Rewarding Learning

ADVANCED
General Certificate of Education
2014

Geography

Assessment Unit A2 2
assessing
Physical Geography and Decision Making

[AG221]

FRIDAY 16 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

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1 (a) (i) The candidate should present a description and explanation of any two of the hard engineering strategies depicted. Better candidates may provide specific names as evidence of use of terminology, although this is not an essential demand of the question. (For example, rock armour, gabion boxes, cliff drainage, retaining wall, sea wall, rip-rap.) As a number of hard engineering strategies operate in a similar manner, candidates may elect to provide a generic explanation.

Level 3 ([6]–[7])
Two of the hard engineering strategies depicted are described with accuracy along with a clear explanation of their operation. Depth/details are present. There is good use of appropriate terminology such as, for example, strategy names.

Level 2 ([3]–[5])
Two of the hard engineering strategies depicted are described along with an explanation of their operation. Depth/details may be restricted. There may be restricted use of relevant terminology.

Level 1 ([1]–[2])
The response may lack description of two of the hard engineering strategies depicted and/or explanation. Depth/details may be very restricted – a cursory response only. Use of terminology may be weak.

[7]

(ii) The stretch of coastline shown in the resources (East Devon) is heavily managed with the use of both hard and soft engineering. It is also an area popular with tourists. The majority of candidates will draw their responses to this question from the text-based resource; it is not expected that candidates will draw on more than one resource.

Level 3 ([7]–[8])
The response is strongly supported by information gleaned from the resource/s. Strong, valid, appropriate outlines (one for and one against) are presented in the relevant context and with clarity.

Level 2 ([4]–[6])
There is some, perhaps restricted, support from the resource/s. Although appropriate outlines (one for and one against) are presented in the relevant context, there may be a lack of clarity or comments may be underdeveloped.

Level 1 ([1]–[3])
Comments relating to the resource/s may be absent, or lacking validity or clarity. One argument may be omitted or comments not placed in the relevant context.

[8]

(b) The candidate is asked to outline the management strategies used and to discuss the resultant benefits to people and the environment 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; benefits to people; benefits to the environment) and with validity and clarity. A high level of appropriate 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; benefits to people; benefits to the 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 (management strategies; benefits to people; benefits to the environment) may be neglected. Case study detail may be very restricted. The response may be a cursory one. Terminology may be poor. [15]

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2 **(a)** The Rivers Stour and Avon shown are heavily managed with the use of both hard and soft engineering. Human demands upon the rivers are high, especially in residential areas such as Christchurch.

Level 3 ([6]–[7])
The response is strongly supported by information gleaned from at least two of the resources. Both domestic/residential and leisure activities are addressed with relevant, valid and detailed comments. Terminology is good. Strong, appropriate discussion is presented in the relevant context and with clarity.

Level 2 ([3]–[5])
There is some, perhaps restricted, support from at least two of the resources. Although valid discussion is presented in the relevant context, there may be a lack of clarity or comments may be underdeveloped. Both domestic/residential and leisure activities are addressed, perhaps in an unbalanced manner or with limited detail. Terminology may be restricted.

Level 1 ([1]–[2])
Comments relating to the resources may be absent, only one resource utilised, or only one demand (domestic/residential or leisure activities) addressed. The discussion may be cursory or comments not placed in the relevant context. Terminology may be poor. [7]

(b) Valid potential impacts of channelisation implementation should be described with detail and appropriate use of terminology. Reward will be limited if there is a lack of clarity, restricted relevant detail or inappropriate terminology. Positive and/or negative impacts are acceptable. (2 × [3])

Appropriate references to place/s should be made [2]. If reference is not linked to potential impacts, maximum [1]. [8]

(c) The candidate is asked to explain the reasons for coastal protection in a valid case study location, and to describe the hard and soft engineering strategies implemented.

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 (explanation, description, hard engineering, soft engineering) and with validity and clarity. A high level of appropriate 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 (explanation, description, hard engineering, soft engineering), 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 (explanation, description, hard engineering, soft engineering) may be neglected. Case study detail may be very restricted. The response may be a cursory one. Terminology may be poor. [15]

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Option B: The Nature and Sustainability of Tropical Ecosystems

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3 (a) This question requires an explanation of the nature and role of plants (producers/autotrophs) and animals (consumers/heterotrophs) in the context of the trophic (feeding) structure of the tropical forest ecosystem. It also requires that examples from a tropical forest ecosystem will be used to illustrate the nature and role of plants and animals.

