GCSE

# Environmental and Land-Based Science

General Certificate of Secondary Education **GCSE J650**

## Report on the Units

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Oxford Cambridge and RSA Examinations

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# B491/01 Plant Cultivation, Foundation Tier

## General Comments

All candidates answered the exam on paper rather than on-line and unfortunately some of the photographs did not appear as clear as they would on-screen. Most students wrote in extended prose where the question required it and there were very few 'no responses'.

## Comments on Individual Questions

**1** This question, targeted at G, provided an 'easy' lead into the paper and most candidates correctly identified the correct activity. A significant number of candidates did not read the stem accurately and entered two activities for each safety measure. These were credited if they both matched. For example 'applying granular fertiliser' and 'spraying pesticide' for 'wear goggles'

**2** This question was well answered on the whole with the most common mistake being where students failed to read the stem and did not state what is likely to be absent.

**3** The difference between a pest and a disease was poorly understood by many candidates who then failed to answer the question correctly.

**4** Most candidates displayed a good understanding of self pollination and correctly identified A as the correct answer. The most common distracter proved to be C with candidates thinking that the pollen moved from stigma to anther.

**5** This overlap question was targeted at grade D. Students did not always make it clear where the R and P label lines were supposed to be. On some occasions letters at the very base of the radical and plumule had to be marked incorrect because it was unclear whether they were referring to the seed itself. The response to this question appeared to be very centre specific with candidates from some centres scoring full marks whilst other centres did not appear to have been taught this information.

Questions 6 to 13 were short answer questions. Questions 6b and 10 were common with the higher paper.

**6** **(a)** This question was poorly answered on the whole with C stigma being the best distracter. It is clearly mentioned in the specification that students should know the name and function of each of the structures of the flower including the style.

**(b)** The role of the style was poorly understood. Many students talked about the pollen growing down to the ovule and although specific detail of sexual reproduction is not required it is important that students appreciate that it is the pollen tube that develops and the nucleus that is transported to the ovule. Another common misconception was that the style produces pollen.

**7** This was an easy question and most candidates were able to correctly interpret the graph and gain 2 marks.

**8** This basic question was again poorly answered with many students failing to give acceptable responses. Vague answers such as 'plants grow better' were very common. A lot of other candidates gained the two marks for the simplistic responses that organic fertilisers are 'natural' and 'cheaper'. Few candidates appreciated the fact that organic fertilisers improved crumb structure, decayed slowly or contained unspecified amounts of nutrients.

**9** Few candidates were able to recognise the structure shown as a rhizome and consequently missed out on the example mark as well. When vegetative propagation is mentioned most candidates just think of runners and strawberry plants.

**10** **(a)** This was an easy two marks however due to a lack of attention and equipment many students lost one or both marks. Bars had to be drawn accurately and this is easier to do with a pencil and a ruler.

**(b)** Most students could make a suggestion as to why the anomalous result occurred. However, vague answers such as human error were not credited unless they were qualified by statements such as incorrect calculation of percentages. The other common mistake was that candidates explained how they found the anomaly eg. the numbers went up and then dipped and then went up again, rather than what caused it.

**(c)** This was poorly answered on the whole with candidates failing to think outside of the question and appreciate the difficulty and cost involved with heating soil to these temperatures.

**11** Most candidates scored both marks on this question. The most common reason for losing a mark was to make a statement about the fork but not relate it to a hazard. For example the fork has 'sharp points' without qualifying the fact by saying how these could injure someone.

**12** This question was poorly answered mainly due to the candidate's inability to use the correct terms. Many candidates referred to the 'red colour' or 'red flower' being dominant.

**13** This question produced a mixed response depending on how well the candidates read the stem and there ability to interpret the diagrams.

Questions 14, 15 and 19 required longer responses. Question 14 was common with the higher paper.

**14** Most students correctly explained the need for a disease-free plant and collection on a dry day. Although there were some references to gardeners getting wet! However a large number of candidates did not read the question correctly and explained the need to collect the seeds when ripe. Many other candidates did not appear to realise that the seeds would not rot if they were not collected and that this would be natural.

**15** Despite the open-ended nature of this question and the large number of possible responses, few candidates scored full marks. Candidates still insist on sowing seeds in soil rather than compost and few described the correct principles. Most candidates gained one mark for watering the seeds but answers were generally limited.

**16** The specification mentions the principles and purposes of soil cultivation by machine but few candidates could write about the use of a plough and harrow. There were a lot of vague statements about tractors and many students just referred to cutting the grass.

# B491/02 Plant Cultivation, Higher Tier

**Comments on Individual Questions**

The first 7 questions were objective questions. Questions 1 and 3 were common with the foundation paper.

