Rewarding Learning

ADVANCED
General Certificate of Education
2015

Geography

Assessment Unit A2 2
assessing
Physical Geography and Decision Making

[AG221]

FRIDAY 15 MAY, AFTERNOON

MARK SCHEME

MARK SCHEMES

Foreword

Introduction

Mark Schemes are published to assist teachers and students in the preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of 16- to 18-year-old students in schools and colleges. The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes therefore are regarded as a part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published; the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

The Council hopes that the mark schemes will be viewed and used in a constructive way as a further support to the teaching and learning processes.

Introductory Remarks

The assessment objectives (AOs) for this specification are listed below. Students must:

AO1 demonstrate knowledge and understanding of the content, concepts and processes;

AO2 analyse, interpret and evaluate geographical information, issues and viewpoints and apply understanding in unfamiliar contexts;

AO3 select and use a variety of methods, skills and techniques (including the use of new technologies) to investigate questions and issues, reach conclusions and communicate findings.

General Instructions for Markers

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all markers are following exactly the same instructions and making the same judgements so far as this is possible. Markers must apply the mark scheme in a consistent manner and to the standard agreed at the standardising meeting.

It is important to recognise that in some cases there may be other correct responses that are equally acceptable to those included in this mark scheme. There may be instances where certain judgements have to be left to the experience of the examiner, for example, where there is no absolute, correct answer.

Markers are advised that there is no correlation between length and quality of response. Candidates may provide a very concise answer that fully addresses the requirements of the question and is therefore worthy of full or almost full marks. Alternatively, a candidate may provide a very long answer which also addresses the requirements of the question and is equally worthy of full or almost full marks. It is important, therefore, not to be influenced by the length of the candidate's response but rather by the extent to which the requirements of the mark scheme have been met.

Some candidates may present answers in writing that is difficult to read. Markers should take time to establish what points are being expressed before deciding on a mark allocation. However, candidates should present answers which are legible and markers should not spend a disproportionate amount of time trying to decipher writing that is illegible.

Levels of Response

For questions with an allocation of six or more marks three levels of response will be provided to help guide the marking process. General descriptions of the criteria governing levels of response mark schemes are set out on the next page. When deciding about the level of a response, a "best fit" approach should be taken. It will not be necessary for a response to meet the requirements of all the criteria within any given level for that level to be awarded. For example, a Level 3 response does not require all of the possible knowledge and understanding which might be realistically expected from an AS or AL candidate to be present in the answer.

Having decided that the level is, it is then important that a mark from within the range for that level, which accurately reflects the value of the candidate's answer, is awarded.

General Descriptions for Marking Criteria

Knowledge and Understanding	Skills	Quality of Written Communication	Level
The candidate will show a wide-ranging and accurate knowledge and a clear understanding of the concepts/ideas relevant to the question. All or most of the knowledge and understanding that can be expected is given.	The candidate will display a high level of ability through insightful analysis and interpretation of the resource material with little or no gaps, errors or misapprehensions. All that is significant is extracted from the resource material.	The candidate will express complex subject matter using an appropriate form and style of writing. Material included in the answers will be relevant and clearly organised. It will involve the use of specialist vocabulary and be written legibly and with few, if any, errors in spelling, punctuation and grammar.	3
The candidate will display an accurate to good knowledge and understanding of many of the relevant concepts/ ideas. Much of the body of knowledge that can be expected is given.	The candidate will display evidence of the ability to analyse and interpret the resource material but gaps, errors or misapprehensions may be in evidence.	The candidate will express ideas using an appropriate form and style of writing. Material included will be relevant and organised but arguments may stray from the main point. Some specialist terms will be used and there may be occasional errors in spelling, punctuation and grammar. Legibility is satisfactory.	2
The candidate will display some accurate knowledge and understanding but alongside errors and significant gaps. The relevance of the information to the question may be tenuous.	The candidate will be able to show only limited ability to analyse and interpret the resource material and gaps, errors or misapprehensions may be clearly evidenced.	The candidate will have a form and style of writing which is not fluent. Only relatively simple ideas can be dealt with competently. Material included may have dubious relevance. There will be noticeable errors in spelling, punctuation and grammar. Writing may be illegible in places.	1

Section A

Option A: Fluvial and Coastal Environments

AVAILABLE MARKS

1 (a) The question demands more than one valid reference to place, along with an explanation of the need for channelisation. Channelisation may be used to increase channel width, depth and/or gradient. The cross profile of the river may be altered through bed load removal. Overall, velocity may be increased, resulting in, for example, a reduction in the likelihood of flooding, improved navigation or protection of property. The need for such alterations may arise from a real or potential threat of flooding which may cause damage to people, property and/or land.

Level 3 ([6]–[7])
At least two valid place references are made with some development. The explanation of the need for channelisation is valid and depth/details are presented. The use of terminology is good.

