General Certificate of Education (A-level)

Environmental Studies

ENVS2: The Physical Environment
Report on the Examination

2440
June 2013

Version: 1.0

Further copies of this Report are available from aqa.org.uk

General

This proved to be an accessible paper. Every question section was attempted by over 90% of the students. The range of marks gained was wide, allowing good discrimination between students of different abilities. No questions proved to be so easy or so hard that they failed to discriminate. The lowest mean score for all students as a percentage of the maximum was 18%, while the highest was 80%.

Question 1

(a) This proved to be a good introductory question and gained the highest mean score.

(b) Over 60% of students gained both marks with good descriptions of nuclear fusion. The most common errors were to refer to fission, splitting of nuclei and uranium.

Question 2

(a) (i) This was not well answered by many students, who did not understand the concept of a dynamic equilibrium and the need for a balance of additions and losses.

(a) (ii) About 50% of students selected the values from the diagram needed to calculate the residence time for the oceans.

(b) (i) This was generally well answered. Nearly 40% gained full marks with good descriptions. A significant minority wrote imprecise answers which could not be awarded marks, although the students may well have understood the correct answer.

(b) (ii) Most students understood that porosity referred to space volume and permeability refers to flow, but many failed to gain marks by referring to a yes/no situation eg porous means the rock can hold water, rather than realising there is a wide range of porosities.

(c) (i) Many students gave good examples of human activities that add large amounts of water to the atmosphere, such as irrigation and reservoir construction.

(c) (ii) Over 70% of students gained a mark for understanding that the extra water vapour will soon be lost due to condensation and evaporation.

Question 3

(a) This question was generally poorly answered. Only a minority of students could apply their general understanding of good experimental methodology to an unfamiliar situation. Better answers referred to the principles of how to locate sample position.

(b) This was also poorly answered by most students. Better answers gave details of sample size, collection method and timing. Many students gave simplistic answers such as: ‘at the same time of day’ or ‘the same time of year’ with no explanation of why it may affect the results.

(c)(i)/(ii) Nearly 60% of students correctly read the value 60 from the triangular graph, but only 40% could use the graph to identify the range of sand content in sandy clay soils in part **(ii)** In part **(ii)**, students gained credit if they gave higher and lower values or the range (ie higher – lower value).

Question 4

(a) Over 80% of students gave a correct example of a rock that often forms aquifers.

(b) This was generally poorly answered. Better students correctly referred to high porosity and permeability. Some students think that the permeability of an aquifer has to be low so that water does not 'leak out'. A significant minority misunderstood the question and described the features of the cap rock or the rock beneath the aquifer.

(c) While over 80% of students gained one mark, only the better answers gained both marks, usually by using appropriate technical terms related to the lowered water table, the change in water pressure and salt water incursion.

(d) Over 80% of students gained the one mark available. Weaker answers simply referred to treatment cost, while better answers referred to what was more expensive for desalination: energy inputs to produce high pressure.

(e) This question was surprisingly badly answered with only 40% gaining more than half marks. While some students understood that the aquifer rock acts as a natural filter, very few understood that the rapid changes in river water quality and the greater likelihood of contamination means that the water has to be treated more as a precaution. Few students gained the relatively straightforward marks for naming contaminants that are more likely to be present in river water.

Question 5

(a) (i) Nearly 90% of students gained one mark, usually by naming a method such as baffle mounds, only 50% gained the second mark by explaining how it works. Expressions such as *deflect sound* gained a mark but vaguer statements such as stop or prevent sound (reaching surrounding areas) did not.

(a) (ii) Over 80% of students gained one mark, usually by referring to water sprays, but less than 40% could explain how they worked.

(b) Better answers gained marks by stating the cause of increased damage then giving an addition statement of how that damage is actually caused or an example. The most common aspects chosen were turbid drainage water, greater spoil disposal problems and the greater surface disturbance.

(c) Universal indicator and electronic meters were both commonly quoted. Litmus and similar indicators that just show two colours gained no marks as they do not indicate the actual pH. For the use of a pH meter to gain full marks, reference had to be made to its being calibrated.

Question 6

(a) A clear understanding of the nitrogen cycle remains a problem for many students. 33% of students gained no mark. The answers of many showed they do not understand the difference between a process and a reservoir.

(b) (i) This was generally poorly answered. Most students ignored the reference to human activities and just talked about nitrates dissolved in water that drains from fields. A small number gained both marks by referring to the consequence of humans draining fields: more aerobic conditions and therefore more aerobic processes such as nitrogen fixation and fewer anaerobic processes such as denitrification.

(b) (ii) This was also badly answered with fewer than 50% of students gaining a single mark and fewer than 20% gaining both marks. The presence of root nodule bacteria is not well known and their function even less so.

(b) (iii) Only a minority of students understood that crop removal involves the removal of the nutrients in the crop biomass which, unless replaced, will deplete the soil nutrients.

Question 7

(a) Around 75% of students knew that the purpose of Heating period 1 was to dry the soil.

(b) Few students understood that, since the experiment was about organic matter content of the soil, knowing the water content was irrelevant, so preventing water gain or loss in period 1 did not matter. The storage conditions were to prevent the loss of OM by breakdown. In storage period 2 preventing water gain was essential to prevent a mass increase. Weaker students gave vague answers about not spilling the soil or mixing samples up.

(c) About 70% of students gave an appropriate temperature.

(d) Only about 25% of students could carry out the percentage calculation.

(e) Roughly equal numbers of students gained each possible total mark. Better answers gave names of suitable taxa and used technical terminology such as enzymes and digestion rather than vague terms like eat.

Question 8

(a) While around half the students gained one mark for stating that the graph shows a positive correlation, or describing it, only a quarter stated that there were points away from the general trend. Some students ignored the command word 'describe' and explained the trend.

(b) Fewer than 10% of students gained more than 2 marks. Many students did not understand the term per capita.

(c) This was generally well answered.

Question 9

(a) The sections of this question were answered correctly by about 50% of the students except part iv which was very badly answered. While many students knew that CFCs release chlorine which causes ozone depletion, few also knew that they also absorb IR radiation and therefore contribute to global climate change.

(b) This question discriminated well between students of different abilities. About 75% of students gained three or more marks. Better answers explained how negative feedback mechanisms re-stabilise dynamic equilibria, positive feedback mechanisms de-stabilise them, then went on to use examples to illustrate these principles.

In general, better students used good practices in their approach to the questions: particularly following command words in the questions and using suitable technical terminology and examples where appropriate.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator www.aqa.org.uk/umsconversion