**1** This overlap question, targeted at grade D, was aiming to provide an 'easy' lead into the paper. Students did not always make it clear where the R and P label lines were supposed to be. On some occasions letters at the very base of the radical and plumule had to be marked incorrect because it was unclear whether they were referring to the seed itself. The response to this question appeared to be very centre specific with candidates from some centres scoring full marks whilst other centres did not appear to have been taught this information.

**2** Answered well on the whole. Candidates that answered it incorrectly tended to answer A encourages cuttings to root suggesting that they did not appreciate the negative nature of the question.

**3** Most candidates displayed a good understanding of self pollination and correctly identified A as the correct answer. The most common distracter proved to be C with candidates thinking that the pollen moved from stigma to anther.

**4** This was a good discriminator at high demand as many candidates were distracted by option B costs of set up are higher.

**5** This question would have been more accessible if the pictures had been in colour on the computer screen. Most candidates correctly identified leaf 1 as the one with vine weevil damage but fewer recognised the yellow green leaves of leaf 4 as being a symptom of lack of nitrates.

**6** Many students did not recognise that garden compost is an organic fertiliser and as such will release its nutrients slowly. Option A decaying quickly was the strongest distracter, but a reasonable number of students gained the correct response.

**7** **(a)** Most students correctly identified the genetic mutation but lack of nitrate was a strong distracter due to the reduction in chlorophyll.

Questions 7b to 19 were short answer questions. Questions 13 to 16 were common with the foundation paper.

**7** **(b)** This was well answered on the whole. One of the main reasons that students lost marks was for not stating specifically how the lack of photosynthesis effected plantlet growth. Students tended to make vague statements such as plantlet growth was effected without stating how.

**8** **(a)** **(i)** This was an easy two marks however due to a lack of attention and equipment many students lost one or both marks. Bars had to be drawn accurately and this is easier to do with a pencil and a ruler.

**(ii)** This was poorly answered on the whole with candidates failing to think outside of the question and appreciate the difficulty and cost involved with heating soil to these temperatures.

**(b)** **(i)** Most students could make a suggestion as to why the anomalous result occurred. However, vague answers such as human error were not credited unless they were qualified by statements such as incorrect calculation of percentages. The other common mistake was that candidates explained how they found the anomaly e.g. the numbers went up and then dipped and then went up again, rather than what caused it.

**(ii)** Higher demand requires students to appreciate the role of the structures of the seed related to their conditions required for germination. It is important therefore that students appreciate the role of enzymes in the breakdown and respiration of food stores and relate this to the temperature requirements for germination. Many students are still getting confused between describe and explain and consequently there were some detailed descriptions of the effect of temperature on germination that scored no marks.

**(iii)** Few students appreciated the role of enzymes in germination.

**9** Although students did not express this well many appreciated the nitrogen fixing ability of legumes and therefore the reason for lack of nitrate in the fertiliser. Responses such as legumes add nitrogen to the soil were not credited. Many students also talked about the lack of leaves on peas, which again is a misconception. Most students knew that the high K was necessary for fruit and flower production.

**10** The role of the style was poorly understood. Many students talked about the pollen growing down to the ovule and although specific detail of sexual reproduction is not required it is important that students appreciate that it is the pollen tube that develops and the nucleus that is transported to the ovule.

**11** This question produced the highest number of no responses either for just one part or for all three parts.

**(a)** **(i)** Few students were able to correctly work out the ratio. The answer 2.82 alone was credited even if it was not represented as a ratio. Many students just guessed at 3:1.

**(ii)** This was a simple monohybrid cross. The students who gained both marks in this section generally carried out a punnett square and then annotated the results. The main mistake came when students used the incorrect letters for the crosses using R and W instead of R and r and consequently representing a co-dominant cross. Alternatively students just completed the punnett square without explaining the result and thus lost one mark.

**(b)** This was poorly understood by all but the top students and so proved a good A* question. The idea that fertilisation is random was not appreciated.

**12** **(a)** The specification refers to pests including aphids but few candidates appreciated how aphids fed. Many students had aphids eating the leaves or covering them to prevent photosynthesis. Vague statements about them removing nutrients from the leaves were common. Credit was given to any reference to the aphids sucking the sap from the plant and the effect that this would have. Even fewer s candidates appreciated the role of aphids in transmitting viruses between plants.

Questions 12b to 14 required longer responses. Question 14 was common with the foundation paper.

**12** **(b)** This was answered very well by many centres where students had clearly had practise in writing detailed risk assessments including hazards and control methods. However in other centres students gained marks although the response was not structured as a risk assessment. Many candidates lost marks because they did not read the question and talked in detail about environmental effects such as bioaccumulation. Some students are still confusing fertilisers and pesticides and talked about eutrophication.

**13** This was answered well with most candidates appreciating the need to have two separate groups of plants one with and one without the fertiliser and the need for a fair test. However students lost marks by failing to express how they would test the results and not carrying out sufficient repeats.