Level 2 ([3]–[5])
At least one valid place reference is made with some development. The explanation of the need for channelisation is valid but depth/details may be restricted. The use of terminology may be restricted.

Level 1 ([1]–[2])
The candidate may omit reference to place or present only one undeveloped or invalid reference to place. The explanation of the need for channelisation may lack validity and/or depth/details. The use of terminology may be restricted. [7]

(b) The candidate should identify and explain any two ways in which the river depicted has been subjected to increasing demands. Examples may include: population increase and associated domestic/residential demands on water; increasing pressure of leisure/tourism; industrial demands.

Level 3 ([7]–[8])
Two valid demands are identified from the Resources with clarity. Both of these are described with depth/detail. Strong reference is made to the 'increasing' nature of the demands. There is good use of appropriate terminology.

Level 2 ([4]–[6])
Two valid demands are identified from the Resources although perhaps with lack of clarity. Both of these are described although depth/detail may be restricted. Although the 'increasing' nature of the demands may be noted, it may be underdeveloped. There may be restricted use of appropriate terminology.

Level 1 ([1]–[3])
Only one valid demand may be identified. Alternatively, two incorrect ideas may be presented. Demand/s may be described in a cursory fashion. The 'increasing' nature of the demands may be overlooked or invalid. Use of terminology may be poor. [8]

(c) The candidate is asked to describe the hard and soft engineering strategies implemented and their impacts upon the physical environment within their chosen location.

Level 3 ([11]–[15])
The answer refers to an appropriate and relevant case study example. Candidates at this level address each element of the question explicitly (hard, soft, impacts upon physical environment) and with validity and clarity. A high level of appropriate case study detail is given. Terminology is good.

Level 2 ([6]–[10])
The answer refers to an appropriate and relevant case study example. Although candidates at this level address each element of the question (hard, soft, impacts upon physical environment), the response may be imbalanced or there may be some lack of clarity, validity and/or depth. Case study detail may be restricted. Terminology may be restricted.

Level 1 ([1]–[5])
The answer may refer to a case study of an inappropriate scale or nature. One or more elements of the question (hard, soft, impacts upon physical environment) may be neglected. Case study detail may be very restricted. The response may be a cursory one. Terminology may be poor. [15]

AVAILABLE MARKS

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AVAILABLE MARKS

2 (a) The question demands at least one valid reference to place along with an explanation as to why the demands upon the coastline of any two of the options are increasing.

Post-war intensification of agricultural practices has aimed to increase productivity. As a result, agricultural demand upon the coastline has increased through, for example, increased fertiliser usage, increased agricultural effluents, development of fish farms, and changes to grazing patterns including both over- and under-grazing.

Industrial demands – coastlines offer industry a ready power source, access to transport, opportunities to acquire large areas of land at affordable cost, and a means of waste disposal. As global demand for industry increases, so too does pressure of this demand upon the coastline.

Energy production – coastlines offer the potential to increase energy production through use of renewable energy sources such as tidal, wave and wind power. In addition, coastal sites are often favoured for generation of nuclear power. As such sources are developed, pressures on the coastline will increase. Coastlines offer more traditional energy production activities access to transport and opportunities to acquire large areas of land at affordable cost, as well as a means of waste disposal. As demand to close the global energy gap increases, so too does pressure of this demand upon the coastline.

Level 3 ([6]–[7])
At least one valid place reference is made for each demand with some development. The explanation for the increasing demand upon coastlines by agriculture, industry or energy production is valid and detailed. The use of terminology is good.

Level 2 ([3]–[5])
At least one valid place reference is made but development may be restricted. The explanation for the increasing demand upon coastlines by agriculture, industry or energy production is valid but depth/details may be restricted. The use of terminology may be restricted.

Level 1 ([1]–[2])
The candidate may omit reference to place, or make invalid references to place. The explanation for the increasing demand upon coastlines by agriculture, industry or energy production may lack validity and/or depth/details. The use of terminology may be restricted. [7]

AVAILABLE MARKS

(b) Candidates are expected to make reference to the resources in evaluating the arguments both for and against the use of hard engineering on this section of the coastline.

Level 3 ([7]–[8])
Reference to the resources is strong. Arguments for and against the use of this method of hard engineering in this location are presented and evaluated with depth/detail. There is good use of appropriate terminology.

Level 2 ([4]–[6])
Reference to the resources may be restricted. Arguments for and against the use of this method of hard engineering in this location may be presented and evaluated, but depth/detail may be restricted. Terminology may be restricted.

Level 1 ([1]–[3])
Reference to the resources may be cursory. Arguments for and against the use of this method of hard engineering in this location may be presented and evaluated, but in a cursory fashion. Terminology may be restricted. [8]

(c) The candidate is asked to outline the management strategies used and to explain the resultant conflicts of interest within a regional case study of a river basin.