Level 3 ([6]–[7])
A clear and accurate explanation of the nature and role of both producers/autotrophs and consumers/heterotrophs is provided and for both aspects examples are given from a tropical forest ecosystem.

Level 2 ([3]–[5])
The explanation of the nature and role of producers/autotrophs and consumers/ heterotrophs is lacking in depth or detail. Examples are provided but these may be limited in their relevance and scope.

Level 1 ([1]–[2])
The answer has an inadequate explanation of the nature and role of producers and consumers in tropical forests and/or fails to give relevant examples. [7]

(b) The candidate should clarify material from the resource that relates to all three aspects of sustainability required (social, economic and environmental). The command word is 'discuss' and while no evaluation is implied, there should be more than a simple listing of aims. Below are the outline facts of what could be discussed.

Social – Employment of local subsistence farmers as tourist guides. The Gamitana Farm is used to educate local people on agroforestry techniques. One centre is used in the education of local young children and the tourist lodge not only provides employment but also training in catering, hospitality and the environment. These education opportunities and additional skills along with employment benefit the life of people from Puerto Maldonado and its region.

Economic – Along with the jobs in the centres and the training provided, there is work and therefore income for subsistence farmers as guides and in the construction of the centres themselves. Support for both tourist groups and scientists adds to the regional economy.

Environmental – the use of local materials and skills in the construction of the centres as well as the modest scale of the development reflect its environmental focus. The education of the local people, children and adult guides supports a care for the environment. The nature of the ecotourist industry – small groups and travel by water or on foot – minimises the impact while the access and funding provided for scientific research (ITA) deepens the knowledge and understanding of the forest's complex ecosystem interactions.

Level 3 ([7]–[8])
All three aspects are developed and an understanding of how management addresses these is clearly presented. Terminology is relevant and used with accuracy.

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Level 2 ([4]–[6])
While all three required aspects are addressed, there is limited depth in the discussion of these with perhaps little more than a list of relevant facts.

Level 1 ([1]–[3])
Limited use is made of the resource and overall the three aspects are not developed. One or more aspect may be overlooked entirely. [8]

(c) The question focuses on two aspects of salinisation, the causes of the issue and the impacts; in both cases the answer must be illustrated from a regional scale case study. Impacts on both the environment and people are required.

Level 3 ([11]–[15])
The response clarifies the causes of salinisation and its impacts, on both people and the environment. Each aspect is described with reference to a relevant study and explained in that context. Valid terminology is used and a range of facts and study detail is provided.

Level 2 ([6]–[10])
A relevant case study is provided with a description of the causes and impacts of salinisation but the detail given and/or the explanation is limited.

Level 1 ([1]–[5])
Answers that fail to develop any one or more of the key elements – a relevant case study, causes and impacts – would be confined to this level.
Alternatively the answer lacks detail or the use of appropriate terminology.
[15] 30

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4 **(a)** The definition of Biomass and Productivity should clarify the difference between the total weight of living material found per unit area (m^2) – Biomass – and the rate at which living material is produced per unit area over time ($kg/m^2/yr$) – Productivity. [2]
The explanation of the tropical forest's high values relative to the other tropical ecosystems is primarily about climate. The near perfect year-round growing environment of the equatorial region ensures firstly the high productivity rates and therefore the high biomass. The hot and wet environment along with abundant daily high insolation means that photosynthesis is continuous. The limitations of a nutrient poor soil are overcome by rapid and efficient nutrient recycling. Also the multilayered forest structure provides numerous niche opportunities for plants (producers). Use of figures from Resource 4A is required for full marks. [5] [7]

(b) In general the description of Venezuelan tropical forest extends from 1°–7°N (though up to 10°N in the eastern area), tropical grassland between 7°–10°N and desert 9°–12°N. While descriptions using latitude values are the logical ones, it may be possible that scale descriptions may be provided, tropical forest up to 1000 km north of the Equator, grassland 700–1000 km north and desert 1000–1350 km north. The description should focus on the poleward pattern of change between the three biomes though some candidates will note the variation of latitudinal extent especially of the TRF in eastern Venezuela. The explanation depends on the candidate's knowledge of the low latitude circulation system, namely the northern hemisphere's Hadley circulation. The map shows the northern summer location of the ITCZ (July); from this the implication is that this region, rather than line, marks the extent of rainfall associated with the meeting of the surface trade winds at the Inter-tropical Convergence Zone (ITCZ). To the south of this, rainfall will be significant throughout the year, while to the north rain will be limited to the summer season (grassland) and beyond this the high pressure area beneath the subsiding limb of the Hadley circulation will dominate, creating desert conditions – dry all year with hot summers and warm winters. Some candidates may choose to use a diagram to help their explanation; while not a requirement this could be a valid approach to dealing with the question.

