

**Science**

Advanced GCE **A2 7885**

Advanced Subsidiary GCE **AS 3885**

**Report on the Units**

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**January 2007**

**3885/7885/MS/R/07J**

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

The reports on the Examinations provide information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content, of the operation of the scheme of assessment and of the application of assessment criteria.

Mark schemes and Reports should be read in conjunction with the published question papers.

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**Advanced Subsidiary GCE Science (3885)**

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## 2841: Science and the Natural Environment

### General Comments

There were some excellent scripts, scoring more than 50 marks from the available 60, and there were quite few scripts that showed little meaningful achievement. Many students were erratic, however, obtaining high scores on some questions and low scores on others. They showed that they could perform well, but suffered from a lack of consistency.

### Comments on individual questions

- 1) Most candidates could provide an overall word equation for photosynthesis, though a few were tempted to provide more detail than was required and to attempt to provide equations for both stages. These were usually weaker candidates, and rarely provided correct versions.

Identifying that light intensity and carbon dioxide generally increase the rate of photosynthesis proved possible for most candidates, but only the stronger candidates could provide descriptions based on the specific shape of the graph.

The remainder of the question proved accessible to most, but some candidates failed to deal specifically with plant cells.

- 2) Parts (a) and (b), and part (c)(v), presented few problems, but part (c) on interpretation of colours was an excellent discriminator at higher grade levels. This suggests that many candidates struggle with concepts relating to false colour.

- 3) Most candidates could name the stages but only those who showed how the stages lead from one to the other, by eating and by transfer of energy and/or nutrients, obtained full marks.

The calculation of level of activity of a radioactive sample and its explanation were achieved by most candidates, but fewer could distinguish atomic number, number of neutrons and number of electrons.

Very many candidates could draw good diagrams of the mass spectrometer. Many provided more complete descriptions than were required, including initial ionisation. Marks were awarded for description of separation by the magnetic field.

- 4) Some candidates seemed not to read the question stem carefully, and thus to penalise themselves.

In part (d), most candidates were able to show some understanding, with some use of specialist vocabulary, such as decomposers, leaching and weathering. Ability to organise the writing coherently proved more difficult for some.

**2842: Science and Human Activity**

Due to the low entry for this unit no Report for Centres has been written.

## 2844: Science & Environmental Management

### General Comments

As in previous years, candidates seemed happiest with straightforward biological questions and it was pleasing to see that even the least well-prepared could achieve full marks on questions about simple genetics.

Most candidates achieved at least half marks on Q1 although few understood the actual meaning of C4 adaptations required for 1(b).

Question 2(a) was beyond most of the weaker candidates as the sequential logic required to answer the question was not recognised by many as key to answering this correctly. For Q3 candidates often failed to identify the difference between selective breeding and genetic engineering (which had been covered by the previous question) and thought that asexual reproduction in plants was a laboratory procedure.

Questions 4 and 5 tended to be answered well or barely attempted, and many candidates answered the chromatography question in terms of paper chromatography which was not creditworthy. Many candidates discussed turgor in plants generally rather than in plant cells. Such candidates should be encouraged to read the question thoroughly.

There were some candidates whose work was a pleasure to mark both in terms of presentation and content. However, there were areas where marks had not been gained by the weaker candidates because, as in previous years, their answers were too superficial to gain marks.

Those candidates who did answer in a superficial way (as bullet points or lists) should be encouraged to link these ideas in ways that reveal more insight than simple recitation.

### Comments on individual questions

1 (a)(i) Many candidates experienced difficulty with standard form ( $10^6$ ).

(a)(ii) Well answered.

(a)(iii) Most candidates only obtained one mark, usually for stating (e.g. economic advantage) and quoting an example.

(b) The question was about C4 adaptation; most candidates knew of its existence but knew very little detail. Those who did know, knew in detail, and produced some excellent answers.

(c)(i) Some candidates gave 'economic or political reasons' which suggests that they did not read the question.

(ii) The most common answer was an economic argument followed by an example, again blocking access to the second mark.

(d) The most well answered part, since here specific examples were acceptable.

(e) Two environmental reasons were needed here. However, some students gave an environmental and genetic reason. Candidates should be encouraged to read the question before resorting to memorised lists.

(f)(i) The majority of candidates got the mark for the increase, about half going on to establish a limit.