Level 3 ([11]–[15])
The answer refers to an appropriate and relevant case study example. Candidates at this level address each element of the question explicitly (management strategies; explanation of conflicts of interest) and with validity and clarity. A high level of appropriate case study detail is given. Terminology is good.

Level 2 ([6]–[10])
The answer refers to an appropriate and relevant case study example. Although candidates at this level address each element of the question (management strategies; explanation of conflicts of interest), the response may be imbalanced or there may be some lack of clarity, validity and/or depth. Case study detail may be restricted. Terminology may be restricted.

Level 1 ([1]–[5])
The answer may refer to a case study of an inappropriate scale or nature. One or more elements of the question (management strategies; explanation of conflicts of interest) may be neglected. Case study detail may be very restricted. The response may be a cursory one. Terminology may be poor.
[15] 30

AVAILABLE MARKS

3 (a) **Tefe** – Tropical Rainforest, **Posse** – Tropical Grassland (savanna), **Santiago** – Tropical/Hot Desert. [3]

The explanation should highlight both the movement of the ITCZ and the climatic characteristics. Explanation should comment on both the thermal and rainfall impact of the shifting ITCZ.

Tropical Forest: Hot with little annual variation (27–29 °C) and wet (2259 mm) all year with no month less than 121 mm.
The climate reflects the dominant role of the ITCZ near the Equator. This region of low pressure, where the trade winds meet and rise to produce convectional rainfall, moves north and south of the Equator following the overhead sun during its annual migration. This migration has little impact on the region, except perhaps a slightly drier period at Tefe, June to August, during the southern hemisphere 'winter'.

Tropical Grassland: Hot with some annual variation (22–26 °C) and moderate rainfall totals (779 mm) but with a distinct dry season (May to September) in southern hemisphere's winter.
Posse at 14°S, experiences the southern migration of the ITCZ during its 'summer' period, November to March, giving slightly higher temperatures (25–26 °C) and significantly higher rainfall totals (99–157 mm). The passage of this low pressure zone in summer produces convectional uplift and hence rainfall on an intense, daily basis during these months. In the 'winter' months, May to September, the northward shift of the subtropical high pressure (Horse latitudes) introduces the dominance of subsiding air and consequently drier even drought conditions.

Tropical Desert: Very hot (28–29 °C in summer December–February) and temperate (15 °C+) in winter. The total annual rainfall is 270 mm with most months having low rainfall (less than 10 mm).
The overhead sun reaches $23\frac{1}{2}$°S in June accounting for the high temperatures during long days at this latitude but the ITCZ and its associated rainfall does not extend to this region. Rather the area is dominated by the subtropical high pressure system (Horse Latitudes) that is the descending limb of the Hadley Cell ensuring surface high pressure and limited rainfall. The shorter days and lower angle of sun in 'winter', May to September, accounts for the lower temperatures compared to the summer days with high sun.
Explanation: [4] [7]

AVAILABLE MARKS

(b) Both a diagram and accompanying description of processes are required. The description might relate purely to the natural process of salinisation or include the role of irrigation in creating the issue. Either is a valid response to this question.

Level 3 ([7]–[8])
An appropriate diagram is presented along with an accurate description of the processes leading to the issue of salinisation in the arid/semi-arid tropical context. Clear and relevant geographical terminology is used.

Level 2 ([4]–[6])
While an appropriate diagram and description are given, the depth and detail provided is limited in its context or terminology.

Level 1 ([1]–[3])
Answers will be confined to this level if no appropriate description of the salinisation process or relevant diagram is presented. [8]

(c) Material from **Resource 3B and** a relevant regional case study are required here. The candidate should focus on the potential solutions to the salinisation issue in both cases.
In **Resource B** the solution involves the use of a newly developed hybrid rice variety, PHB71, which is salt tolerant and capable of a 30–40% higher rice yield than traditional varieties. If the use of PHB71 in Vietnam or any of the other countries named in the Resource is part of the candidate's regional study then additional information on solutions is expected. A regional case study should be clearly presented and the nature and operation of possible salinisation solutions discussed.

Level 3 ([11]–[15])
The solution outlined in **Resource 3B** is accurately described and additional possible solutions from a named regional study are discussed with clarity using appropriate terminology.

Level 2 ([6]–[10])
The solution in the resource is identified and reference is made to possible solutions in an appropriate case study but the depth and detail of the discussion of either is limited.

