



**General Certificate of Education (A-level)  
June 2011**

**Environmental Studies**

**ENVS3**

**(Specification 2440)**

**Unit 3: Energy Resources and Environmental  
Pollution**

***Report on the Examination***

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## General

This proved to be an accessible examination with almost all candidates attempting all sections of all questions.

### Question 1

This was well answered with over 75% of candidates gaining 4 or 5 marks.

### Question 2

This was generally poorly answered with fewer than 50% of candidates gaining 3 marks. Candidates were not expected to give full names or define the abbreviations. They had to name an area of the pollution topic to which the abbreviation related.

### Question 3

- (a) This question was generally not well answered. While many referred to low individual pollution emissions, fewer referred to fuel consumption and very few showed an understanding of an overall optimum.
- (b) Over 50% of candidates gained full marks, with many giving chemical details of reactions producing PANs or tropospheric ozone. Weaker candidates did not understand the meaning of the term 'secondary pollutant'.
- (c) This was the least well answered section in the examination. Many candidates described why lichens are good biological indicators rather than how sample sites would be chosen.

### Question 4

- (a) Most candidates could describe one design feature, with double hulls and separate ballast tanks being the most common choices. Some candidates described features of tanker operation rather than design.
- (b) Nearly 50% of candidates gained 3 marks. Many candidates lost marks by describing the direct effects of oil on living organisms.
- (c) About 50% of candidates gained one mark, usually by referring to faster bacterial action at warmer temperatures. A significant number referred to high temperatures killing bacteria or denaturing enzymes, which is not likely at the temperatures that would occur following an oil spill.

### Question 5

- (a) A pleasing percentage of candidates clearly understood the concept of energy density. The most common answers referred to the smaller quantity of fuel required and the smaller storage volume required.
- (b) The concepts of the need to store energy to match fluctuating supplies and demand was well understood. Better answers referred to how the hydrogen is produced and the usefulness of hydrogen in uses that require a high energy intensity.

### Question 6

- (a) Over 30% of candidates gained full marks. Most referred to variations in ore purity, the distance to market or extraction differences, such as depth of overburden, overburden hardness or the energy needed for pumping drainage water.
- (b) (i) This was one of the best answered question sections. Most candidates understood that the lower mass of aluminium and plastics more than compensated for a higher embodied energy over the lifetime of the vehicle.
- (b) (ii) This was also well answered. Poorer answers ignored the reference to the end of life and described features such as aerodynamics.
- (c) This was generally well answered with many candidates giving specific examples and benefits. Weaker answers used vague terms such as eco-friendly, low-impact, environmentally friendly or greener. These are never likely to gain a mark.

### Question 7

- (a) This was surprisingly poorly answered with many candidates just rephrasing the question by saying the materials would not have to travel as far.
- (b) Only better candidates gave specific examples of pollutants that would not be released as much.
- (c) Only better candidates linked specific ways in which solar power is used to specific ways in which other energy inputs would have been used.
- (d) This was one of the more poorly answered questions. Many candidates gave vague answers referring to insulation. Better answers described how double glazing prevents convection currents or rates of conduction. Some named gases which are poor conductors. Very few understood that there is an optimum gap with heat losses being greater at larger or smaller gaps.
- (e) The vast majority of candidates gained 2 marks, usually by referring to rainwater collection and a named use, such as washing or toilet flushing. Few gained marks by referring to waste water treatment and disposal.

### Question 8

In general, candidates gained lower mean marks for the essays than for the short-answer questions, with mean marks for all candidates of 40 – 45%. The three most common failings were:

- a lack of structure with different issues being mixed up.
- lack of examples
- a lack of specific technical terminology

Better answers almost always started with a plan.

- (a) Many candidates gave good descriptions of the deoxygenation and related problems caused by organic and inorganic pollutants, but many confused them, often giving two descriptions of eutrophication. Many candidates also confused aerobic and anaerobic conditions and processes.
- (b) A pleasing number of candidates referred to a wide variety of pollutant properties, but only better ones used specific named examples and explained how the property affected the environmental damage caused.
- (c) This was, surprisingly, the most poorly answered essay. Many answers were vague, with much repetition of 'high emissions' and 'low emissions' or high and low impact with little or no detail.

**Mark Ranges and Award of Grades**

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