Level 3 ([7]–[8])
The answer makes valid reference to the elements of the Hadley Cell (surface and vertical movements) including the ITCZ to describe and explain the distribution of the tropical ecosystems shown.

Level 2 ([4]–[6])
Both description and explanation of at least two of the tropical ecosystems is provided but the links to the atmospheric circulation (Hadley Cell, ITCZ) are limited in either depth or understanding.

Level 1 ([1]–[3])
Answers that are limited by a lack of valid reference to the Hadley Cell, ITCZ or fail to use the resource would be confined to this level. [8]

		AVAILABLE MARKS
(c)	A relevant case study is required both in scale and of a tropical forest ecosystem. The description should be specific to the management of the case study given, with an evaluation of its sustainability provided. **Level 3 ([11]–[15])** The candidate provides a relevant study, and an accurate description of the attempt to achieve sustainability is clearly presented. The success of the case study is evaluated and appropriate terminology and case study detail is presented. **Level 2 ([6]–[10])** A relevant case study is presented but either the detail or the evaluation of the attempt to be sustainable is underdeveloped. **Level 1 ([1]–[5])** Answers at this level may be limited in a number of ways: a lack of descriptive case study detail or no attempt is made to identify the different aspects of sustainable development. [15]	30

Option C: The Dynamic Earth

AVAILABLE MARKS

5 (a) While the use of the resource material is a requirement, the candidate's answer needs to further develop the problems of accurate earthquake prediction. From the resource both timing and scale issues are noted as despite past history and more recent minor events, scientists could not be definite in their "reassuring statement". The resource suggests that this was not simply the view of this group of seven Italian scientists but is shared with the wider scientific community including USGS. Beyond the resource, reference to both timing and scale of earthquake prediction is required. Candidates may address this in many ways, such as the failure to predict earthquakes in the past or a discussion of the various methods that have been and are used in monitoring.

Level 3 ([6]–[7])
Valid resource material is used and the issue of predicting earthquakes in terms of both their timing and scale are discussed in a wider context with understanding shown.

Level 2 ([3]–[5])
Material from the resource is used but the discussion of issues over the timing and scale of earthquake prediction is not developed.

Level 1 ([1]–[2])
Answers that focus entirely on the resource or effectively ignore it would be confined to this level. [7]

(b) A diagram is required but some may choose to draw a simple outline with a more detailed written account while others may use an annotated detailed illustration – either approach is valid. In any case it is a destructive margin (Ocean to Continent **or** Ocean to Ocean) and specifically the explanation (not just location) of tectonic activity – Volcanic and Seismic – that is the focus. It is expected that the varying depth of earthquakes along the descending plate (Benioff Zone) is noted and explained as well as the source of magma for the volcanic activity parallel to the ocean trench formed at subduction.

Level 3 ([7]–[8])
A clear and relevant diagram is provided. The answer locates and explains the processes behind the destructive margin and its associated tectonic activity – earthquake and volcanic. Appropriate and precise terminology is used throughout the response.

Level 2 ([4]–[6])
A relevant diagram is provided but it or the written explanation does not fully explain the tectonic activity associated with destructive margins.

Level 1 ([1]–[3])
Answers that lack a relevant diagram or explanation of the tectonic activity would be confined to this level. [8]

		AVAILABLE MARKS
(c)	Accurate detail of one relevant MEDC earthquake case study is required here. All three influencing factors (knowledge, perception and stage of development) need to be discussed in relation to the management of the effects; it is probable that management will cover preparation for as well as short and longer term responses to the event. **Level 3 ([11]–[15])** Details of management of the effects of a relevant case study (MEDC) are provided. The role of perception, knowledge and stage of development in the management are all discussed in an appropriate way. **Level 2 ([6]–[10])** Answers in which the case study detail or the discussion of the factors influencing the management of the earthquake effects is limited in depth are confined to this level. **Level 1 ([1]–[5])** This discussion of the factors may be cursory or incomplete or there may be no relevant case study material. [15]	30

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6 (a) From the resource the candidate should describe how the SLR system has allowed real time monitoring of plate movements to be recorded in the Pacific basin. The question also requires the description of other evidence; this may include the topography of the oceans, the age and pattern of ocean basin geology, palaeomagnetism, the distribution of earthquakes and volcanoes and the distribution of fossil and glacial evidence in rocks. There is no requirement for a specific number of types of evidence but a description is required rather than a mere list.