Level 1 ([1]–[5])
An answer that omits either the use of the resource or an appropriate regional case study would be confined to this level. Alternatively, a regional study may be given but the focus is not on possible solutions. [15] 30

AVAILABLE MARKS

4 **(a)** A diagram of the nutrient cycle is a requirement: a Gersmehl style diagram is the most likely but relevant other versions should be accepted. Some candidates may use a basic model-style diagram without proportional flows and stores and while this is acceptable, the written description would need to clarify the relative scale of nutrient stores (Soil, Litter, Biomass) and flows (inputs, outputs and transfers).

Level 3 ([6]–[7])
A clear and accurate description of the nutrient transfer system, along with the relevant inputs and outputs is given. The detail relates specifically to the context of the TRF ecosystem.

Level 2 ([3]–[5])
A limited description is provided but restricted in the fullness of its coverage (stores, flows, transfers) or in its reference to the TRF ecosystem context.

Level 1 ([1]–[2])
A description of nutrient cycling without the TRF ecosystem context or the lack of a relevant diagram would be confined to this level. [7]

(b) The key command word is 'evaluate' and the focus is on three aspects of sustainable management. Only material from the resource is required in the evaluation.

ECONOMIC
The system replaces the short-term economy gains of commercial crop production, logging that involved uncontrolled forest clearance or clearance for access to oil exploration. The system involves selective logging of narrow (30–40 m by 200–500 m) strips and the subsequent use of all felled timber for commercial use. The timber is not simply sold abroad but processed (value added) into building timber, posts and charcoal fuel and supplied to the countrywide market. The formation of an economic co-operative is a key part of the system and the aim includes creating employment and an income. While profits were made from the first year, the start-up costs were high and needed national government and external (USAID) assistance. This may be seen as a negative in terms of economic sustainability.

ENVIRONMENTAL
The system aims to maintain a healthy forest by using small-scale strip logging allowing natural regeneration and retaining areas of untouched primary forest for wildlife habitat. The evidence is that regeneration of cleared land has occurred with 130 native tree species re-colonising cleared land within 15 months. The use of oxen or water buffalo in the movement of felled timber reduces both costs and the soil damage that heavy machinery would cause.

SOCIAL
The focus is on local people, specifically five communities of Yanesha Indians. The forest resources need to be further utilized as the traditional slash and burn agricultural system alone cannot support the growing local population. The system not only provides employment for the felling process but also creates jobs in the various processing of charcoal, building timber etc. Socially the use of the products across the wider Peruvian market is a positive in sustainability terms.

AVAILABLE MARKS

Level 3 ([7]–[8])
The resource material is utilized with balanced reference to all three noted aspects of sustainability – economic, environmental and social – and comment is made of the effectiveness of this management system with respect to these areas.

Level 2 ([4]–[6])
The response is limited by a lack of development of the evaluation. Alternatively at least one of the three aspects of sustainability is absent or not developed or while all are present the depth and detail is restricted.

Level 1 ([1]–[3])
An absence of evaluation or very restricted use of the resource would confine an answer to this level. [8]

(c) The question has three equally important requirements; reference to a suitable regional tropical forest ecosystem, a description of soil characteristics and an explanation of the soil's role in nutrient cycling.

Level 3 ([11]–[15])
The response has an accurate description of the soil and an explanation of its role in nutrient cycling in the context of a specific TRF ecosystem.

Level 2 ([6]–[10])
One of the three key elements is underdeveloped or alternatively the depth and detail is lacking across the description and explanation.

Level 1 ([1]–[5])
The lack of a suitable TRF ecosystem context or the absence of soil description or an explanation of nutrient cycling would confine a response to this level. [15] 30

Option C: The Dynamic Earth

AVAILABLE MARKS

5 (a) The Resource refers to environment consequences of the Japanese tsunami of 2011 for the North American coastline including invasive species, chemical pollution and radiation.

Level 3 ([6]–[7])
The threats posed are clearly identified and discussed in relation to their consequences, the source and the need to monitor the development in the future. The identification and discussion goes beyond simple plagiarism of the resource.

Level 2 ([3]–[5])
While the threats are identified, discussion of these is restricted in width and/or depth.

Level 1 ([1]–[2])
There is little valid discussion of the threat posed to North America. The resource use is restricted and poor terminology is employed. [7]

(b) The two types of evidence for plate movement noted in the specification, that relate to ocean plates, are 'magnetic striping' and 'geological evidence'. The first may be discussed as Palaeomagnetism while the second covers a range of possibilities relating to oceanic crust material. One valid, fully explained type of evidence only may be awarded a maximum of [4].

Level 3 ([7]–[8])
Responses should describe any two distinct, valid oceanic plate types of evidence and explain with clarity and using appropriate terminology how these indicate plate movement.

Level 2 ([4]–[6])
Two valid types of evidence are described but the explanation of how these link to oceanic plate movement is incomplete.

