as a basal dressing; Urea as a top dressing.
- (b)
  - (i) Any crop in storage needs to be kept dry and well ventilated and most candidates were aware of this.
  - (ii) Various ideas on how to preserve the timber legs of the storage building were suggested; insecticide, creosote and paint all gained credit
  - (iii) Here, an explanation was required as to why the baffles stopped pests climbing up. 'They stop the pest climbing up' did not receive credit. The explanation is that to get past the baffles the pests have to turn upside down and because of the smooth surface they lose their grip and fall off.
  - (iv) A variety of roof materials were accepted but credit was only awarded if the reasons for using them were valid. Accepted reasons were; 'commonly available', 'long lasting' and 'good insulation properties'. 'Keeping the rain out' was not given credit as any roof material should do this.

### Question 6

This structured question linked disease control with genetics.

- (a) The knowledge of blight was good. Most candidates gave fungi as the cause of blight and warm, wet or humid conditions as ideal for its spread.
- (b) The precautions needed when spraying to control blight were also well known e.g. 'do not spray in windy weather', 'do not eat while spraying' and 'spray close to the plant'. However, many candidates did not read the question carefully enough. It stated 'other than wearing of protective clothing' so giving this as a precaution was not credited. It also stated 'during spraying', so preparing the spray solution and cleaning up the sprayer were also not credited.

- (c)
- (i) Genetics still poses problems for candidates taking this foundation paper. The question only required knowledge of a standard genetic cross but little credit was awarded for the genetic diagrams given.
  - (ii) Candidates had to identify a homozygous recessive offspring i.e. rr.
  - (iii) This part was difficult as it required candidates to relate their knowledge of asexual reproduction to the genetics of tubers. As tubers are all produced from the same stem they have identical genetic make-up; in this case Rr.

### Question 7

This question dealt with animal nutrition and health. Part (a) was another instance of where candidates omitted to place labels on a diagram when there was no space for an answer.

- (a)
- (i) Perhaps candidates were confused by the rabbit diagram which is not so commonly used as the pig when teaching the non-ruminant digestive system.
  - (ii) The position of the pancreas was given as anywhere within the loop of intestine between stomach and liver.
  - (iii) Descriptions of the digestive process were the most disappointing responses on the paper. Candidates did not give basic details of how food is broken up mechanically by chewing and chemically by using enzymes.
- (b) At the first signs of ill health an animal should be isolated. Many candidates said 'take it to a vet'. This is the next step after isolation.
- (c) Once again the open-ended final part of the question provided the best answers. Sheep are ruminants by virtue of their rumen and the chewing of the cud. Having a four chambered stomach was accepted.

### Question 8

This question tested reproduction. Part (a) did so in a novel way to which candidates responded well.

- (a) This part asked candidates to compare the process of plant and animal reproduction and many were awarded full credit.
- (b) Definitions must be inclusive and accurate. For fertilisation the following statement would be appropriate, 'the fusion of male and female gametes to form a zygote'.
- (c) The placing of a letter to show where the process of lactation takes place in the mammal life cycle proved to be difficult for many candidates. It is immediately after birth. When indicating answers on a diagram it is important to do so accurately.
- (d) An explanation was needed in this part so general answers gained only partial credit. Colostrum provides high levels of antibodies which help control disease in the young animal. It also has high levels of fat and protein to help early growth.

### Question 9

This was the most difficult question on the paper for the weaker candidates as it involved some difficult data analysis and extended writing. Candidates must realise that if three marks are available for an answer these are not going to be given for one general statement.

- (a) The diagram provoked a range of credit-worthy answers such as ‘as the quality of the meat increased the price went up’, ‘there are fewer animals that produce good quality meat’ and ‘the price of animals increased when the number of animals decreased’.
- (b) Animals kept intensively need to have good ventilation, be cleaned out regularly and have clean fresh water and food if they are to remain healthy. Most candidates realised this though some incorrectly referred to hygiene needed before the animals were put in the houses.
- (c) In this part a full explanation was needed. Two example answers are provided below, once which received full credit, the other did not.

‘The animals will not be getting their protein for tissue growth, their carbohydrates for energy or minerals, such as calcium for teeth and bone development or iron for blood’.

‘Animals with poor diet will not grow well because they lack various nutrients’

- (d) The records given had to relate to producing good quality meat animals, e.g. growth rate, slaughter weights and conformation classification of both the animal itself and its sire and siblings. Other records such as milk yield and number of offspring were not credited.

# AGRICULTURE

---

Paper 0600/03  
Extended Theory

## Key Messages

- Students would benefit from direct observation of living systems to aid them in learning to identify key structures.
- Candidates are reminded to label their diagrams precisely and read the questions carefully to make full use of the information provided.
- The following topics appear least well understood: sustainable farming, latent heat, the process of converting uncultivated land to soil, homozygous recessive genes and the digestive systems of ruminant and non-ruminant mammals.

