Rewarding Learning

CCEA GCE - Environmental Technology
Summer Series 2016

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 was the third sitting of the AS paper in the Environmental Technology specification. Candidates provided a wide range of responses to the questions.

There was no evidence that any of the questions had proved to be too difficult for candidates to answer.

In addition, there was no evidence that the paper was too long for the allocated time.

Q1 All parts of this question were answered well by the majority of candidates.

In Part (c)(i) a number of candidates made reference to changes to the ozone layer around the earth which was not relevant to the question.

Q2 In general, this question was well answered although a surprising number of candidates were unable to provide a definition of biomass in response to Part (a).

Response to Parts (c) and (d) displayed a good level of knowledge of the issues surrounding the use of biomass and nuclear power as alternatives to coal in the generation of electricity.

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

In Section (c) some candidates did not provide a clear form of the formula for the Coefficient of Performance.

A surprising number of candidates were unable to re-arrange the data provided in order to calculate the energy used by the heat pump.

Q4 Part (a) of this question was generally well answered although some candidates appeared to be unaware of the precise significance of the Betz Limit.

In Part (b) some candidates did not provide two ways in which the performance of the turbine could be influenced by each of the named factors. Some responses to this question and Part (c) were too vague.

Part (d) was well answered.

Q5 In general, this question was answered well although in Part (a)(iii) a number of candidates did not provide the names of the correct toxic gases. Some gases were referred to which might be released during the incineration of plastic but which are not toxic.

In Part (b)(ii) some candidates referred to general laboratory items which might be used in experimental work but which do not themselves measure tensile strength.

Responses to Part (c) displayed a good knowledge of the issues surrounding biodegradable plastic.

Q6 Parts (a) and (b) of this question were generally well answered by a large number of candidates but in Part (c) a small number of candidates did not provide appropriate factors which would impact on the potential location of a pumped hydro energy storage system.

Q7 This question produced a variety of responses. In the best answers candidates provided a clear and logical discussion regarding the feasibility of generating electricity from solar PV using the bullet points provided in the question as a basis for the structure of their answer. Some responses surprisingly failed to provide sufficient detail on the first bullet point on the amount of solar energy available for energy purposes.

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 a distinct phased 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.

Teachers are advised to use these questions and those in the Sample Assessment Materials and Exemplification of Examination Performance materials as practice materials for students in preparation for the examination in future years.

Principal Moderator's Report

Assessment Unit AS 2 Renewable Energy Technologies

Marking was good, accurate and within tolerance. Annotation was good, detailed and relevant. All student task responses were well packaged and complete. Some of the candidates produced high quality work and most candidates showed a very thorough understanding of the scenario and the implementation of renewable energy technologies to it.

AO1: Reports were well illustrated and generally a comprehensive and thorough overview of the three renewable technologies was given. The reports, were excellently written using specialist vocabulary. Referencing was sometimes a little erratic with most candidates correctly identifying the reference to the text but a few only giving a bibliography type list with no link to the text at all.

AO2: The practical investigations were well carried out. The design used was appropriate and clear. The calculations produced by most candidates were relevant and accurate.

AO3: Most physical measurements were accurate with few errors. The data was mostly presented in a range of formats. Most candidates produced a comprehensive recommendation with strong rationale. It must be pointed out, however, that the risks aspect in AO3 should also be referenced to the practical investigations as well.

Chief Examiner's Report

Assessment Unit A2 1 Building and Managing a Sustainable Future

This was the second cohort to take the qualification in Environmental Technology at A2 level. Candidates produced a varied 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. There was no evidence of candidates not having enough time to attempt all sections of the paper. There are some issues specific to certain questions which will be referred to in the report.

Q1 This question dealt mainly with anaerobic digestion. In Part (a) some candidates were unaware of the material percentages involved in low and high solid residue. Some of the responses for multi-stage digester systems were unclear. Part 9 (b) of this question dealt with the generation of combined heat and power (CHP) by anaerobic digester

systems. Most candidates were aware of the generation of both heat and power but some were unclear in their explanation. This was mainly in relation to the use of the excess heat after the generation of steam to drive a turbine and generator to produce electricity. Some candidates stated that heat was being produced as the primary energy output. Parts (c) and (d) were generally well answered although a surprising number of responses to part 9 (d) provided an incorrect reason as to why catering waste is unsuitable for composting.

