



SUBJECT:	<b>Geography</b>
PAPER NUMBER:	I
DATE:	21 <sup>st</sup> May 2018
TIME:	9:00 a.m. to 11:05 a.m.

Answer **THREE** questions in total, one from each section. Questions carry equal marks.

### **SECTION A: PHYSICAL GEOGRAPHY OF THE MALTESE ISLANDS**

**Choose ONE question from this section.**

1. The maquis ecosystem is a major community that forms part of the successional sequence towards the climatic climax vegetation.
  - (a) Briefly state why maquis is considered to be a major community. (4 marks)
  - (b) Which major community is considered to be the climatic climax vegetation of the Maltese Islands? Give reasons for your answer and discuss in relation to the successional sequence mentioned in the statement above. (10 marks)
  - (c) Describe the most important ecological and geographical characteristics of the maquis ecosystem in the Maltese Islands. (10 marks)
  
2. The fact that the Maltese Islands are mostly made up of limestone rocks and are situated in a fully maritime setting involves an inescapable consequence – lots of caves (Pedley et al., 2002:71).
  - (a) With reference to the above statement, discuss the processes involved in the formation of the **TWO** major types of limestone caves found in the Maltese Islands. Supplement your explanation with local examples. (10 marks)
  - (b) Karst topography develops best on carbonate rocks such as limestone and includes both surface and underground features. Identify **TWO** subaerial (surface) karst landforms found in the Maltese Islands, discuss their process of formation and account for their spatial distribution and human use, where applicable. (14 marks)

3. Figure 1 illustrates the formation of a perched aquifer.

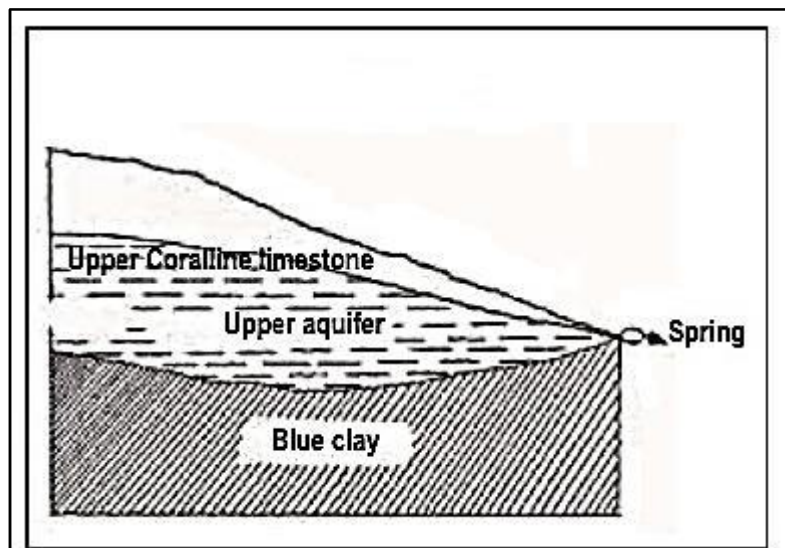


Figure 1: A perched aquifer scheme (IGN, 1990)

- (a) Refer to Figure 1 and briefly explain the formation of a perched aquifer in the Maltese Islands. (8 marks)
- (b) Outline the spatial distribution and most important uses of this resource in Malta and Gozo. (8 marks)
- (c) Discuss the relationship between nitrate contamination and the perched aquifer. (8 marks)

## SECTION B: HUMAN GEOGRAPHY OF THE MALTESE ISLANDS

Choose **ONE** question from this section.

- 4. Maltese commuters lose 52 hours from their daily activities annually because they are stuck in road traffic congestion (Attard et al., 2015).
  - (a) Discuss **THREE** negative impacts that derive from car use. (12 marks)
  - (b) The 2018 budget speech indicated that the government was determined to implement measures to reduce traffic congestion ([www.independent.com.mt](http://www.independent.com.mt)). Describe **FOUR** possible alternatives to car use for daily commuting and explain initiatives taken by the government to promote such alternatives. (12 marks)

5. The Maltese freshwater crab (*Potamon fluviatile lanfranconi*) (Figure 2), in Maltese known as "Il-Qabru", is an endemic species. This species is vulnerable and may become extinct.



