General Certificate of Education

Environmental Studies   2441

ENVS3   Energy Resources and Environmental Pollution

Report on the Examination

2010 examination - June series

General

This was the first examination of this A2 module for the new A level Environmental Studies specification. It was hoped that it would prove to be academically rigorous, yet be accessible to all candidates. This proved to be the case, with almost all candidates attempting all questions. As intended, some questions proved easier with most candidates scoring well, while others were more demanding with better candidates demonstrating their higher skills.

Question 1

This was generally well answered with most candidates gaining four marks. The most common errors were to state that uranium is a fossil fuel and tidal power is unpredictable.

Question 2

This was a poorly answered questions, perhaps because candidates had to draw on knowledge from a variety of topics that involve ozone.

(a)   (i)   Few candidates understood the role of ozone in oxidising other pollutants.

(a)   (ii)   Many candidates gave inaccurate or vague answers with terms such as reflected, blocked or filtered.

Question 3

This was the second best answered question. Most read values from the graph accurately, but many did not know how to interpret a compound graph, taking the values between lines rather than just the value of the upper line.

Most candidates gave good descriptions of the pros and cons of nuclear and solar power. Better answers gave precise descriptions of the risks of nuclear power with precise use of terminology and specific health issues. Weaker answers used vague terms such as 'environmentally friendly' or 'greener'.

Many issues are not fully understood with differing opinions. Credit was given for any well-justified issue eg solar panels do not release pollutant emissions during use (for), but their manufacture does (against) but less than using fossil fuels (for).

Question 4

Answers to part (a) showed that many candidates find analysing and describing graphs difficult. The main issues were the similar general trend on each weekday but a different trend at the weekend. Few described the fluctuations during the daytime 'plateau'.

Some candidates gave explanations of the trends rather than a description.
In part (b) very few candidates gave comprehensive answers. Most knew that demand for electricity is higher when people are at work but most omitted to say what the electricity is used for. Many gave uses that don't use mains electricity, such as driving to work.
Answers to part (c) included many misconceptions about energy storage by the electricity industry.

Credit was given for technologies that are well-established and those that are being developed eg fuel cells.

There are no large-scale methods of storing electricity itself so surpluses must be converted into other forms of energy, such as gravitational potential energy (pumped-storage HEP) or chemical energy (eg hydrogen from the electrolysis of water).

Batteries are not used in power stations (other than to power emergency cooling in nuclear reactors) and electricity is not stored in the National Grid, which is purely a distribution system.

Some candidates described methods of conserving energy, reducing demand or using renewable energy resources which missed the point of the question.

Question 5

This question was generally well answered with many candidates giving details of chemical processes. Weaker candidates believe that catalytic converters are used to reduce all atmospheric pollutants.

Many candidates did not have a full understanding of the use of lichens as biotic indicators. Almost all knew they are sensitive to atmospheric pollution, particularly acid pollutants. Few candidates described how this could be determined in terms of the differing sensitivities of a variety of species and observable changes, such as abundance, size or reproductive structures. Descriptions of how the study could be organised were also given credit eg location of study sites and sample numbers.

Question 6

(a)   Was generally well answered, but many could not select data from the table to realise that the increases in power are predictable and constant as wind speed or blade diameter increase.

(b)   Weaker candidates gave vague answers with no explanatory comments or examples eg habitat damage or impact on wildlife.

Site accessibility is clearly a confusing issue. Access to the existing local or National Grid and access roads is more important than being in isolated areas such as the Orkneys (which do use wind power).

A large minority believe that windy areas are avoided because of the risk of blade damage. This would influence the choice of blade design but would not make the site unsuitable.

(c)   Many candidates ignored the word 'economic' in the question.

Question 7

This question required candidates to apply their knowledge of pollution and general scientific methodology to an unfamiliar case study. No knowledge of benzene was expected or required.

The focus of the question was the evidence of poor methodology in the studies of benzene.

Better candidates selected quotes from the text and explained why they would affect the validity of the results.

The most commonly quoted problems were:
Small sample number
Inaccurate dose measurement
Possible synergistic effects
Variability of study subjects
Lack of knowledge of previous exposure
Transferability to humans of animal tests
Ethical problems of testing on humans

Question 8 Essays

Essay (a) was the most popular but worst answered essay, being attempted by about half the candidates, with (b) and (c) being attempted by about a quarter of the candidates each.

Better essays included even coverage of the major issues, supported with explanatory comments and examples.

(a)   Many candidates concentrated on behavioural changes such as using public transport or walking. Better candidates also gave specific examples of vehicle design with descriptions of how they work.

Many candidates gave very brief coverage of industrial energy conservation, often giving examples that are more applicable to domestic energy conservation, such as using low-energy lightbulbs or building insulation.

(b)   This was the best answered essay. Most candidates included descriptions of landfill, incineration and recycling, with many giving details of methods and how they work.

Better candidates also gave details of specialist industrial wastes such as asbestos or radioactive wastes.

Some included details of sewage treatment. Sludge treatment and wastes trapped in screens or grit traps were given credit, but details of fluids were not relevant.

(c)   While some answers were very good, some candidates missed the specific focus of the title and gave very general answers of the 'all I know about' style.

Better answers covered wind direction and velocity, water currents, temperature, pH, oxygen levels, biota, topography etc, backed up with named pollutants and effects on pollution impact.

Mark Ranges and Award of Grades
Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.