Level 1 ([1]–[3])
Responses confined to this level would include those that provide only one poorly developed valid type of evidence or alternatively those that fail to link the evidence described to ocean plate movement. [8]

(c) One case study is required in either an LEDC or a MEDC context. The specification notes three factors influencing earthquake management, namely: knowledge, perception and stage of development. These concepts may be expected though others, or equally valid terms, may be employed. The command words indicate the need for a factual description of factors in context of an event and also that an evaluation is made of the role of these factors in managing the earthquake effects.

Level 3 ([11]–[15])
The candidate provides an accurate description of an earthquake event in one context and specifically of its effects and the management of these. A number of influencing factors are identified and a valid evaluation of these with respect to the management is provided.

Level 2 ([6]–[10])
A valid case study is described but the range of influencing factors is restricted or the evaluation of the factors described lacks depth or detail.

Level 1 ([1]–[5])
The lack of a valid case study or an answer that does not focus on factors influencing the effect management would be confined to this level. [15]

AVAILABLE MARKS

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AVAILABLE MARKS

6 **(a)** A diagram is a requirement in this question and while it is anticipated that a cross section view of the island, crust and underlying mantle is used some candidates may use alternative illustrations.

Level 3 ([6]–[7])
An appropriate, accurate diagram is presented and used to explain the nature and role of the hot spot in the sequential formation of the Hawaiian Island chain as illustrated by Resource 6A.

Level 2 ([3]–[5])
The response must have an appropriate diagram but at this level its quality or the clarity of the explanation is restricted. Alternatively a valid diagram and explanation that lacks any reference to the resource, i.e. the Hawaiian Island chain, would be confined to this level.

Level 1 ([1]–[2])
The lack of an appropriate diagram or valid explanation would confine the response to this level. [7]

(b) Both the hazards and benefits of volcanic activity for society and the economy are required and these should be drawn from the resource and from other places.
Resource hazards – Economic – the loss of the city in 79AD by ash and pumice burying it 5 m deep and Social – the death of some of the city's citizens through toxic gas emissions.
Resource benefits – the unique picture of 1st century Roman life preserved by the ash fall for historical and archaeological study, the educational opportunity today and the income generated for the region through tourism (2.5 m visitors a year) while creating a wide variety of jobs and employment opportunities. (Social and economic)
Other social and economic hazards include displacement, fear, injury, loss of land, income and employment
Other social and economic benefits include land creation, improved soil fertility, mineral deposits and other forms of tourist potential generating employment and income.

Level 3 ([7]–[8])
Examples of both volcanic hazards and benefits are described from the resource and from other named locations. These cover the social and economic aspects highlighted in the question.

Level 2 ([4]–[6])
The answer uses the resource and other places to discuss volcanic activity but it is restricted in its coverage and/or the detail presented.

Level 1 ([1]–[3])
Some significant aspect of the question is omitted; perhaps it is confined only to the resource or no attempt is made to clarify the social and economic impacts. [8]

		AVAILABLE MARKS
(c)	Firstly, a relevant small scale case study is required with a clear description of the methods employed to predict volcanic activity. Secondly, the limitations of the prediction in the context of the study are evaluated. **Level 3 ([11]–[15])** A relevant case study is presented and accurate detail of the methods used in predicting the volcanic activity is provided. The limitations of the prediction are evaluated in context. **Level 2 ([6]–[10])** A relevant case study is presented and some detail of the prediction methods for volcanic activity is provided. The description may have limited detail or the evaluation of limitations may lack depth. **Level 1 ([1]–[5])** The response either lacks a relevant case study or the description and/or evaluation lacks specific study detail. [15]	30
	Section A	**60**

Section B

AVAILABLE MARKS

Introduction: some guiding principles

7 The ideas outlined in the 'Guidance on Content' section are lines of thought that candidates might take in their report. They are not to be seen as the definitive answer, though it is to be expected that the points outlined below will feature, if only in part, in most answers. When allocating marks look favourably on answers which:

(a) avoid undue verbatim quoting from Resource Booklet and adopt a consistent style;

(b) use the full range of the resource material appropriate to the task – particularly where it is provided in non-literary format such as the OS map, infographics, printed maps and photographs;

(c) apply knowledge and concepts that are not specifically raised in the resource material, yet are both illuminating and relevant to the task;

(d) maximise opportunities presented by the resource material;

(e) appreciate that "bias" might exist in resource material which expresses particular views;

(f) avoid undue repetition of the same answer material in different sections or, if overlap is unavoidable, present it in a fresh way;

(g) back up points with specific detail, e.g. giving statistical information where it is provided rather than making vague statements when details are readily available.