Figure 2: The Maltese freshwater crab  
(<http://cefisshessentials.com/>)

- (a) Discuss **TWO** factors that can contribute to the Maltese freshwater crab's extinction. (10 marks)
- (b) Discuss **TWO** measures that can help with the conservation of the Maltese freshwater crab. (14 marks)
6. A typical characteristic of Maltese villages is that they are nucleated (De Lucca, 1988).
- (a) Outline the characteristics of a nucleated village and give **ONE** example of such a village in Malta. (6 marks)
- (b) Describe **TWO** other types of settlement patterns found in Malta. Your answer should include **ONE** example of each. (8 marks)
- (c) Discuss **TWO** examples of heritage loss that is taking place in Urban Conservation Areas despite existing policies that are meant to protect this zone. (10 marks)

**Questions continue on next page**

**SECTION C: FIELDWORK, CARTOGRAPHY AND STATISTICAL ANALYSIS**

**Choose ONE question from this section.**

7. Figure 3 shows a map of Il-Buskett with the location of orange tree orchards. Note that the information about the location of the orange tree orchards is not real. Il-Buskett covers an area of 473,694.5 m<sup>2</sup>.

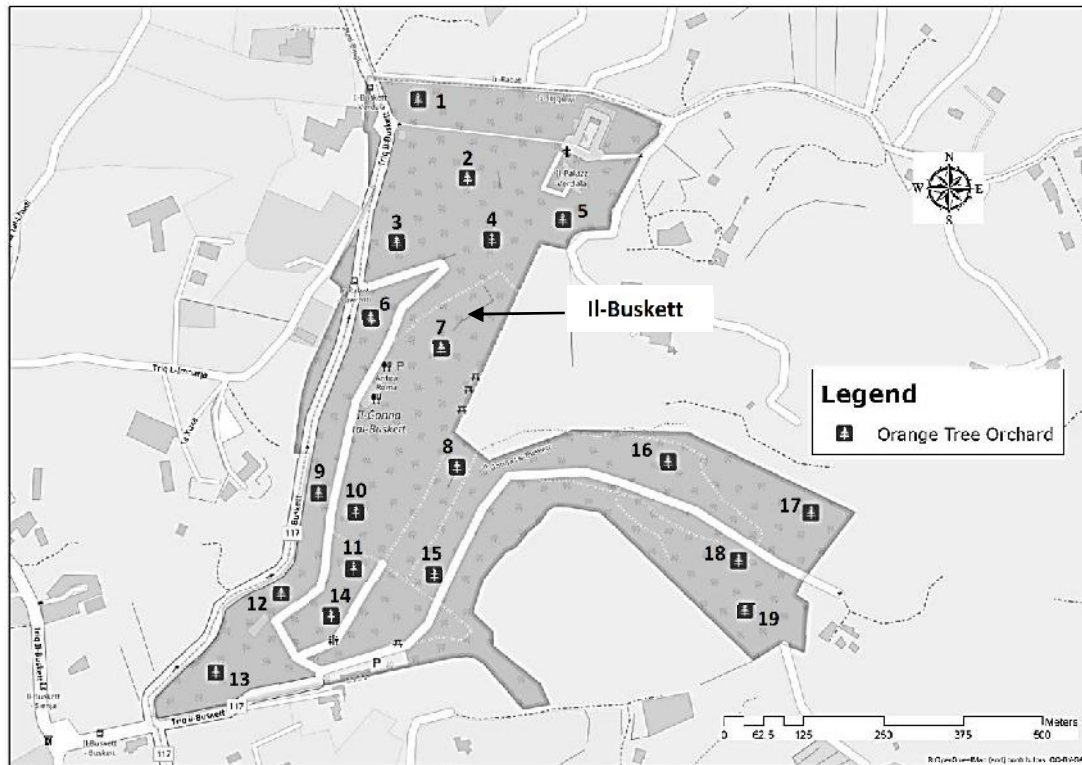
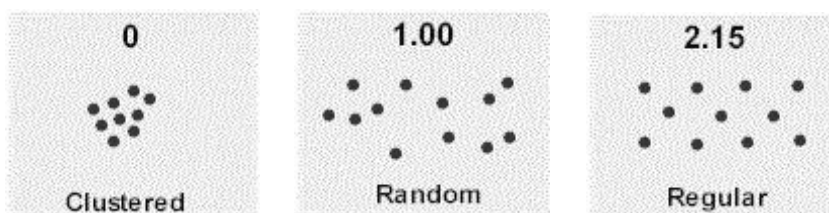


Figure 3: A map of Il-Buskett with the location of orange tree orchards (Source: Adapted from OpenStreetMap in ESRI 2018)

- (a) Define the statistical technique known as the Nearest Neighbour Index. (4 marks)
- (b) Work out the Nearest Neighbour Index for the information provided in Figure 3. The formula is the following: (16 marks)

$$NNI = 2D \sqrt{(N/A)}$$

The nearest neighbour formula will produce a result between 0 and 2.15, where the following distribution patterns form a continuum:



- (c) Interpret the answer found in (b). (4 marks)

- 8. (a) Explain why Chi-Square ( $X^2$ ) tests are used. (6 marks)
- (b) List **FOUR** criteria that need to be met to perform a Chi-Square test. (8 marks)
- (c) Robert carried out a fieldwork on rock type and the number of potholes. He counted the following number of potholes.