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- (ii) Most candidates answered correctly but then went on to discuss eutrophication which was largely irrelevant to the original intent of the question. However, the answer 'it could lead to eutrophication' is an acceptable response.
- (iii) Very few candidates linked the application of fertiliser to more rapid growth, hence only gaining access to one mark.
- 2
- (a)(i) Candidates know the word 'vector' but many showed little understanding of its meaning. Such candidates should be encouraged not to waffle as this may negate some marks where the science is clearly wrong.
- (ii) Most candidates got both marks for this if any were scored. There were several blank spaces seen.
- (iii) A lot of good answers were seen. This was where candidates had realised that the answer was sequential. Many confused the injection insertion into the plasmid as being an insertion by injection.
- (b) Students had obviously been taught about visible marker genes, which is a procedural invention to see if the process works, rather than transfer of desirable characteristics. This is, however, an acceptable answer.
- (c) Many candidates saw this question as about the proliferation of the plants rather than the process of passing on the genetic modification to the plants and so there were few good answers.
- (d) Candidates would be well advised to read the question as economic value is not an inheritable value.
- (e) 'Inbreeding depression' was given as an answer for 'lack of variation', which strictly speaking is incorrect. However, it was thought to be just creditworthy.
- (f) It was good to see that candidates quoted sensible distances/barriers to cross pollination.
- 3
- (a) Very few candidates answered this well; many thought you took seeds and somehow inserted them into a plant. It is clear that many consider 'seed' and 'pollen' to be synonymous.
- (b) (i) Many considered asexual reproduction to only take place in a laboratory, at cellular level. Hence none of the marks were available to them.
- (ii) The better candidates recognised that two marks were available and so linked cause and effect.
- (c) (i) 'pollen and ovum' were frequent and acceptable answers.
- (ii) Frequent occurrence of 'mitosis' as the wrong answer, although a good description of this process which corresponded with the first stages of meiosis gained, generally, two marks.
- (d) Well answered.
- (e)(i) Again, well answered.
- (ii) & (iii) The weaker candidates did not understand the use of diagrammatic representations of this and many had alleles crossed with themselves. Both parts were answered very well by a significant majority of candidates.
- 4
- (a) & (b) Candidates either knew or did not know at all.
- (c)(ii) Very few candidates showed any knowledge of capillary action.
- (iii) This was the most difficult part of the question with many candidates gaining no marks at all. A minority of candidates produced superb answers. These candidates deserve high praise indeed.
- (d) (i) Many knew a formula for  $R_f$  values, but the weaker candidates did not manage to define terms successfully.



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- (ii) Many responses included references to different solvents but failed to state that this would lead to different results.
  - (iii) The response 'they travelled the same distance' was not creditworthy as the question was about the  $R_f$  value and not the distance travelled.
  - (e)(i) Weaker candidates often just repeated the words from the diagram and received no credit.
  - (ii) Well answered by 50% of the cohort.
  - (iii) Well answered.
- 5
- (a) The poorer answers simply rephrased the stem repeatedly gaining no credit. The better answers showed evidence of thought and a genuine understanding of the mechanisms of water transport.
  - (b)(i) Many of the creditworthy responses seen were those that were deemed creditworthy for (ii). Where these responses (by the plant) were *rapid* then they were acceptable for (i).
  - (c)(i) Very few mentioned the concentration of *specific* ions was *too high*.
  - (ii) *Desalination* is a process not a method and hence is not creditworthy.

**Advanced GCE Science 3885/7885  
January 2007 Assessment Series**

**Unit Threshold Marks**

Unit		Maximum Mark	a	b	c	d	e	u
2841	Raw	60	46	41	36	31	26	0
	UMS	90	72	63	54	45	36	0
2842	Raw	60	46	41	36	31	26	0
	UMS	90	72	63	54	45	36	0
2844	Raw	90	69	61	53	45	37	0
	UMS	90	72	63	54	45	36	0

**Specification Aggregation Results**

Overall threshold marks in UMS (i.e. after conversion of raw marks to uniform marks)

	Maximum Mark	A	B	C	D	E	U
<b>3885</b>	300	240	210	180	150	120	0
<b>7885</b>	600	480	420	360	300	240	0

The cumulative percentage of candidates awarded each grade was as follows:

	A	B	C	D	E	U	Total Number of Candidates
<b>3885</b>	0.0	50.0	50.0	83.3	100.0	100.0	6
<b>7885</b>	100.0	100.0	100.0	100.0	100.0	100.0	1

**7 candidates aggregated this series**

For a description of how UMS marks are calculated see;  
[http://www.ocr.org.uk/exam\\_system/understand\\_ums.html](http://www.ocr.org.uk/exam_system/understand_ums.html)

Statistics are correct at the time of publication

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