Guidance on content

AVAILABLE MARKS

A. Introduction (Explain the high global demand for potash, and briefly outline the proposed project)

Demand for potash is growing across the world and there are a number of reasons for this. As the population of the planet increases, additional food is needed for these extra people. Potash is used for artificial fertiliser, when combined with phosphates and nitrogen. At the same time as the world population is rising, the amount of arable land is declining, meaning that more food has to be produced from less land each year. This will require additional fertiliser. Additionally, people in LEDCs are changing to higher protein diets requiring more potash to help to supply this trend. Farmers are getting better at applying the potash and this is also fuelling demand. Also, biofuels are becoming more popular and this too is impacting on the amount of potash used. Soil nutrients are becoming depleted around the world meaning that artificial fertilisers, with potash as a major component, are increasingly required to make up the shortfall. This increasing demand has pushed up the price of potash to over $400 per tonne.

This proposal involves the construction of a mine in the North York Moors National Park, accessed from what is now Dove's Nest Farm (GR: 895051), but stretching out under the North Sea. Shafts will be sunk 1600 metres down to access the potash which is contained in seams up to 50 metres thick. The mine contains an estimated 2.2 billion tonnes of potash, which would make it the biggest potash mine in the world. Two pipelines will be constructed and buried between the mine and the port at Teeside. This system is capable of transporting 20 million tonnes of potash each year. The minehead, with the winding gear, and areas for crushing and loading the potash onto the pipelines, will be screened from view and will also be constructed below ground level in an 'artificial depression'.

Level 3 ([8]–[10])
The candidate clearly explains the growing demand for potash in the world and briefly outlines the development. The description of the development may be a little longer than the growing demand section or the other way round, but both will be considered fully. Precise figures and facts will be used where possible.

Level 2 ([4]–[7])
The candidate makes fewer clear and correct points. There is little or no development of any point, but points made are valid. There may be a major imbalance between the description of the project and the reasons for the growing global demand, or there may be a lack of detail.

Level 1 ([1]–[3])
The candidate presents little content and a lot of it is irrelevant to the need for the development or the description of it. Some of the points made may lack validity. There may be excessive verbatim use of resources.

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B. (i) Discuss the possible beneficial effects of the proposed development on people and the economy in the Yorkshire and Humber area, and the counterarguments.

AVAILABLE MARKS

This will bring in enormous sums of money for 300 landowners in the area under whose land the potash is located, as they get 2.5% of the mine's earning in royalties. It is estimated that £2 million will be invested in the community every year by the York Potash Foundation while the project is being built and a further £7 million when it is at full production. It is stated that this benefit will last for over 50 years, making a very substantial change to this region. Independent research suggests that demand for potash across the world is set to rise by 3.5% each year from 2013. This mine needs to be developed to tap this growing demand, bringing sustained income into the country as a whole, including the Yorkshire and Humber area.

The project will cause jobs to be created. For example, there will be 6089 jobs in the construction phase, lasting 10 years. At least 150 of these will be unskilled, providing opportunities for people for whom otherwise it might be difficult to find work. All of these jobs in construction will be open to locals. There will be a further impact on local people as 500 will get training as a result in a 3 year programme of education and skills. There will also be 50 apprenticeships created over three years. The type of employment available is very varied, from IT specialists to administrators, so appealing to a wide range of people in the Yorkshire and Humber area.

These employment opportunities are particularly important for Yorkshire and Humber as it is a region with a higher unemployment rate than many other regions of England and Wales. Its Location Quotient value of 1.12 indicates that it has a higher rate of unemployment than all of England and Wales, with a Location Quotient of 1.0. The Location Quotient shows Yorkshire and Humber to have a higher unemployment concentration than all but three of the regions in England and Wales. Bill Breakell emphasised this for one town when he said "Unemployment is an issue in Whitby". This mine can bring employment to the whole region.

It is estimated that £55 million will be added to the economy locally while the project is being built, and £940 million to the local economy each year when in full production. There will also be a spin-off into other industries and services for those companies that provide supplies for the mine. The salaries of the workforce will filter out into the Yorkshire and Humber regional economy, supporting further employment.

The project will impact on the whole country, for example by contributing £1.4 billion to the economy. Yorkshire and Humber area will be able to share in that growth. Additionally, enough potash will be mined to ensure adequate fertiliser supplies for whole of the UK, including to farmers in the Yorkshire and Humber area, for several hundred years and this will help the farms in this largely rural area of Yorkshire and Humber, as shown in Resource 7A.

The developers of the proposed mine commissioned a study of tourism which found that most visitors go to the seaside resorts at Scarborough and Whitby. These resorts are not impacted on at all by the development. The National Park is seen as a 'side attraction' by most visitors. In any case, as the mine generates £1.4 billion to the economy of the UK each year, this will help to provide investment in the tourism infrastructure in the country, including in Yorkshire and Humber, which may actually help to develop tourism in the area.