Table 1: Number of potholes in relation to rock type.

Rock Type	No. of potholes
Upper Coralline Limestone	60
Globigerina Limestone	30
Lower Coralline Limestone	9

The areas examined on each rock type are the same.

Interpret your answer using (i) the formula below; (ii) Table 1 to identify whether the number of potholes reflect the nature of the rock type and (iii) the 95% confidence interval (Table 2). (10 marks)

$$X^2 = \sum \frac{(O - E)^2}{E}$$

Table 2: Critical Values of the  $X^2$  Distribution

**Critical Values of the  $\chi^2$  Distribution**

df \ p	0.995	0.975	0.9	0.5	0.1	0.05	0.025	0.01	0.005	df
1	.000	.000	0.016	0.455	2.706	3.841	5.024	6.635	7.879	1
2	0.010	0.051	0.211	1.386	4.605	5.991	7.378	9.210	10.597	2
3	0.072	0.216	0.584	2.366	6.251	7.815	9.348	11.345	12.838	3
4	0.207	0.484	1.064	3.357	7.779	9.488	11.143	13.277	14.860	4
5	0.412	0.831	1.610	4.351	9.236	11.070	12.832	15.086	16.750	5
6	0.676	1.237	2.204	5.348	10.645	12.592	14.449	16.812	18.548	6
7	0.989	1.690	2.833	6.346	12.017	14.067	16.013	18.475	20.278	7
8	1.344	2.180	3.490	7.344	13.362	15.507	17.535	20.090	21.955	8
9	1.735	2.700	4.168	8.343	14.684	16.919	19.023	21.666	23.589	9
10	2.156	3.247	4.865	9.342	15.987	18.307	20.483	23.209	25.188	10
11	2.603	3.816	5.578	10.341	17.275	19.675	21.920	24.725	26.757	11
12	3.074	4.404	6.304	11.340	18.549	21.026	23.337	26.217	28.300	12
13	3.565	5.009	7.042	12.340	19.812	22.362	24.736	27.688	29.819	13
14	4.075	5.629	7.790	13.339	21.064	23.685	26.119	29.141	31.319	14
15	4.601	6.262	8.547	14.339	22.307	24.996	27.488	30.578	32.801	15

**Questions continue on next page**

9. Figure 4 is a weather map of the North Atlantic, Western Europe, and the Mediterranean Region on the 27<sup>th</sup> December 2017.