**14** Most students correctly explained the need for a disease free plant and collection on a dry day. Although there were some references to gardeners getting wet! However a large number of candidates did not read the question correctly and explained the need to collect the seeds when ripe. Many other candidates did not appear to realise that the seeds would not rot if they were not collected and that this would be natural.

# B492/01 Amenity Horticulture, Foundation Tier

## General Comments

The B492 papers appear to be taken by a smaller proportion of candidates than some of the other optional papers, often as a follow on to B491. While it is noted that there may be overlapping themes, the 'Amenity Horticulture' papers look to apply the concepts learnt to a commercial situation.

The Foundation and Higher papers have some questions in common which allows comparability, although it was noted that there was a difference in the level of articulation on common questions between the two papers. Questions asked fell into four categories: objective, short answer, data analysis and extended writing.

It should be noted that questions requiring suggestions and opinions do require factual support, as superficial answers do not gain credit. Awareness of the mark allocation is also important in such questions. These often have 3 marks which indicate that more than one idea or comment is needed and that elaboration is required.

There are still signs of areas of the specification not being adequately covered in certain centres, and clear signs of knowledge gained through practical tasks in others, where candidates could talk about these aspects with authority.

## Comments on Individual Questions

**1** The question on glasshouse use was answered generally well by candidates.

**2** Large numbers of candidates were able to identify a Christmas houseplant from the four choices.

**3** This question on the siting of a greenhouse was a good discriminator requiring a thorough knowledge of the subject.

**4** Most candidates were able to identify potential hazards, perhaps from personal experience.

**5** The topic of biological control was poorly answered, perhaps requiring greater emphasis in teaching.

**6** This question on the growing on of sweet peas showed that the poorer candidates scored one mark maximum, with only the strongest candidates achieving full marks.

**7** Candidates showed confusion as to when a summer hanging basket would look its best. A wide range of plants suited for hanging baskets were allowed (part b) but they must be suited to summer. 'Rose' was not allowed.

**8** Some good observations of a typical work situation, allowing candidates to reflect on experience. Two distinct responses were required for two marks. "Tidy up" only scored one mark.

**9** The question focussed on the way a mower cuts. Many candidates referred to "sit on" or "petrol" rather than the type of cut.

**10** Another question which drew on candidate experiences. Most scored the first mark, with the stronger candidates finding two answers. Concepts such as removing the plant from the pot were not allowed.

**11** A strong test of understanding of desirable features to be bred into a plant. The responses were varied.

**12** **(a)** Candidates demonstrated a poor understanding of the term 'annual' suggesting more work needed on this topic.

**(b)** Likewise, poor understanding shown of the needs to thin seedlings.

**(c)** This question was data response. Most candidates could identify how many seeds are in the packet.

**(d)** Another data response question which was perhaps more discriminatory. A number of candidates stated the sowing time in error.

**13** **(a)** Another data response question, but there was some confusion over the reasons why London Plane was popular. Data was taken and used from the table, but often not related to the question.

**(b)** Candidates mostly made suitable alternative choices from the table.

**14** Despite the question steering the candidate away from price, there was a number of such responses. Strong candidates showed understanding of basic retailing concepts.

**15** Some good ideas regarding the benefits of polycarbonate. Something to note is: while the material is stronger than glass, it does not have a longer life, but it is less likely to breakage. Answers needed to demonstrate the idea of comparing.

**16** The final question gave an opportunity to demonstrate knowledge of the risks of repeating crops in the same soil. Expected responses included references to depletion of nutrients and the build up of pest and diseases. The general comment "the soil gets sick" was allowed although a low grade response.

# B492/02 Amenity Horticulture, Higher Tier

**Comments on Individual Questions**

**1** This question on the properties of different composts demonstrated little understanding that peat based compost has less mass than soil based. This is a fundamental advantage of peat based compost not picked up by candidates.

**2** This question showed variable responses, with the better answers relating to personal experiences.

**3** This was a common question with the foundation tier which was generally better understood than on the other paper.

**4** A question on the factors affecting plant choice demonstrated an application of basic plant knowledge. Only the stronger candidates could identify four distinct factors.

**5** A high level question, requiring the application of knowledge, which generally discriminated well.

**6** This was another common question. It demonstrated some good responses but the ideas relating to removing the plant from the pot were not allowed.

**7** **(a)** A question on vegetative propagation with a common theme to the B491 unit so it is disappointing to report about the low level of knowledge demonstrated.

**(b)** The advantages and disadvantages over seed were poorly described by all.

**8** Another common question with the reasons for the thinning of seedlings better realised by candidates on this paper.

**9** The disadvantages of bedding plants were generally well understood.

**10** A poor understanding of the limitations to growth for a large plant in an office was shown. Also a general lack of knowledge of equipment which would assist growth. Responses citing the need for a large pot were disallowed; the main limitations are likely to be light and warmth.