Level 3 ([6]–[7])
The response is strongly supported by accurate information gleaned from the Resource, highlighting the evidence of plate movement found. Other types of evidence are described with accuracy and understanding.

Level 2 ([3]–[5])
Use is made of the resource but its description or that of the additional evidence is limited in depth or detail in terms of the understanding shown.

Level 1 ([1]–[2])
Answers that focus entirely on the resource or effectively ignore it would be confined to this level. [7]

(b) For each of the two selected earthquake activity effects, both the causes and impacts must be explained. (2 × [4])

Ground deformation is when the ground surface above an earthquake is distorted or displaced. The ground can be moved vertically, horizontally or a combination of these elements. Such ground deformation is normally confined to areas close to the epicentre but may run along the fault line for several kilometres. Ground deformation may cause offsetting of surface features both natural and human.

Liquefaction is the process by which soft or unconsolidated sediments amplify the effect of shaking ground. The effect can occur with either dry or wet sediments but is most clearly seen where there is significant water content. Liquefaction is when shaken loose sediment starts to act as a liquid often causing building foundations to sink or subside. Not only will liquefaction cause land to fail to support buildings but underground service pipes may bend and fracture. Liquefaction may also cause land and anything built upon it to spread laterally so that roads or airport runways can crack open. Another associated impact is that water-laden sand can rise to the surface as sand boils, rarely more than 3–5 m across; these are not particularly hazardous but indicate the presence of liquefaction.

Seismic shaking. The energy released by an earthquake radiates out from its focus in all directions, like the ripples on a pond. These seismic waves shake the crust as they pass through it, and when they reach the Earth's surface they shake the ground and anything built on it. There are different wave forms but most cause a lateral side-to-side motion. Shaking of only 20–30 cm is potentially devastating for buildings made from weak materials and the longer the shaking persists the greater the damage caused. Walls made of weak material such as mud brick or poorly mortared brickwork offer little resistance to shaking and such structures are often the cause of a large proportion of the deaths and injuries sustained. Shaking buildings do not have to fall to create hazards. Glass from skyscrapers, overhanging balconies, parapets and even advertising hoardings may fall onto people and property nearby. Even inside buildings seismic shaking creates hazards; fixtures such as machinery in factories, filing cabinets in offices and large

fridges in homes become potential threats to life and limb. Structures other than buildings, including bridges and flyovers, may also suffer damage from shaking. [8]

(c) Two themes in relation to the effects of volcanic activity are required by this question, namely social and economic. In each case both benefits and hazards are to be described and evaluated. All descriptions have to be illustrated by reference to places. There are a number of possible approaches to answering the question, such as social then economic, or benefits then hazards. Whatever approach is taken, all four areas need to be described, spatial examples given and an element of evaluation provided.

Level 3 ([11]–[15])
The benefits and hazards of volcanic activity in social and economic terms are described with places referred to in context. Evaluation of the impacts is given. Terminology is accurate and a range of impacts is described.

Level 2 ([6]–[10])
The impacts are described with some reference to place/s but the depth and detail provided for the social and economic impacts is limited in range. Some evaluation is present in the response.

Level 1 ([1]–[5])
Answers in this level may lack valid reference to place/s or two or more of the key elements – economic benefits, economic hazards, social benefits or social hazards or evaluation. [15]

Section A

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Section B

Introduction: some guiding principles

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, 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

A. Introduction (Briefly describe the proposed project and discuss the need for it.)

Falmouth Docks is a working port comprising ship repairing yards, a luxury yacht-building business, cargo handling mainly of animal feeds and fertilizer, small businesses including fish processing and other port operations (see Resource 7C1). The plans to develop the docks are shown in Resource 7C2. While much of the existing land use will be retained, the developers plan to build a marina to the west of the main pier. They also plan to extend the cargo area and, importantly, access for large cruise ships. Currently, passengers arriving at Falmouth have to transfer onto smaller vessels to come ashore. The new deep-water approaches and docksides will allow the new larger cruise ships, some of which hold almost four times more passengers than the older smaller ships, direct access to Falmouth Docks. This will require deepening of the seabed from the current 5.1 metres to a depth of 8.3 metres. A stretch of the sea floor from Carrick Roads to the quay, up to 155 metres wide, will be dredged as part of the development. As part of the proposed development, a new reception building for cruises is planned (Resource 7D3), alongside new quay and other facilities.

