Rewarding Learning

CCEA GCE - Environmental Technology
(Summer Series) 2015

Chief Examiner's and Principal Moderator's Report

environmental technology

Foreword

This booklet outlines the performance of candidates in all aspects of CCEA's General Certificate of Education (GCE) in Environmental Technology for this series.

CCEA hopes that the Chief Examiner's and/or Principal Moderator's report(s) will be viewed as a helpful and constructive medium to further support teachers and the learning process.

This booklet forms part of the suite of support materials for the specification. Further materials are available from the specification's microsite on our website at www.ccea.org.uk

Contents

GCE ENVIRONMENTAL TECHNOLOGY

Chief Examiner's Report

Assessment Unit AS 1 The Earth's Capacity to Support Human Activity

This was the second sitting of the AS Paper in Environmental Technology specification. There was a wide range of responses to the questions with a pleasing overall improvement in the level of response compared to the previous year. There was no evidence that any of the questions were too difficult for candidates to answer at least some sections of each. In addition there was no evidence that the paper was too long for the time allocated.

Q1 This question was answered well by the majority of candidates.

In Section (d) a number of candidates appeared to be unsure about the role of the refrigerant liquid in heat pump technology.

Q2 In this question dealing with wind power most candidates were aware of the differences between Vertical and Horizontal Axis Wind Turbines. In Section (b) a number of candidates appeared to be unsure of the nature of the Betz Limit and its relation to real life power efficiencies in wind turbines.

Section (c) was answered well although some candidates referred to the temperature of the wind tower structure in Part (ii).

Section (d)(ii) was answered poorly by a large number of candidates with a significant number unable to show the effect on turbine mass of increasing blade length.

Q3 In this question, Sections (a) and (b) were well answered by a large number of candidates.

In Section (c) some candidates confused passive and active solar design techniques.

In Section (d) some candidates were able to describe financial incentive schemes available to homeowners who install solar panels but were unable to name specific schemes.

Q4 Section (a) of this question was well answered. In Section (b) some candidates did not clearly discuss the role of CHP in improving energy efficiencies in traditional power plants.

Q5 In general this question was answered well. A number of candidates were unclear about the use of excess energy produced by renewable forms of energy at off peak times being used in the Compressed Air Energy Storage system for use at times of high demand.

Q6 Sections (a) and (b) of this question were well answered by a large number of candidates but in Section (c) a significant number did not provide an appropriate description of the process of gasification of biomass with some responses referring to anaerobic digestion.

In response to Section (d) applications for syngas were vague in many cases.

Q7 This question produced some excellent responses. In the best answers candidates provided a clear and logical discussion of the part of fossil fuels in the development of modern society using the bullet points provided in the question as a basis for the structure of their answer.

Some responses failed to make reference to the trends in fossil fuel use globally as requested in the question.

Principal Moderator's Report

Assessment Unit AS 2 Renewable Energy Technologies

Work presented by the candidates was generally of a good standard. Marking of candidates work was of the correct standard and teachers annotated their marking clearly. The inclusion of the Assessment Criteria and Mark Band Sheets showing the teachers assessment mark was helpful.

In AO1, candidates generally demonstrated good research skills and produced detailed research summaries. Written communication skills were generally good with specialist vocabulary used to good effect. Some referencing was still not accurately presented. Some candidates did not link the issues within the scenario to their desktop research summary, or base the research on renewable energy technologies used in similar scenarios.

In AO2, most candidates designed good practical investigations however some candidates made no link within the write ups to the scenario or gave a strong rationale for the design. Many candidates' calculations and experimental results contained no or few errors. Some candidates showed a lack of interpretation or analysis of the data from their practical work.

In AO3, it was found that many candidates did not consider building heat loss in their discussion and recommendation. Marks would be enhanced by clearly setting out and making reference to the issues highlighted in the scenario. Candidates could also enhance their work by providing a more detailed risk assessment for the practical investigation.

Chief Examiner's Report

Assessment Unit A2 1 Building and Managing a Sustainable Future

This was the first cohort to take the qualification in Environmental Technology at A level and it is pleasing to report that candidates produced a good range of responses to the questions set in the paper. All questions were attempted with no evidence of any questions posing particular or specific problems for candidates. All of the questions were accessible and there was no evidence of candidates not having enough time to attempt all sections of the paper. Candidates and teachers deserve credit for the hard work and preparation which went into their approach to the examination.

Q1 This question dealt mainly with Carbon Capture and Storage with the majority of candidates displaying a good level of knowledge of the concept. In Part (b) candidates were expected to be familiar with the three specific phases of Carbon Capture and Storage.

Whilst most candidates were able to outline the processes associated with each phase some did not outline the individual phases as required by the question.

In Part (c) of the question candidates displayed a good knowledge of the advantages and risks associated with geo-engineering.