**11** **(a/b)** A common questions which was generally well answered by all candidates.

**12** **(a)** Stronger candidates demonstrated the link between temperature and the addition of high light levels.

**(b)** While candidates were able to use the data to answer the first part of the question, there was limited understanding that carbon dioxide enrichment is only useful if the vents are closed. Responses stating that enrichment would be of little use at night were allowed.

**13** Another common question which was generally well answered apart from the belief that polycarbonate has a longer life than glass.

**14** The environmental arguments for peat reduction were practically demonstrated, although there was little understanding why it is still used (uniform, lightweight, weed and pest free, lack of equally performing alternatives).

**15** This was a question targeted at the higher achieving candidates. The social benefits of ICT control were not understood (less antisocial hours, flexible working patterns). The ideas of accuracy and the ability to grow to 'blueprints' were better appreciated.

# B493/01 Management of the Natural Environment, Foundation Tier

**General Comments**

This paper, Management of the Natural Environment, is compulsory. It was set for computer format and was later adapted to the question paper format.

The foundation and higher papers have some questions in common. Most of the higher tier candidates dealt with these better, mainly because they wrote sentences that related to the question, rather than responding with a short statement which left the examiner to make the connections.

A higher percentage of candidates than previously took the higher paper this session. A significant number of candidates did not achieve the C threshold. Centres need to appreciate that the higher paper is designed to differentiate between A*, A and B grades, not to identify C grades.

Whether this paper is taken early in the course or at the end is a matter for centres to decide. It does contain topics already covered in Key Stage 3 but there are others, for example intensive and extensive management systems, rare breeds, and some aspects of soil structure that are not and which are dealt with in detail in other course units. By their very nature environmental topics involve some general knowledge and a degree of subjectivity when responding to questions. The exam for the foundation tier targets two thirds of the questions at low demand, but there were a considerable number of candidates in this session that scored less than half of these low marks.

Questions fall into four categories: objective, short answer, data analysis and extended writing. They are presented in this order and generally show an incline of difficulty within each category.

In data analysis questions candidates must take care to respond to the data given and not base their judgements on what they know.

It should be noted that questions requiring suggestions and opinions do require factual knowledge; superficial answers do not gain credit. Awareness of the mark allocation is also important in such questions. These often have 3 marks which indicate that more than one idea or comment is needed and that elaboration is required.

It is important that candidates are taught the significance of ‘command’ words in the question stem. State, describe, explain and suggest all have specific and different meanings.

Topics that appeared to have been well understood were pollution, intensive and extensive production systems, monoculture and significance of hedgerows.

Topics not so well known were; organic methods of food production, mixed cultivation and the details of soil types and food pyramids.

**Comments on Individual Questions**

The first seven questions were objective questions. Question 7 was common with the higher paper.

**1** This first question, targeted at G grade, was intended to be an easy lead into the paper and so it proved to be. Most candidates correctly identified the slug sand woodlouse. The main confusion was with snails.

**2** The question was about agents of weathering which were named in the stem. Most candidates correctly identified the running water as physical weathering, although some lost marks by placing the X too far from the stream bank. A number of candidates labelled the tree. Some texts do describe the action of tree roots as physical but in the context of the question the tree would be described as a biological agent.

**3** Nitrogen fixing plants were correctly identified as legumes by the majority of candidates. The most common distracter was ‘organic’.

**4** Targeted at G grade this was a straight forward recall question on the food chain. It did not appear straightforward to a lot of candidates, A (sunlight) and D (the yoghurt producing dairy) proved to strong distracters.

**5** This proved to be the most difficult question in this section requiring candidates to apply their knowledge about the environment and possible plant adaptations to dry hot conditions. A narrow leaf to reduce water loss and, an extensive root system to take up a lot of water, were the expected answers.

**6** This question, linked to practical soil testing, required knowledge of the colours that soil indicator goes at different pH. When designed for the computer format it required candidates to move colours into the correct boxes on a pH scale - a slightly easier exercise.

**7** The instructions listed that referred to health and safety were, ’do not eat when working’ and ‘wash hands after work’. A lot of candidates gave ‘washing hands before work’ as a choice. A lot, too, gave more than the two required ticks. An extra incorrect tick negated a correct choice. Candidates should be warned of the consequences of giving more than the required answers.

Questions 8 to 15 were short answer questions.

**8** Clearly candidates had not been taught a definition for mixed cultivation - ‘the growing of different crops in the same plot of land’. Thus many described what they saw in the photograph, ‘different plants growing together’. This was given credit.

**9** Noisy, unsightly, ugly, damages birds, were all acceptable answers to environmental objections to wind farms. ‘Vanes becoming detached and injuring people’ was rejected. ‘Do not provide sufficient regular energy’ was another answer rejected here, although it was correct for Q10.

