

CCEA GCE - Environmental Technology
(Summer Series) 2014

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

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GCE ENVIRONMENTAL TECHNOLOGY

Chief Examiner's Report

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

This is the first year in which candidates were entered for this unit and a number achieved high marks and provided clear evidence of their knowledge, understanding and skills drawn from the specification content. All of the questions contained in the examination paper produced responses from candidates. There was no evidence of any question lacking accessibility or providing too high a challenge. There was no evidence that the paper was too long in terms of content, it appeared all candidates had sufficient time to attempt all of the paper.

- Q1** The first two parts of this Question (a)(i) and (ii) were generally answered well with the majority of candidates being aware of the terms fossil fuel and renewable energy source. Part (b) dealing with European, UK and Northern Ireland targets was not well answered with a significant number of candidates being aware of the target areas but failing to quantify the actual targets themselves. Part (c) required candidates to describe two issues surrounding the use of carbon trading. A significant number failed to do this and provided a description of the process of carbon trading, candidates did not address the issues surrounding its use.
- Q2** This question dealt with wind power and was answered well in the first two Parts (a)(i) and (ii) with the majority of candidates being aware of the main energy transformations and the purpose of the yaw mechanism. In Parts (b)(i) and (ii) a number of candidates were able to explain the annotated points on the graph but did not identify them as asked for in the question. The responses to Part (c)(i) were generally satisfactory but a large number of candidates were unable to perform the calculation required in Part (c)(ii).
- Q3** The majority of candidates were able to state three factors to be considered when calculating the roof area required to install flat plate solar panels on a house as required in Part (i). The calculation in Part (ii) was performed successfully by a number of candidates but a significant minority failed to recognise the need to meet at least 65% of the annual hot water demand as a factor to be taken into account. The sketch of the flat plate thermal solar panel required in Part (b) proved challenging for a number of candidates with some confusing solar thermal with solar PV. The last part of the Question (c)(i) and (ii) was well answered by a large number of candidates.
- Q4** In general this question was not answered well. In Part (a)(i) a large number of candidates were able to provide a response explaining the purpose of the anti-reflection coating in a PV cell although some required a degree of interpretation due to the lack of technical language. In Part (a)(ii) it was evident that the role of the metal contacts in a PV cell was not well known with a significant number of candidates making reference to heat transfer. This pattern was continued in Part (iii) with vague and generalised explanations of the operation of a PV cell being provided in a number of cases. Clear reference is made to the required knowledge for this question in the specification but there was evidence of a poor level of knowledge in a significant number of scripts. Responses to Part (b) also displayed a lack of basic knowledge on the part of a number of candidates. In response to Part (c) most candidates displayed

a level of knowledge and understanding of the need for and use of an automated tracking system. However, a number of candidates provided an answer which did not contain sufficient detail concerning the various requirements of a tracking system to enable them to gain all three marks allocated to the question.

- Q5** In response to this question some candidates failed to identify the trend indicated in the bar chart and to link this to the increased use of oil. Responses to Parts (b)(i) and (ii) were generally poor.
- Q6** The majority of candidates provided a correct response to the first bullet point of Part (a)(i) but a significant number did not explain the concept of energy density in the second bullet point. It was evident in response to Part (a)(ii) that the process of gasification in relation to biomass was not well understood. In response to Part (b) a number of candidates clearly understood the advantages and disadvantages of using commercial anaerobic digesters but did not fully understand the debate concerning the growing of crops for energy.
- Q7** This question provided a wide range of response levels. A number of candidates appeared not to have a clear knowledge and understanding of smart grid. In a number of cases answers were not structured in an appropriate way and only made reference to three or four of the suggested reference topics. The question clearly outlined the points to be referred to and candidates must exhibit their knowledge of these concepts. They must then show how the points relate to each other in the context of the discussion required by the question. Some candidates used additional answer pages for this question. Whilst this is acceptable it is not essential to achieve a high mark in the question. In response to this question candidates should use appropriate specialist terms and display good spelling, punctuation and grammar. The form and style of the response should be sentences and paragraphs of prose as opposed to short notes or bullet points.

Principal Moderator's Report

Assessment Unit AS 2 Renewable Energy Technologies

In general the marking was found to be slightly generous. However, most marking was within tolerance.

Within Assessment Objective 1, some of the centres work was poorly referenced with failure to clearly link the reference to the specific part of the research. Many of the candidates work would have been enhanced by giving reference to current installations which are at present in use. The practical investigations, in some cases, lacked structure in terms of a rationale which showed clear design and methodology. The results of the investigations should provide a basis for the recommendations to be made in Assessment Objective 3. Some candidates did not provide convincing evidence that the experiments had actually been performed and there was some evidence that results had been obtained from the internet. In terms of the biomass aspect, too many candidates did experiments using wood pellets which was in contrast to the scenario of agri-waste. A pleasing number of candidates did investigations using biomass materials which bore relevance to the use of agri-waste. Care should be taken that results of investigations do not show too much similarity

The marks achieved in Assessment Objective 3 were generally lower. Marks would have been enhanced if for each technology being recommended consideration had been given to the site details given by the scenario, cost benefit analysis, environmental impact and security and continuity of supply. Calculations to prove capacity of the chosen technologies to meet the target of 80% energy needs were often not provided.

Contact details

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