Q2 This question focussed on heat flow and insulation. The calculation in Part (a) was well done. Common errors in this question where these existed were mainly incorrect calculation of the temperature difference between the inside and outside of the room and subtraction rather than addition of the rates of heat flow through the wall and window. Parts (b), (c) and (d) were well answered although some candidates provided responses in Part (d) which were not related to the minimisation of energy consumption for home heating but more to a reduction in electricity consumption through less use of lighting, etc.

Q3 In this question dealing with wave and tidal power most candidates provided a satisfactory response to Part (a). Some candidates did not receive all five marks by failing to include a complete description of the processes used in tidal barrage systems where power generation is achieved on both incoming and outgoing tidal movements. Part (b) dealing with tidal stream generation was well answered as was Part (c) on geo-engineering. However, Part (d) which required a description of the operation of a Bio-Photovoltaic device was not well answered. It was evident from candidate responses that whilst they were aware of the technology they were not familiar with the processes taking place within it.

Q4 In this question dealing with bioremediation Part (a) was well answered. Part (b) was well answered in some cases but too many candidates focussed their answers on the economic and short term environmental benefits of bioremediation and did not refer to the longer term benefits of the technique. Part (c) on the role of genetic engineering in bioremediation was well answered in many cases.

Q5 Responses to Part (a) of this question were in many cases vague and displayed a lack of knowledge of the issues surrounding, in particular, the development of landfill sites. Parts (b) and (c) on the Northern Ireland Waste Management Strategy were well answered in many cases. Part (c) required candidates to interpret information presented in graphical form. Responses to this were successful in the majority of scripts although some candidates made reference to data from the graph before the year 2000 which was not relevant to the question as the Strategy only came into effect on that date.

Q6 Responses to all parts of this question were good in many cases, the exception being Part (b) where candidates were asked to include a relevant equation in their answer. In a significant number of scripts an incorrect or incomplete equation was provided.

Q7 Responses to this question were, in a number of cases, lacking precise detail. Candidates are given indicators as to the nature of their response to a question of this type in the bullet points provided in the stem of the question. In order to achieve high marks responses must include 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 interlinking concepts. In a significant number of scripts insufficient detail was provided on each bullet point or, in some cases, information was provided on some but not all of the points. 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 focussed on vehicle technologies and strategies employed to reduce transport demand. It was clear from candidates' responses that this section of the specification was well understood and a significant number obtained full marks. In a small number of cases candidates did not assess the effectiveness of congestion charging in Part (b) or the strategies referred to in Part (c).

Q9 The points made in reference to Question 7 regarding presentation and style are also relevant to this question. It was clear from candidates' responses that they had a certain degree of knowledge of the concept of an ecological footprint but had limited knowledge of the issues surrounding the differences between countries at various stages of economic development. In a number of responses candidates did not provide sufficient information on the effects of population, affluence and technology on the ecological footprint of a country. Teachers are advised to use these questions and those in the Sample Assessment Materials and Exemplification of Examination Performance materials as practice materials for students in preparation for the examination in future years.

Principal Moderator's Report

Assessment Unit A2 2 Environmental Building Performance and Measurement

Marking was good and accurate and within tolerance. Annotation was good, detailed and relevant. Some of the candidates produced high quality work and most candidates showed a very thorough understanding of CSH and its implementation to the task issues. It was pleasing to see that centres had taken note of the points made in last years report.

AO1: The reports were well illustrated and generally showed a comprehensive and thorough overview of CSH within the wider context of sustainability measurement. The quality of the written reports was excellent with clear evidence of the use of specialist vocabulary. Referencing was a little erratic with many candidates correctly identifying the reference to the body of the text but a few only giving a bibliography type list.

AO2: Most candidates identified a range of investigations. Some areas for improvement would include the assessment of their dwelling against the Life Time Homes criteria and the pollution nitrogen oxide criteria. A more detailed methodology and analysis of their findings would have improved some candidates' overall marks. All candidates used more than one source to obtain data for the seven categories. The calculations produced by most candidates were comprehensive and accurate.

AO3: Most physical measurements were accurate with few errors. The data was mostly presented in a range of formats. Most candidates produced a comprehensive list of recommendations with strong rationale for each. It should be noted, however, that the health and safety aspect in AO3 should be referenced to the recommendations presented.

Contact details

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