**10** Any answer that implied that the energy source was irregular or insufficient was given credit.

**11** The expected answers were to do with competition for resources between the crops and the weeds. The fact that weeds look untidy/grow all over the place and that they attract pests were also credited. Answers that stated 'weeds killed the crop' without qualification were rejected.

**12** This question, targeted at F, proved to be harder - possibly through inadequate reading of the stem. Clear polythene allows the light to reach the weeds, unlike the black polythene, so weeds grow.

**13** The importance of hedgerows to the environment appears to be well understood and a wide range of answers were allowed as advantages to the farmer for their removal. Better for large machinery use, more room for crop, no need for maintenance and fewer pests to invade the crops, were common responses.

**14** A common question. The results indicated a sandy soil or sandy/loam. Part (b) asked for the 'properties of a clay soil' i.e. poor drainage, poor aeration, heavy to work, cold. Many candidates interpreted the question as 'characteristics of clay - sticky, easy to shape into a ball, brown etc. One mark maximum was allowed for this interpretation. The fact it is used for making pots was not credited.

**15** Another common question but targeted at C. The required answer had to relate to the pyramid of numbers becoming unbalanced because of more top consumers and fewer secondary/primary consumers. Lower grade answers tended to state, 'prey got less', and they were not credited. Weak candidates misunderstood the position of raptors in the food chain, stating that animals that fed on raptors would increase.

Questions 16 to18 were data response.

**16** This two part question required candidates to take information from a table of data on conservation organisations. A surprising number of candidates did not read the table correctly. The RSPB was the answer for both parts.

**17** This question required analysis of a line graph. Despite the fact that air pollution was in bold a lot of conclusions given were about the % of lichens in and away from the city, rather than the levels of pollution.

**18** This data response question provided the opportunity for candidates to draw a bar chart using the information in a table. This was a common question. Some candidates produced accurate neat bars but too many produced hand drawn approximations. Two of the readings were at 900, which required candidates to divide a 1 cm grid square into 5. The two readings were often very different. Histograms/block graphs were accepted despite the fact that they should only be used for continuous data. However, those histograms that were out of alignment to the crops were penalised. Overall, a disappointing performance. Drawing up bars on screen might have produced a better response.

Questions 19 and 21 required longer responses, 20 being common.

**19** A definition of organic food is straight from the specification but few scored 2 marks. Statements that referred to not using chemicals on the crops were rejected. There are inorganic chemicals, artificial chemicals and natural, organic chemicals, distinctions which need to be taught. Similarly using no pesticides or no fertilisers was rejected. There are natural methods of pest control and there are natural fertilisers such as farm yard manure. Definitions need to be accurate and precise.

# B493/02 Management of the Natural Environment, Higher Tier

**Comments on Individual Questions**

The first six questions were objective questions.

**1** A common question with the foundation paper. The instructions listed which referred to health and safety were, 'do not eat when working' and 'wash hands after work'. A lot of candidates gave 'washing hands before work' as a choice. A lot, too, gave more than the two required ticks. An extra incorrect tick negated a correct choice. Candidates should be warned of the consequences of giving more than the required answers.

**2** This was a straight forward question on the nitrogen cycle requiring candidates to complete a diagram. Common errors were: nitrogen gas and nitrates the wrong way round and humus instead of nitrates for B.

**3** There is always a degree of muddle over pH and acidity - the soil acidity is decreases as the pH number goes up. What was surprising was the number of candidates who considered that lime provided potassium.

**4** A straight forward question on ICT which although targeted at D differentiated at B.

**5** Another question that proved to be a good discriminator at B as the options required careful reading. The heavy machinery compacting the soil reduced the air spaces and hence the oxygen levels.

**6** This was the least correctly answered objective question. Very few candidates scored 3 marks. Questions set on the major types of ecosystems in the UK do require a general knowledge of the plants and animals each supports. The plants associated with each woodland were better known than the soil type and % of light that came through the canopy. A few candidates got the lists completely visa versa and it was assumed this was due to their mistaking the terms deciduous and coniferous so 2 marks were given under ECF (error carried forward).

**7** The first part of this question asked for an advantage of intensive systems to the environment not, as many decided, an advantage to the farmer. The expected answers were either more land free for natural habitats or less damage to habitats from the free ranging chickens. The point of the second part of the question was appreciated by only a few candidates. The specification for higher demand on production systems states that 'priorities change over time'. The stem of the question led to the idea that compared to the 1930's the public are more aware about animal welfare, there are now the 5 freedoms, animal rights groups' campaigning and welfare legislation is in place. In addition most modern systems have more than one bird to a cage. Most answers ignored the stem and stated 'keeping animals in cages was cruel or unnatural'.

