

Science

Advanced GCE A2 7885

Advanced Subsidiary GCE AS 3885

Report on the Units

January 2008

3885/7885/MS/R/08J

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This report on the Examination provides 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.

Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

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Advanced Subsidiary GCE Science (3885)

REPORTS ON THE UNITS

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2841 Science and the Natural Environment

General

The total entry for this exam was 405 students. The paper represented a similar demand to the previous exam paper although the style of question was slightly different. Grade boundaries were agreed at 27/60 for grade E and 46/60 for grade A. The full range of grades was achieved by the cohort, although “A” grades at this stage were achieved by a minority of students. In general, many students do not attempt questions that require extended writing “in rough” before committing their final answers to the exam paper and this results in a number of untidy scripts. The vast majority of students attempted the full range of questions and the evidence suggested that students had sufficient time to complete the paper.

Comments on individual questions

Question 1

- a) i) Most students managed to recall the equation for photosynthesis and credit was given to a word or symbol equation providing the formulae were correct. (The formula equation was not required to be balanced)
- ii) Many students struggled with the clear idea of a deduction about photosynthesis from the data and tended to simply state what the data suggested. For example “Plant A photosynthesises faster than plant B” was a common answer but only the better students progressed from this observation to the statement that “brighter light results in a greater rate of photosynthesis”. Only the better students scored 3 or more on this part of the question.
- b) Most students realised chloroplasts are the organelles where photosynthesis takes place but many neglected to mention the need for light for the second mark. A surprising number of students failed to recall the function of mitochondria.

Question 2

- a) Completing the EM frequency figure was correctly completed by the majority of students and b) parts i) and ii) were generally correctly answered.
- b) iii) proved to be a challenging question and precision of language for this part was required. The clear idea of IR radiation being EMITTED 24 hours a day but a visible image being dependent upon visible radiation being REFLECTED was only achieved by A grade candidates.
- iv) required the idea of reflection and random dispersion of light to be mentioned. Weaker students talked about the light being split into its component colour frequencies.
- c) i) Generally an easier mark but many students mistakenly referred to a similarity in “colour” between low cloud and the land rather than understand that the “colour” implied similar temperature in an IR image.
- ii) Generally answered well.

Report on the Units taken in January 2008

- d) The calculation was done well by students who were familiar with this type of calculation and 4 marks were frequently awarded. At the other end of the spectrum, candidates who were clearly unfamiliar with numbers in standard form and a simple manipulation of the equation scored poorly.

Question 3

- a) i) Most students labelled electron and electron shell/orbital correctly.
ii) Few students realised that it was the different **predictive** values of different models in different circumstances that was important.
- b) i) and ii) Both marks were achieved by most candidates
- c) Too many students included an electron to give a hydrogen atom when only the nucleus was required.
- d) For alpha emission a particle resembling an alpha particle (2p and 2n) was required plus a larger remaining particle.

For the fission process, two isotopes of similar size (about half size of original) plus a neutron(s) was required. Many students were unclear as to how to answer this question clearly.

- e) Few students scored 4 marks here but many picked up 1 or 2. Specific environmental hazards were required rather than a general mention of harmful.

Question 4

- a) Speciation was required
- b) i) The aim of this question was for students to appreciate that species could **not** interbreed and thus the population would be a mixture of long and short beaks based on either A breeding or B breeding. However, many students took this to be a dominant recessive allele type question and thus on reflection the examiners credited either box 3 or 4. Part ii) had to be consistent with the choice in b i)
- c) Best adapted to a particular environment was required.
- d) Number adapted to a specific environment does not imply advanced.
- e) i) Natural selection ii) Geographical isolation or mutation.

Question 5

- a) Students seemed a little confused as to how to indicate their answers on the sheet but both answers were generally achieved.
- b) The key idea behind this question was to appreciate that nutrients are recycled but the flow of energy goes only in one direction. Too many students talked about energy being "recycled" and answers were frequently badly structured (see comment in general introduction). Again, in an extended question, specific details were expected rather than vague generalisations.

2844 Science and Environmental Management

Question 1

- (a) (i) The definition of allele was often vague and did not score.
- (a) (ii) This was done well by most candidates
- (b) There were many good answers here where candidates realised all of the plants produced were Tt and would be long stemmed because T is dominant.
- (c) Again there were many correct answers with clear working shown.

Question 2

- (a) The meaning of haploid was known quite well and it was often well-expressed.
- (b) There was a range of response to this question. The vast majority correctly tried to follow the course of mitosis. The best candidates could pick up 6 of the marking points. Sometimes, however, the events were in the wrong order.
- (c) (i) This was well answered by the best candidates.
- (c) (ii) Few candidates could score three marks here but one or two was quite common.
- (d) (i) Candidates generally gave suitable sources.
- (d) (ii) Frequent answer involved algae feeding on the nitrate. The answer required was algae growth is promoted by nitrates.
- (d) (iii) Poorly answered with most answers based wrongly on eutrophication. The idea of the population of some fish species increasing while others were decreasing was not appreciated.

Question 3

- (a) There were many good diagrams but some drew a diagram for a sodium atom rather than a sodium ion.
- (b) Some candidates had difficulty rearranging the equation. Where they attempted the correct processing they made mistakes with significant figures, indices and units.

Question 4

- 4 (a) (i) Many candidates could appreciate that one spot was the pesticide and the other two were breakdown products.
- (a) (ii) Few could give a correct answer here.
- (a) (iii) The R_f value was usually correctly calculated.
- (b) Usually some progress was made in this question.
- (c) Candidates often knew enough about t.l.c and g.l.c. to score marks.

Question 5

- (a) (i) Most scored the mark here. If they were wrong it was because exothermic and endothermic were the wrong way round.
- (ii) The value for sodium fluoride was usually right, but the other two were sometimes the wrong way round.
- (b) This question was very badly done. It was commonly believed that energy was needed to make bonds and released when bonds were broken. Also if they got it the correct way round they stated that in an exothermic reaction only bonds were formed and in an endothermic reaction only bonds were broken. The idea of two processes occurring together and whether the reaction was exothermic or endothermic depending upon the enthalpy changes was not understood. Few candidates related back to the three compounds in the table.
- (c) There were very few scoring answers here with strange ideas such as evaporation of the water being given.

Question 6

- (a) This was usually correct.
- (b) Few could give the three correct names but could give the correct initial letters. This received two of the three marks. The percentages tended to be all correct or all wrong.

Question 7

- (a) Every candidate filled every space with a word and most scored a good mark.
- (b) (i) and (ii) There were some very good answers to these parts from candidates who understood the process of genetic engineering.

Grade Thresholds

Advanced GCE Science (3885/7885)
January 2008 Examination Series

Unit Threshold Marks

| Unit | | Maximum Mark | A | B | C | D | E | U |
|------|-----|--------------|----|----|----|----|----|---|
| 2841 | Raw | 60 | 46 | 41 | 36 | 32 | 28 | 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 | 71 | 63 | 55 | 48 | 41 | 0 |
| | UMS | 90 | 72 | 63 | 54 | 45 | 36 | 0 |

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

| | Maximum Mark | A | B | C | D | E | U |
|------|--------------|-----|-----|-----|-----|-----|---|
| 3885 | 300 | 240 | 210 | 180 | 150 | 120 | 0 |
| 7885 | 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 |
|------|---|------|------|------|-------|-------|----------------------------|
| 3885 | 0 | 11.1 | 55.6 | 77.8 | 100.0 | 100.0 | 9 |
| 7885 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

9 candidates aggregated this series

For a description of how UMS marks are calculated see:

http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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