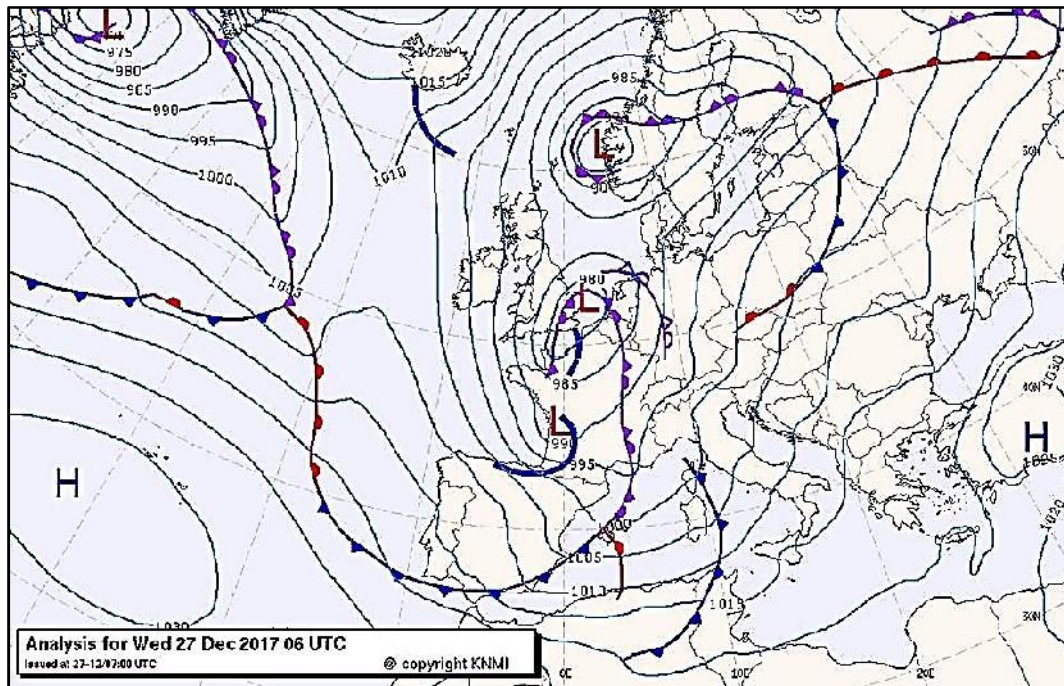


Figure 4: Weather Map for the North Atlantic, Western Europe, and the Mediterranean Region (Gozo Weather Page, 2017).

- (a) Name and describe the characteristics of the **THREE** different fronts that are represented in Figure 4. Illustrate your answer with a labelled sketch for each front. (12 marks)
- (b) With reference to Figure 4, describe the weather being experienced in Western Europe and Malta on the 27<sup>th</sup> December 2017. (12 marks)



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SUBJECT:	<b>Geography</b>
PAPER NUMBER:	II
DATE:	22 <sup>nd</sup> May 2018
TIME:	9:00 a.m. to 11:05 a.m.

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Answer **THREE** questions in total, one from each section. Questions carry equal marks.

**SECTION A: ATMOSPHERIC PROCESSES AND PATTERNS**

Choose **ONE** question from this section.

1. Figure 1 is a NASA image of hurricane Harvey in 2017.



Figure 1: Hurricane Harvey.  
(<https://www.nasa.gov/sites/>)

- (a) Define the term 'hurricane' and describe its main characteristics. (4 marks)
- (b) Explain the key factors that encourage the development of a hurricane. (6 marks)
- (c) List **TWO** countries which are commonly affected by hurricanes. (2 marks)
- (d) List **THREE** hazards associated with a hurricane. (3 marks)
- (e) Discuss **THREE** ways how climate change is affecting the development of hurricanes. (9 marks)

**Questions continue on next page**

2. The Sahel Region has experienced a series of historic droughts throughout the years, going back to at least the 17<sup>th</sup> century.

(a) Explain **THREE** causes of drought. (9 marks)

(b) Discuss **ONE** environmental, **ONE** economic and **ONE** social consequence of drought. (9 marks)

(c) Discuss **THREE** common ways used to mitigate the implications of drought. (6 marks)

3. The Earth receives energy as incoming short-wave solar radiation, often referred to as insolation.

(a) List **FOUR** cosmic factors that affect the amount of incoming radiation received by the Earth. (4 marks)

(b) Figure 2 shows the atmospheric heat budget. Define the term 'heat budget' and explain the key concepts in the diagram by also making reference to the positive and negative heat balance. (8 marks)