**8** A common question. The results indicated a sandy soil or sandy/loam. Part (b) asked for the 'properties of a clay soil' i.e. poor drainage, poor aeration, heavy to work, cold etc. Many candidates interpreted the question as 'characteristics of clay - sticky, easy to shape into a ball, brown etc. One mark maximum was allowed for this interpretation.

**9** To gain the mark in this question reference had to be made to the habitat and how it would be changed; 'sand blown away' was insufficient. Blow outs, loss of the humus top layer or exposure of plant roots were the kind of comments that were credited.

**10** Another common question but targeted at C. The required answer had to relate to the pyramid of numbers becoming unbalanced because of more top consumers and fewer secondary/primary consumers. Some candidates rightly suggested that fewer primary consumers would increase the producer base. Lower level answers tended to state, 'prey got less', and these were not credited.

**11** This open ended question produced some good responses. Most candidates made the point about flooding destroying the nests which many thought would be constructed earlier because of the warmer winter. Fewer related the warmer weather to predator survival.

**12** This was a question which discriminated well. The three options for marks were: allotment, public garden or leave as it is. In the former situations the point could be made that many different varieties of plant were planted which then supported a wide range of animals. Leaving it alone does not disturb the habitats and allows ecological succession which adds biodiversity. Not many candidates appreciated this point.

Questions 13 and 14 were data analysis questions

**13** This common data response question provided the opportunity for candidates to draw a bar chart using the information in a table. The candidates' performance was disappointing. There was not much difference in the standard achieved in this higher tier than in the foundation. Some candidates produced accurate neat bars but too many produced hand drawn approximations. Two of the readings were at 900, which required candidates to divide a 1 cm grid square into 5. The two readings were often very different. Histograms/block graphs were accepted despite the fact that they should only be used for continuous data. However, those histograms that were out of alignment to the crops were penalised.

**14** The four parts to this question concerned the analysis of line graphs that depicted the effects of water pollution by nitrates. The data, which was quite complex, was accessible to the better candidates. They were able to provide a sensible range, 20 - 250 metres, downstream where eutrophication was occurring and make the simple conclusions about the effects of nitrate on plant numbers and bacteria on oxygen levels. The former rose and fell together, the latter were the opposite.

Questions 15, 16 and 17 required longer responses.

**15** Most candidates were able to explain dispersion of the pollution by diffusion in the fast flowing stream but no one appreciated the A* mark that oxygen would be absorbed into the bubbling stream waters which would also lower pollution levels.

**16** This question with a target at C was common and candidates taking the higher tier grasped the point more readily then those taking the foundation.

If produce is grown to soil association organic standards then by definition it must be organic. Damage to the environment through air miles is not within the definition. Many suggested that foreign countries would not comply with the regulations but that is not relevant.

However, having the organic 'tag' suggests that the produce is good for both consumer and the environment. Clearly if food has been transported thousands of miles there is a considerable carbon footprint. The food is not 'eco' friendly. If it is then called organic it is rather misleading. Some answers suggested the food could not be fresh having travelled or had become tainted by air pollution so should not be called organic. Neither idea was credited.

**17** This final question produced some very good answers. It was assessed by level of response marking. To achieve 3 marks the candidate had to quote in detail from the data given and make either the point that the advantages (cleaner environment) out weighed the quoted objections or that if nothing was done the habitats would be lost anyway to global warming.

# B494/01 Care of Animals, Foundation Tier

**Comments on Individual Questions**

**1** This proved an accessible first question with most candidates giving the craft answer.

**2** The photograph was not as clear in black and white as had been originally planned, but candidates were still able to respond well.

**3** There is confusion amongst candidates on the role of the caecum with only the best candidates giving the correct answer. The commonest incorrect response was 'to digest protein'.

**4** This question was answered well by nearly all candidates, the occasional incorrect response included gerbil.

**5** **(a)** Candidates were generally able to read this graph correctly and select the two columns with the same percentage. Occasionally candidates tried to answer the question without apparent reference to the graph.

**(b)** Candidates were usually able to total the percentage of problem dogs. The occasional incorrect answer was '50'.

**6** This was almost universally correct. Candidates have learned basic hygiene procedures well.

**7** The data in this table challenged some candidates and many attempted to answer the question using general knowledge rather than the table. Common incorrect responses were 'lions tigers and bears' and 'monkeys and chimpanzees'.

**8** **(a)** Candidates were able to interpret the data to select the most suitable dog. Some candidates selected the Welsh terrier.

**(b)** Those candidates who selected the Yorkshire terrier were able to explain their choice using data in the table. Those that selected the Welsh terrier made the assumption that the old lady had grandchildren.

**9** This was one of the most challenging questions for candidates, with some being totally confused between the reproductive and digestive systems. Responses were often vague and demonstrated little knowledge of anatomy.