## General Comments

This paper produced a wide range of answers which were relevant and appropriate to the questions asked, and were answered in an appropriate way. Candidates appear to have worked through the paper in a logical way with almost all candidates attempting all questions.

Some Centres should carefully consider the level of paper for which their candidates are entered as some candidates found some of the more challenging questions to be difficult, although they appear to have made an attempt to answer the questions in a positive way.

## Comments on Specific Questions

### Question 1

- (a) (i)(ii) Crop rotation-appeared to be well understood.
- (iii) The term 'sustainable farming' was poorly expressed, with many candidates confusing sustainability with self-sufficiency.
- (b) The nitrogen cycle was generally well understood, including the way nitrogen is incorporated into the soil and becomes available to the plant crop. Some candidates found the identification of root nodules quite challenging and the viewing of living legume root systems should be encouraged when delivering this topic.

### Question 2

- (a) The processes of weathering and erosion were well understood and explained.
- (b) Candidates made good use of the photograph showing terraces, though some candidates confused the vegetation at the side of the terrace as a structural part of the terrace system. Candidates gave excellent descriptions of irrigation systems and explained clearly the advantages and disadvantages of their chosen system.



### Question 3

- (a) (i) Candidates need to take care to use the required wording such as 'good' and 'poor' when using tables. It was pleasing to note that many candidates initially wrote a statement, recognised their error and amended appropriately.
- (ii) Although few candidates used the term 'latent heat', candidates gave good creditworthy explanations for how and why sandy soils warm and cool quickly.
- (b) Most candidates performed well in (i), (ii) and (iii) although some candidates appeared to have responded to the question before carefully studying the table and relating it to the questions being asked.
- (iv) Deficiency diseases was an area where some Centres demonstrated a good understanding whilst in others the effects of deficiency disease in livestock was not understood and the answers related to plants instead of livestock.

### Question 4

- (a) Most candidates identified osmosis and transpiration correctly.
- (b) Most candidates described the action and behaviour of stomata in good detail. Credit was also awarded for a whole range of xerophytic adaptations which were well described and related to the control of water loss by plants.
- (c) Most candidates understood systemic herbicides and how they are translocated to the roots of the plant.

### Question 5

- (a) Many of the answers on clearing a plot were not focused on the actual question and showed a poor understanding of the process of converting uncultivated land to soil with a tilth suitable for root crop cultivation. Candidates were credited for any three stages which might have been employed.
- (b) Candidates understood and could recognise signs of crop maturity and the conditions needed for crop storage in (i) and (ii).
- (iii) Credit was awarded for any appropriate material suggested by the candidates. A worrying number of candidates mentioned the use of asbestos; this was accepted but candidates should be made aware of the potential hazards of using such a material.

### Question 6

- (a) Candidates showed a good understanding of the causes of blight.
- (b) Most candidates were awarded full credit for completing the genetic cross; however some candidates did not understand the phrase *homozygous recessive*.
- (c) The reasons for growing crops asexually was generally not well understood and resulted in some rather muddled descriptions of the process.

### Question 7

- (a) The digestive system of a non-ruminant appeared to be poorly understood. Most candidates correctly identified the position of the rectum but few could identify the duodenum, and very few were able to suggest a position for the pancreas, many candidates sighting it in the liver or the gall bladder.
- (b)(c) The process of cellulose digestion in rabbits or ruminants was poorly understood, resulting in some very confused answers.

### Question 8

- (a) The marking of this question was generous in interpretation of the candidates' responses. Candidates need to take care to be more accurate when asked to annotate a diagram, taking care to answer the question asked.
- (b)
- (i)(ii) These parts presented few candidates with any problem.
- (iii) The role of artificial insemination and its use in a breeding process to improve cattle was very poorly understood, with few candidates going beyond the first generation cross, and not explaining how desirable characteristics can be introduced over three or four generations.

### Question 9

- (a) Few candidates studied the diagram sufficiently to be able to identify the relationship between the number of animals and the quality of the animals.
- (b) Candidates responded well and were able to identify the benefits of a semi-intensive livestock production system.
- (c) This question produced some outstanding answers and showed a very good understanding of the processes involved in borrowing money to improve or develop a production system. Some interesting answers included the need for collateral, a business plan and documentation relating to the ownership of the land. Interesting and specific examples such as the need to obtain permission from the tribal chief along with other answers that were clearly relevant but of a local nature were credited.

# AGRICULTURE

---

**Paper 0600/04**

**Practical**

## **Key Message**

- Before starting to prepare candidates for practical coursework it is important that teachers check the current year's IGCSE syllabus which provides a list of suitable practical activities, advice as to how practical work may be organised, the assessment criteria, the regulations concerning the recording of marks and requirements for external moderation. Ideally Centres should provide one task from each of the syllabus sections i.e. soil, growing crops, livestock husbandry, farm structures and agricultural economics.

## **General comments**

This year several Centres did not comply fully with the requirements for this paper. Several Centres this year just tested the aspects of preparing a garden plot and the growing and harvesting of crops. This reduced the opportunities for candidates to demonstrate a full range of skills.