Counter

AVAILABLE MARKS

This is a massive industrial-scale development at the heart of one of UK's National Parks. While the developers claim that the mine will have little or no impact on tourism, and that most visitors go to the seaside resorts of Whitby and Scarborough, other figures suggest that in 2011 there were 6.3 million visitors to the North York Moors National Park (NYMNP) and the surrounding area. Tourism is a major creator of wealth in the area and the National Park is a major part of that. £264 million was generated within the National Park itself, compared to the comparatively small £171 million generated outside it. It is also a major employer. Tourism in the National Park created employment for 6539 people directly and, it is estimated, 1318 indirectly. These jobs are sustainable and secure and should not be undermined by a mine being built in the middle of this National Park, a mine which would damage its integrity.

The NPA have carried out their research which suggested a 15% reduction in visitors to the National Park while the mine was being constructed. There would be a loss of £40 million of income each year for those four years as well. If the mine were to become operational, the research suggests that visitor numbers would fall by 14% with a loss of tourism income of £38 million each year. It is the National Park which attracts a large number of visitors to this area as they see it as providing 'peace, tranquility, remoteness and natural beauty' (Resource 7G). All four of these attractions would be under attack, were the proposal to go ahead.

The Ordnance Survey Map (Resource 7A) shows three combined camping and caravan sites near to the proposed mine. One of these, at Lound House (G.R. 891065) is just over a kilometre away from Dove's Nest Farm. All of these facilities will be likely to suffer as a result of having a mine on their doorstep. As a local resident and owner of a tourist facility stated "The park belongs to the nation, not to York Potash or to mineral rights holders".

While the developers boast of a mine producing potash for 50 years or more, there are already some who suggest that the mine will not actually be successful. The type of potash is not as high in nutrients as that being mined in the neighbouring Boulby mine and, as a result, the developers may find it hard to get a market. In addition, Boulby mine has just been upgraded so the UK can get its potash for the next 40 years even if this proposed mine does not open. The Boulby mine will also be able to supply potash to export, earning money for the region.

Another factor which could impact on the potential of the mine to create sustainable employment for people and money for the economy of Yorkshire and Humber is the demand for potash. The world demand did grow until mid-2008, but the economic crisis since then meant that demand has been falling. For example, Table 1 shows that UK consumption has fallen from 420 thousand tonnes in 2001 to just 290 thousand tonnes in 2011. This mine could be constructed, damage tourism and yet not survive to produce any employment or economic support in the long term to the population of Yorkshire and Humber.

NB Some candidates may discuss environmental factors in this section and this is acceptable, so long as they focus on the economic and social impacts of such changes to the environment. In B(ii), should the same environmental factors be revisited, candidates should not merely repeat the information, but should treat it in a fresh way.

AVAILABLE MARKS

Level 3 ([8]–[10])
Candidate states clearly the main benefits and the counterargument. The discussion will be detailed and comprehensive. The scale will be focused on the Yorkshire and Humber region and, where impact on smaller or larger scales is referenced, that impact is related to the impact on the Yorkshire and Humber region. The account will have many of these characteristics:

- The points made will be consistently relevant and logically structured
- The ideas will demonstrate insight and a level of sophistication
- Clear understanding of all concepts will be demonstrated
- Use will be made of most of the relevant resource material, including that in diagrammatic form in the resources and the Location Quotient statistic, and understanding of the resources will be demonstrated – no significant points will be omitted
- Figures, where available and appropriate, will be used to good effect
- Ideas will be expressed clearly and effectively

Level 2 ([4]–[7])
Candidate will have fewer lines of thought or discussion may be limited. However, while ideas may lack depth and/or detail, they are still adequate. There may be a heavy imbalance between the two sides of the argument. There may be issues with the impact in terms of scale – some national or global scale impact may be discussed without referring to the impact on Yorkshire and Humber. The account may show deficiencies in the following ways:

- Understanding displayed but an over-reliance on verbatim quoting in places, even though appropriate
- Resource material used but some information not as well exploited as it could be
- Largely related to the question but some irrelevant material introduced
- Ideas not expressed particularly logically or clearly

Level 1 ([1]–[3])

- Simple understanding demonstrated but sketchily dealt with
- Excessive verbatim use of resources
- Some use made of the resource material but many relevant resources omitted
- Little or no structure or logic in the ordering of content

10

B. (ii) Discuss the potential environmental damage of the proposed development and the counterarguments.

AVAILABLE MARKS

The proposed mine is to be built in the middle of a National Park, close to cycling and walking trails popular with tourists. To build a mine producing 12 million tonnes of potash each year will change the landscape in this protected rural area for ever. The impact will be great. Resource 7C5 purports to show how the landscape will change. However, these images are produced by the company themselves and do not show the whole picture. This has been called an "industrial-scale development at the heart of the National Park" (Resource 7G). They plan to excavate two giant 100 metre deep holes inside which the winding gear of the mineshafts will be placed. While this will mean that the winding gear is not visible on the skyline, it will, along with the 1700 metre mineshafts and other underground workings, produce 1.2 million cubic metres of spoil. Chris France, the Chief Planning Officer for NYMNPA, has pointed out that this "would fill Wembley Stadium". The buildings planned are also inappropriate for such a location. It will resemble an industrial estate and, in the words of one local resident, will be "the size of six Tesco supermarkets". A construction with an 80 place car park, a helipad and engineering workshops all surrounded by security fencing is entirely inappropriate for a protected National Park.