**10** Generally well answered. Most candidates could give a disease causing organism or name one correctly.

**11** Almost universally correct responses here. Again the importance of correct animal handling appears to be well understood by candidates.

**12** Candidates were usually able to distinguish between the three breeds of cat, but their terminology was often poor.

**13** This was a challenging question for all candidates with only the better candidates scoring 2 or 3 marks. Many candidates tried to create a new breed of cat by crossing two of those given, while others had little idea what to suggest.

**14** Candidates usually knew the role of protein and fat in the diet but weaker ones appeared to be thrown by the term 'carbohydrate'.

**15** Candidates were usually able to select the most appropriate drinking container but were often unable to give a good reason why. Incorrect responses included reference to a rabbit's small mouth. It was unfortunate that the photographs were not to the same scale, as this may have misled a minority of candidates.

**16** **(a)** There was confusion about suitable foods for small mammals, and even confusion about what a small mammal was – those named included snakes and elephants.

**(b)** About half the candidates could give the difference between succulent and concentrates and appeared to be drawing on knowledge gained in other units. The remaining candidates often answered in terms of man-made and natural, with few candidates giving a correct response.

**17** Candidates found this calculation difficult. The commonest error was to multiply the cattery care by 365 days. Candidates who demonstrated that they knew there was multiplication involved and did not simply add up the figures in the table gained one mark.

**18** Candidates could generally gain one mark here, but only better candidates gained full marks. The terminology again let down some candidates, while others gave vague responses like 'check it looks OK'.

**19** A well answered question with most candidates scoring at least one mark. Some lost marks by describing signs visible in bedding for example.

# B494/02 Care of Animals, Higher Tier

**Comments on Individual Questions**

**1** **(a)** An easy starter and candidates universally answered correctly.

**(b)** Usually answered correctly.

**2** Candidates knew how to do this calculation but several missed the idea that there would be no kittens born in the first year.

**3** This question was common to both papers and was generally well answered by the candidates sitting this paper.

**4** Candidates did not answer this question well. Many gave pH specific as their response.

**5** Some candidates could correctly give the function of LH but others were confused.

**6** A surprising number of candidates believe that rabbits do not drink water. Only the better candidates gave the correct answer here.

**7** Good candidates were able to deal with the complex data in this table but weaker candidates struggled.

**8** This question was common with the foundation paper and as with this paper, it was a challenging question for all candidates with only the better candidates scoring 2 or 3 marks. Some candidates tried to create a new breed of cat by crossing two of those given, while others had little idea what to suggest.

**9** Another question common with the foundation paper. Candidates found this calculation difficult, with only the best gaining full marks. The commonest error was to multiply the cattery care by 365 days. Candidates who demonstrated that they knew there was multiplication involved and did not simply add up the figures in the table gained one mark.

**10** Another question in common with the foundation paper. A well answered question with most candidates scoring at least one mark. Some lost marks by describing signs visible in bedding for example.

**11** Many candidates could select the most appropriate rabbit breed, but some selected the Flemish breed as they thought the Himalayan would be too small.

**12** A very poorly answered question. Most candidates had little idea about the roles of calcium.

**13** **(a)** Most could name an appropriate succulent food.

**(b)** Most candidates could give the difference between succulent and concentrates but appeared to be drawing on knowledge gained in other units.

**14** Candidate were not usually able to explain the stages of risk assessment, answers were very vague.

**15** Good candidates were able to analyse this data. The commonest incorrect response was 'fearful of leaving owner'.

**16** **(a)** Most could gain one mark here explaining what 'line breeding' was but only better candidates explained why it is used as a breeding strategy.

**(b)** Responses here were often vague.

**17** Well answered and understood.

# B495/01 Livestock Husbandry, Foundation Tier

### General Comments

Candidates seemed to find this an accessible paper with very few candidates not attempting individual questions. In those questions where practical knowledge was of an advantage it was clear that many candidates had been taught well in the practical situation.

Most candidates are now trying to give more detail in their extended answers and are as a consequence picking up more marks for these questions. Some of the candidates lost marks through carelessness on data response questions and centres could well help their students if they gave them more opportunities to practice these types of questions.

### Comments on Individual Questions

**1** An easy question used to settle the candidates into the paper which only the very weakest candidates answered incorrectly.

**2** Well answered overall. Candidates seem to be well practised on this question area which we has been tested before.

**3** The term 'conformation' was not well known by the majority of candidates.

**4** **(a)** Weaker candidates did not know the term 'hybrid'.

**(b)** Some poor reading of the question led to several candidates stating *what* would be recorded rather than *how* to record information efficiently.

**5** A poorly answered question across the candidature. Very few realising that gametes have half the number of chromosomes that body cells have.