Other Centres provided a wide range of interesting exercises - staking a crop, demonstrating the effects of mulching, formulating chicken feed, fish pond maintenance, designing a piggery, making silage and setting up an irrigation system.

It is not essential to test all candidates on the same exercises. Nor is it essential that every task should be used to assess all of the criteria.

Centres are encouraged to use practical exercises that differentiate over the full ability range. Some practical exercises by their very nature do differentiate, for example long term work like the feeding and maintenance of chickens or monitoring plant growth. These are more demanding than, for instance, a lab-based soil settlement exercise. The former gives opportunities for testing all five assessment criteria so helping differentiation, the latter does not. This exercise, however, could be used with a worksheet that offered options and extension work to test initiative and enable differentiation at the higher grades.

Internal moderation only needs to be carried out by teachers when there is more than one teaching group in the Centre.

For external moderation a sample of ten candidates' work together with their record cards is required. Work sheets and marking schemes used for the assessment are needed and several Centres did not comply with this regulation this year making moderation difficult. The work sent should include the top and bottom marks. Any difficulties experienced by the Centre in carrying out the assessments should be highlighted. Photographs of candidates carrying out tasks are also useful evidence of work done.

Please note that a major revision of IGCSE Agriculture coursework has been made for 2012. The present project paper (05) and practical exercises (04) are combined into one paper (03).

# AGRICULTURE

---

**Paper 0600/05**

**Project**

This paper continues to attract a small entry of above average candidates worldwide. In 2011 there was a small decrease in the number of candidates taking this component.

It is most important that teachers new to the syllabus and component check the assessment criteria before starting to prepare candidates for the project. These criteria are included in the current IGCSE Syllabus.

It is expected that prior to the selection and carrying out of the project candidates will have been made aware of the assessment criteria, taught what a hypothesis is and how to design a questionnaire, control variables, collect data and select suitable graphs. The nature of limitations should be discussed and the required layout of the project should be described.

The regulations for paper 5 allow teachers to monitor candidates' progress and to offer advice. In some assessment criteria the amount of help given will affect the mark awarded. The nature of the help given should be recorded on the individual candidate record card.

Assessment criteria causing most problems were the background study, making deductions from the evidence and assessing the limitations of the data. For the background study the material recorded should relate very closely to the project being specifically undertaken by the candidate. In some projects an effective background was missing. In deductions the evidence needs to be thoroughly analysed and commented upon in adequate detail. This criterion was in some cases very leniently interpreted. With the ability to assess limitations, any flaws in the experimental plan that became apparent should have been commented upon as well as describing the things that went wrong due to unforeseen circumstances and human failings. Some candidates tended to focus on external factors and not on the limitations in their experimental method. Suggestions as to how the limitations may be overcome should be put forward.

Other criteria which would benefit from development include the planning of the investigation. In a number of Centres this was rather brief. The work of each candidate should contain a detailed account of the experimental method and the procedures used. Handling of data was in some cases superficial and there was a lack of suitable graphs even though data was available for processing. Candidates should be encouraged to develop this criterion especially when they have spent considerable time and effort on collecting substantial data.

As in previous years, the presentation of many projects was excellent. Many demonstrated very good use of computer graphics with more Centres recording candidate portfolios in this way. This is a positive development and Centres are to be congratulated.

Several Centres provided very useful notes or explanatory comments about the work of individual candidates. This helpful technique should be adopted by all Centres.

Where evidence is gathered as part of work in a group it is expected that for the criteria to be securely met the individual contribution of each candidate is clearly identified, and marks for individuals should reflect this.

As in previous years experimental comparisons provided successful projects. They included effects of spacing, fertilisers and thinning of crops. Comparing the effects of diet on animal growth was a livestock study which was undertaken. Length and width of leaves are not good indicators of growth in many plants; height is more significant. Candidates sometimes measured fewer than five leaves which is insufficient to produce valid data.

Some interesting surveys were undertaken, producing some adventurous topics including the effects of soil erosion, recession on farming and HIV/AIDS on agriculture. Candidates should ensure that sufficient questionnaires are completed in order to collect enough data for subsequent analysis. The data from the questionnaires should be tabulated prior to the production of pie charts or bar graphs.

For external moderation a sample of ten projects is required; the highest and lowest scoring ones, and the remainder should represent the full spread of marks. The projects should be presented in plastic wallets, not bulky files.

The annotation by teachers of record cards was much appreciated and is of great assistance at external moderation. Comments that indicate how much guidance was given and the problems encountered by the candidate help the external Moderator to understand how the marks had been allocated. This is an area for further development. It is most important that marks for all criteria are completed on the record cards. Where adjustments have been made in internal moderation, these adjustments should be clearly shown on the record cards and the revised mark then entered on the form MS1.

Centres must ensure that the Moderator copy of form MS1 is sent after completion with the sample of work for moderation.

Every teacher responsible for teaching this syllabus should be fully conversant with all assessment criteria and candidates need to follow clear guidelines.