Those in favour argue the need for the development. At present passengers are inconvenienced by having to change onto a smaller boat to be taken ashore at Falmouth. This is inconvenient for passengers and there is a fear that larger cruise ships will stop calling at the port. Tourism is a vital economic activity in the area and is said to be the 'most important' (Resource 7E). Cruises are an important and growing kind of tourism and generate large amounts of money, reaching almost £2.3 billion in 2011 and this is growing rapidly. It is also an

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important employer with almost 64 000 jobs dependent on the sector. These employees earned £1.5 billion, which contributes enormously to the economy of the UK. As the recession has a serious impact on employment and growth in the UK generally and especially in areas like Cornwall, such an industry should not be allowed to decline argue those in favour of the development.

Level 3 ([7]–[8])
The candidate clearly describes the proposed port development and identifies the need for such a development. Both elements are included. Consideration of need may be more extensive than the description, but description is still effective and well handled. Irrelevant material will not be included.

Level 2 ([4]–[6])
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 discussion of the need and the description of the project.

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. Excessive verbatim use of resources may be seen. [8]

B. (i) Discuss the possible beneficial effects of the proposed development on people and the economy and the counterarguments.

The economies of Falmouth and the county of Cornwall rely on tourism as one of the major economic forces in the area. It brought in £1.6 billion into Cornwall in 2007 and generated up to 50 000 jobs. The large cruise ships bring in 3 500 passengers and 1300 crew. This would result in a rapid growth in visitors to Falmouth and, from there, into the local area. It is estimated that there could be 200 000 visitors a year by 2030, compared to just 27 000 in 2010 (Table1). These visitors are estimated to spend £38 each in the local area. While this sounds modest, when multiplied by the numbers of tourists it will be a significant boost to the local economy. The Harbourmaster for Falmouth Docks, Mark Sansom, emphasises the importance of dredging the approaches to the docks when he argues that the cruise ship industry “won't be bringing larger ships to ports where they can't get alongside”. This would threaten the growth of this crucial industry.

Falmouth Harbour is also an industrial hub, the largest in the whole of Cornwall, providing employment for 1703 people. Most of these are involved in ship repairing and the rest in building luxury yachts. According to the Harbourmaster, the approaches to the docks are silting up, and even smaller ships need the area dredged. With dredging, larger ships could access the repair yards, which create so many jobs in the area already.

The proposed development would invest £100 million and create an increase of employment to 4125, and a further 3273 spin-off jobs. Construction itself would bring a small, but welcome, additional 78 jobs to the area. The estimates of its impact are considerable with goods and services rising by £105 million, and spin-off benefits of £156 million. And this investment is needed in Falmouth where unemployment has been growing since 2009 and there are significant problems of part-time and seasonal employment. Local businesspeople, such as a fish and chip shop owner, remind us of the “extremely challenging economic times” and describe the development as “a massive boost to the struggling Cornish economy”.

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On the other hand, there are others who argue that the suggested economic benefit is exaggerated and that there could be a threat to people and the economy. The local fishing industry takes lobster and shrimp from the bay and there are oyster beds in Carrick Roads and prawn grounds to the east of the bay. These fishermen fear the potential impact on their activities. This could be as a result of the dumping of the spoil from the dredging. As 600 000 cubic metres are to be dumped, this could cause physical damage to the fishermen's equipment, such as lobster pots. While the material will be dumped in a designated dumping ground (Resource 7B), they fear that the silt from the dumping could be moved by currents and the tide and impact on fishing grounds well away from that official dumping area. Some fishermen, such as those who depend on crab for almost all of their income, say that dumping of material before caused them losses. The fishermen, as represented by Tim Vinnicombe, reported 'great concern' and the worries about 'a detrimental effect'. There are additional concerns that the removal of maerl beds will affect commercial fishing, as fish and shellfish depend on the maerl when they are young.

In any case, the opponents point to the fact that the docks can be developed and increase employment without the dredging taking place. Falmouth is not an unemployment black spot, having lower unemployment rates than Cornwall as a whole, or the south-west of England or the whole country.

Tourism, they argue, is vital for Cornwall's economy. As visitors are attracted to the region by the unspoiled scenery and the wildlife of the area, any developments must be considered very carefully. Mass tourism of the sort proposed by the development, with a fifth of a million visitors arriving on enormous cruise ships (see Table 1), may change the nature of the area and, in the long term, actually make tourism less important in the area, causing economic damage.