**6** Well answered by the majority of candidates.

**7** Only better candidates realised that Salmonella is likely to be transmitted through poor hygiene.

**8** A challenging question applying knowledge of embryo transfer which again was targeting better candidates.

**9** The common error here was to select **A**, a high tech free-range unit.

**10** A well answered question.

**11** A question where several candidates lost marks by not putting down all they knew, very few scoring the maximum three marks for six correct points.

**12** Some very good answers to this question. However, weaker candidates suggested the baby was stuck without explaining why.

**13** This question has been asked before in different forms and candidates responded to it very well across the ability range.

**14** A well answered question by all abilities.

**15** Although clearly stated on the specification, few candidates were able to identify the characteristics of different breeds of cattle.

**16** A good discriminator with weak candidates not getting either mark and only the best candidates getting both marks.

**17** Only better candidates were able to give both name and function for all three parts but most scored at least two with the sperm duct being least well known. Several answers to the penis were rejected as they were too imprecise e.g. to release sperm, better answers referred to placing sperm into the female.

**18** A well answered question with most candidates scoring two marks. Centres should advise candidates that if there are three marks then the examiner is going to be looking for at least three different points.

**19** As with the last question, most candidates scored one mark but only better candidates were able to give two reasons for the full marks.

**20** Most candidates achieved the first two marking points but only better candidates gave two months as the correct answer to part (c) most incorrectly suggesting the answer was three months.

**21** Careless calculations lost candidates marks here. Centres should remind candidates that calculators can be used and should be brought along to exam sessions using paper versions and are available on screen for online versions.

# B495/02 Livestock Husbandry, Higher Tier

**Comments on Individual Questions**

**1** Most candidates realised that concentrates are the most likely source of the production ration.

**2** Common question with foundation tier.

**3** Candidates need to practice these calculations as only 60% of them were able to answer this question.

**4** A well answered question with most candidates realising that protein is particularly important for growing animals.

**5** The common error on this question was that candidates thought the fat content was higher in the first few weeks although colostrum is only produced in the first few days.

**6** This was a challenging question with only better candidates realising that genetic engineering is unlikely to increase the gene pool.

**7** Common question.

**8** Common question.

**9** Common question.

**10** Very well answered question with only the weakest candidates not realising that cattle have to have a passport.

**11** A well answered question with most candidates able to give one legal requirement, and better candidates, two.

**12** Few good quality answers with only better candidates realising that the corn bag was of known mass and could be used to calibrate the scales.

**13** A well answered question with most candidates getting the first mark and better candidates getting point (b). Good answers referred to parasites leading to weight loss and the increased profit to the farmer of a healthy animal at the point of sale.

**14** Many candidates had obvious practical experience to enable them to answer this question very well.

**15** Common question.

**16** Common question.

**17** Weaker candidates found this a difficult question, with a very common error being “it helps the farmer know when the calf will be born”.

**18** Common question.

**19** A well answered question with over half the candidates achieving maximum three marks.

**20** Again, a well answered question. Weaker candidates responded to part (b) with answers such as “it is cruel” without saying why.

**21** Common question.

**22** Common question.

# Grade Thresholds

**General Certificate of Secondary Education**
***Environmental and Land-based Science (Specification Code J650)***
**January 2009 Examination Series**

**Component Threshold Marks**

| Component | | Max Mark | A* | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|---|---|---|
| B491/01 | Raw | 36 | | | | 25 | 21 | 18 | 15 | 12 |
| | UMS | 34 | | | | 30 | 25 | 20 | 15 | 10 |
| B491/02 | Raw | 36 | 27 | 23 | 19 | 16 | 13 | 11 | | |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | | |
| B492/01 | Raw | 36 | | | | 25 | 21 | 18 | 15 | 12 |
| | UMS | 34 | | | | 30 | 25 | 20 | 15 | 10 |
| B492/02 | Raw | 36 | 30 | 26 | 22 | 18 | 14 | 12 | | |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | | |
| B493/01 | Raw | 36 | | | | 23 | 19 | 15 | 12 | 9 |
| | UMS | 34 | | | | 30 | 25 | 20 | 15 | 10 |
| B493/02 | Raw | 36 | 30 | 26 | 22 | 18 | 15 | 13 | | |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | | |
| B494/01 | Raw | 36 | | | | 26 | 22 | 19 | 16 | 13 |
| | UMS | 34 | | | | 30 | 25 | 20 | 15 | 10 |
| B494/02 | Raw | 36 | 33 | 29 | 25 | 21 | 18 | 16 | | |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | | |
| B495/01 | Raw | 36 | | | | 28 | 24 | 21 | 18 | 15 |
| | UMS | 34 | | | | 30 | 25 | 20 | 15 | 10 |
| B495/02 | Raw | 36 | 33 | 30 | 27 | 24 | 19 | 16 | | |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | | |

**There were no candidates aggregating this series.**

Statistics are correct at the time of publication.

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