Q2 This question focussed on wave and tidal energy. In Part (a) most candidates displayed a good knowledge of the operation of a wave energy attenuator although some did not provide sufficient information on the operational processes in particular the hydraulic rams in the connecting sections of the device.

Part (b) on environmental implications was well answered as was Part (d).

In Part (c) a number of candidates did not provide enough information comparing tidal stream generators and tidal barrages and contrasting the differences between the two types of device.

Q3 The first part of this question dealing with One Planet Living was well answered with candidates displaying a good level of knowledge of the different approaches required by the concept. In Part (b) a number of candidates had difficulty explaining the concept of an ecological footprint and its measurement.

A number of responses dealt with the use of resources without referring to their consumption over a year and the use of the amount of land and sea required to support this.

Q4 In this question dealing with hydrogen fuel cells the vast majority of candidates were able to answer Parts (a), (b) and (d) satisfactorily. However, in Part (c) it was evident that a number of candidates were not able to explain the operation of a typical hydrogen fuel cell with specific reference to the anode and cathode of the cell itself.

At this level candidates must be able to explain the splitting of hydrogen atoms into protons and electrons at the anode, their subsequent movement and recombination at the cathode with oxygen.

Q5 Responses to Part (a) of this question were better than those to the Part (b).

In Part (b) it was evident that a significant number of candidates were not familiar with the precise nature of biomass pre-treatment and cellulose hydrolysis as steps in the industrial production of bioethanol from biomass.

This lack of knowledge was also evident in the response of a number of candidates to Question (b)(ii) in outlining the nature of glucose fermentation.

Q6 The calculation in Part (a) of this question is standard in nature and this was evident in the number of correct responses provided. Parts (b) and (c) of this question were also well answered.

However, Part (d) was poorly answered, or not at all, by a significant number of candidates although the content, Zero Carbon Homes hierarchy, is clearly mentioned in the specification for the subject.

Q7 Responses to this question were, in a number of cases, disappointing. Candidates are given a clear direction as to the nature of their response to a question of this type in the bullet points provided in the stem.

In order to achieve a high mark candidates must provide a balanced overview of the concept in question making specific reference to the issues identified in the question. Candidates are advised to structure their response around the bullet points taking each one in turn and identifying any threads between them.

Quality of Written Communication is being assessed in this question so candidates must pay attention to spelling, grammar and punctuation and style and form of presentation.

A bullet point or short points made in distinct phrases approach is not appropriate for this type of question. Responses should be paragraphed and constructed in a coherent and logical fashion with use of relevant technical terms.

Q8 This question provoked a wide range of responses. For Part (a) the pollutant treated by the various micro-organisms must be identified clearly. The description of phytoextraction in Part (b)(i) was well answered by a number of candidates but some did not explain how the metal uptake is harvested.

Part (b)(ii) was well answered. There appeared to be some confusion on the part of some candidates in their understanding of bio hydrometallurgy and this was evident in the range of responses to Question (c)(i) and (ii).

Q9 A number of responses to this question concentrated on the difficulties associated with the promotion of sustainability in rural communities to the exclusion of the possible solutions to these.

The question was based around the issues which underpin sustainable rural development as alluded to in the italicised points in the stem of the question. The best responses took these points and provided a balanced overview of the various issues involved.

The points made in reference to Question 7 regarding presentation and style are also relevant to this question.

Teachers are advised to use these questions and those in the Sample Assessment Materials as practice for students in preparation for the examination next year.

Principal Moderator's Report

Assessment Unit A2 2 Environmental Building Performance and Measurement

Work presented by the candidates was generally of a good standard. Marking of candidates work was mostly of the correct standard and teachers annotated their marking clearly. The inclusion of the Assessment Criteria and Mark Band Sheets showing the teachers assessment mark was helpful.

In AO1, the technical report was generally of a good standard but some of candidates could have improved their work by giving a more in-depth overview of CSH within the wider context of sustainability measurement. Some candidates did not give a detailed description of the building they had chosen to investigate.

In AO2, many candidates provided limited information when identifying the physical measurements for the specified categories. Many candidates made little or no reference to Health and Safety considerations. In the task of identifying and sourcing building data, marks would be enhanced by using a variety of sources. Referencing, generally could be better.

AO3, in many cases, was well researched and presented. Candidates mostly gave a good list of recommendations but some gave only a basic evaluation of the measurement processes. Stronger references to Health and Safety considerations for this section would enhance student's marks. Clearer evaluation of the sustainability measurement processes used throughout the task would also enhance students marks.

Contact details

The following information provides contact details for key staff members:

- Specification Support Officer: Nuala Tierney
  (telephone: (028) 9026 1200, extension 2292, email: ntierney@ccea.org.uk)
- Officer with Subject Responsibility: Judith Ryan
  (telephone: (028) 9026 1200, extension 2133, email: jryan@ccea.org.uk)