There is also a wider threat. Should these proposals for a mine at the heart of the NYMNP be permitted, this weakens the protection provided in all National Parks.

Counter

The developers have gone to enormous lengths to minimize the impact of the development on the environment. As Resource 7C3 shows, the mine will make use of existing screening and there will be additional screening by trees to reduce the visibility of the mine. The artificial depression created at the mine will ensure that the mine shaft head and the mineral crushing and loading areas are below the skyline. There will also be embankments created which, as shown in Resource 7C5, will completely obscure views of the mine. Even just five years after construction, Resource 7C5 shows these embankments as pleasant areas with young trees beginning to become established. The few buildings that there are will be at ground level, will look no different from agricultural buildings and, in any case, will be difficult to spot because of the embankments and screening.
The choice of a pipeline to transport the potash in suspension in salt water will mean that there will be no trucks or trains carrying the potash to Teeside – all of the transport will be underground.
There has been a public consultation which shows 91% of local people are in support of the proposed potash mine and just 1% against. It is unlikely that any development which might damage the environment would get such an endorsement from the local community.

AVAILABLE MARKS

Level 3 ([7]–[8])
Candidate states clearly the main changes and the counterargument. The discussion will be as detailed and comprehensive as the resources allow. The account will have many of these characteristics:

- The points made will be consistently relevant and logically structured
- The ideas will demonstrate insight and a level of sophistication
- Clear understanding of all concepts will be demonstrated
- Use will be made of most of the relevant resource material, including that in diagrammatic form in the resources – no significant points will be omitted
- Figures, where available and appropriate, will be used to good effect
- Ideas will be expressed clearly and effectively

Level 2 ([4]–[6])
Candidate will have fewer lines of thought or discussion may be limited. However, while ideas may lack depth and/or detail, they are still adequate. There may be a heavy imbalance between the two sides of the argument. The account may show deficiencies in the following ways:

- Understanding displayed but an over-reliance on verbatim quoting in places, even though appropriate
- Resource material used but some information not as well exploited as it could be
- Largely related to the question but some irrelevant material introduced
- Ideas not expressed particularly logically or clearly

Level 1 ([1]–[3])

- Simple understanding demonstrated but sketchily dealt with
- Excessive verbatim use of resources
- Some use made of the resource material but many relevant resources omitted
- Little or no structure or logic in the ordering of content

8

C. Decision (State clearly your decision and justify it on the basis of the greater overall benefits)

AVAILABLE MARKS

The recommendation may overlap with some of the points made in B in relation to the potential economic, social and environmental impact of the mine and associated developments. However, the emphasis here has to be on the greater overall benefits of developing or not developing the potash project and the contrary view. In this section, for example, candidates can weigh up the relative merits of arguable damage to the environment with possible economic development and employment for local people.
There is no mark for stating a decision alone without a justification.

Level 3 ([8]–[10])
Candidate states clearly a decision. A range of reasons are provided in justification.
The account will have many of the following:
- There is evidence that the arguments of both sides are being balanced, one against the other
- Links are made between diverse aspects of resource material, not possible in Section B
- Points are consistently relevant and logically structured
- There is a clear grasp of the concepts used

Level 2 ([4]–[7])
There are fewer lines of thought or discussion, but what there is is relevant and correct or supportable in what is argued. There may be deficiencies such as:
- Too much verbatim quoting or overuse of quotations in full
- Important sections of resource material not utilised
- Irrelevant material introduced
- Ideas not expressed particularly logically or clearly
- Understanding of concepts not always clearly demonstrated

Level 1 ([1]–[3])
- Few lines of thought and sketchy in detail
- Large gaps in the use of resource material
- Little or no structure or logic in the ordering of the concepts
- There may be excessive verbatim use of resources [10]

Format
Clear format headings **using the headings provided** throughout [1]
Clear subheadings **using the subheadings provided** in Section B [1] [2]

Role
Role of Dr Eileen Gildea, advisor for NYMNPA, adopted [1]
Role maintained [1] [2]

Graph
Reference in report [1]
Appropriateness of the technique used [1]
Accuracy of the data presented [3]
Conventions (key, labelled axes, title) [3] [8] 22

Section B **50**

Total **110**