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.

Level 3 ([9]–[12])
Candidate states clearly the main changes and the counterargument. Three or more different factors should be discussed. 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 – 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 ([5]–[8])
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

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- 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]–[4])
- 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 [12]

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

Maerl is a type of seaweed that occurs in deep beds on the floor of the sea. The top of these beds is covered with living maerl, which is very fragile. It is rare, existing in only a few coastal areas in Britain and Ireland, and also very useful as it acts a nursery ground for small fish and other sea life. It is said to be "excellent for marine biodiversity". Many of the fish and shellfish that are commercially fished in the area (including cod, haddock and lobsters) rely on the maerl beds for their young to grow and survive. These beds, once lost, are irreplaceable and will cause great environmental damage to all of the sea life that depends upon them.

Such importance is placed in these maerl beds that Falmouth Bay has been given the highest environmental protection possible for any endangered wildlife site – it has been declared a Special Area of Conservation (SAC). That protection has led to the government's own body, Marine Management Organisation, turning down earlier requests to dredge the maerl in the approach from Carrick Roads to Falmouth Docks. While Port of Falmouth Development Initiative has suggested that the maerl will be returned to the seabed after it has been deepened, we can be sceptical that dredging, relocating and then replacing such fragile plants will be successful.

Those who are against the development fear that the development may cause environmental damage beyond Falmouth Bay itself. SACs are there to protect fragile and endangered sites and, if the government change the law to allow this one to be damaged, others will be threatened in turn, e.g. the Thames and the Severn Estuaries. These concerns have been expressed both by RSPB and Cornwall Wildlife Trust, who have described it as "the thin end of the wedge" (Tom Hardy, Marine Conservation Officer, Resource 7H).

Disturbing the sediments in the Fal estuary may cause environmental damage. Dangerous chemicals such as Tributylin (TBT) have accumulated heavily in the estuary. TBT is a chemical component of marine paints, highly toxic to sea life. The chemical concentrates further up the food chain so will threaten much marine life in the area, if disturbed. The docks at Falmouth are known to be particularly contaminated with TBT, so dredging there will release a lot of the chemical that might affect a wide area.

Those in favour of the scheme accept that there may be some environmental damage, but argue that steps have been taken to reduce it. The presence of TBTs and heavy metals is known and these are of concern even before dredging has been carried out. However, any contaminants that enter the lower Fal Estuary are not likely to affect the oyster beds in Carrick Roads or the prawn grounds to the east of Carrick Roads. The developers will take steps to minimise any contamination that might take place. One benefit is

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that, after dredging, those areas will be free from TBT and any other contaminants that were there before. The developers assure us that the SAC will suffer no long-term impact from the development.

Dredging will remove a small proportion of the maerl beds, less than 2%, consisting of just 4 hectares. The developers plan to lift the maerl, and relocate it elsewhere until the dredge is complete. At that point it will be returned to its original site where it can recolonise, resulting in no loss of maerl. Indeed, it is estimated that there will be maerl left over after this operation, allowing 2 more hectares of maerl bed to be created.

The material that is removed from the sea floor in the dredging will be carefully dumped at sea in a designated offshore dump site (Resource 7B). The dumped sediments will accumulate in depths of between 10 and 50 centimetres there, and in areas more that 1 km from that dump site there will be less than 0.5 cm of deposition. The impact on fisheries is said to be "minimal". It is conceded that the development will have some impact on marine mammals as a result of the increased noise underwater, the release of TBT and the barges taking the dredged material out to the dumping ground. However, steps will be taken to ensure that these effects are minimised and it is "not likely" that there will be a significant negative impact on wildlife in the area, whether fish, shellfish or birds.

Level 3 ([7]–[8])
Candidate states clearly the main effects and the counterargument. 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 – 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. Conclusion (State clearly your decision and justify it on the basis of the greater overall benefits)

The recommendation may overlap with some of the points made in B in relation to the potential economic, social and environmental impact of the development. However, the emphasis here has to be on the *greater overall benefits* of development and the contrary view. In this section, for example, candidates can weigh up the relative merits of, arguably, damage to the environment against possible economic development and employment for local people. *No mark for stating a decision alone without a justification.*

Level 3 ([8]–[10])
Candidate states clearly a decision. A range of reasons is 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 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 is there 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 [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 Prof Tom Finch, advisor for DfT, 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]

Section B

Total

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50
50
110