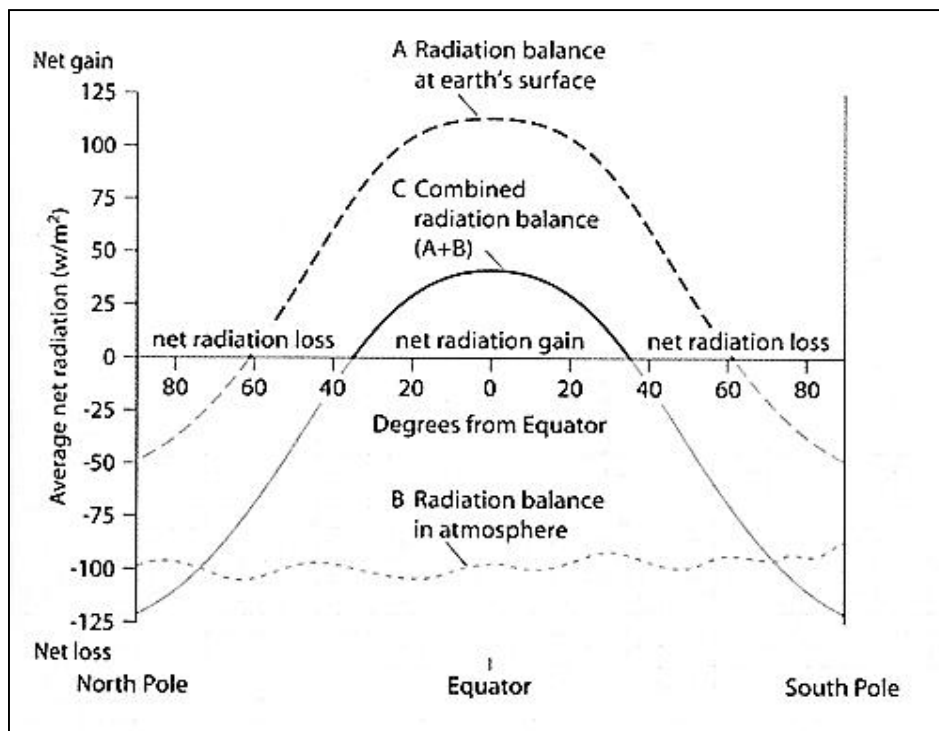


Figure 2: The Global Heat Budget  
 (<http://thebritishgeographer.weebly.com/climate-controls.html>)

(c) The amount of insolation on Earth varies considerably over time and space.

(i) Explain **FOUR** long-term factors that affect insolation. (8 marks)

(ii) Explain **TWO** short-term factors that affect insolation. (4 marks)



**SECTION B: GEOMORPHOLOGY**

**Choose ONE question from this section.**

4. In March 2011 a tsunami hit the northeastern coast of Japan, in Fukushima (Figure 3).



Figure 3: Fukushima, NE coast of Japan  
 (<http://www.emergency-live.com/en/news/>)

- (a) Define the term 'tsunami'. (3 marks)
  - (b) Explain how tsunamis originate and briefly describe **THREE** characteristics of this phenomenon. (10 marks)
  - (c) Briefly describe **TWO** main impacts of tsunamis. (4 marks)
  - (d) Explain what a risk assessment study in relation to a tsunami hazard entails. (7 marks)
5. The coastline is a complex and dynamic environment, with change occurring over a range of timescales (Bishop and Prosser, 1997).
- (a) Explain **FOUR** processes that lead to coastal erosion. (12 marks)
  - (b) Cliffs undergo the process of mass movement or mass wasting. Draw an annotated sketch and provide a brief description of **THREE** types of mass movements that affect cliffs. (12 marks)

**Questions continue on next page**

6. Figure 4 shows the Thames Barrier in London, England.



Figure 4: Thames Barrier, London England  
(<http://www.dailymail.co.uk/sciencetech/>)

- (a) Briefly describe **THREE** reasons why communities prefer to live near rivers. (6 marks)
- (b) Uncontrolled development leads to flooding. Explain with reference to **TWO** particular situations and give specific examples to further substantiate the validity of this statement. (14 marks)
- (c) Outline **FOUR** negative consequences that would happen if the Thames Barrier were not installed. (4 marks)

### SECTION C: BIOSPHERIC PROCESSES AND PATTERNS

Choose **ONE** question from this section.

- 7. The Mediterranean biome is found on the west coasts of continents between 30° and 40° north and south of the Equator i.e. in areas bordering the Mediterranean Sea, California, Central Chile, Cape Province and parts of southern Australia.
  - (a) List **TWO** common types of vegetation found in the Mediterranean biome. (4 marks)
  - (b) Explain **FIVE** ways how plants in the Mediterranean naturally adapt to the climate. (10 marks)
  - (c) Discuss **FIVE** threats that the Mediterranean biome is facing as a result of human activity. (10 marks)
- 8. The tropical rainforest biome includes the Amazon and Congo basins and the coastal lands of Ecuador, West Africa and extreme south-east Asia.
  - (a) Define the term 'biome'. (2 marks)
  - (b) Briefly explain the key climatic conditions associated with tropical rainforests. (4 marks)

(c) Describe **FIVE** main characteristics of the vegetation in tropical rainforests. (8 marks)

(d) Describe the natural nutrient cycle in tropical rainforests and explain the consequences of deforestation on this cycle. Illustrate your answer with a diagram/s. (10 marks)

9. Figure 5 is a photo of waterlogged soil in Woodanilling, in the Great Southern region of Western Australia.



Figure 5: Waterlogged soil in Woodanilling.  
(<https://www.agric.wa.gov.au/soil-management/overcoming-waterlogging>)

(a) Define the term 'waterlogging of soil' and briefly explain its causes. (6 marks)

(b) Explain **TWO** ways how climate change can contribute to the waterlogging of soils. (4 marks)

(c) Give **THREE** reasons why waterlogging needs to be managed. (6 marks)

(d) Discuss **FOUR** management options for waterlogging. (8 marks)

SUBJECT:	<b>Geography</b>
PAPER NUMBER:	III
DATE:	22 <sup>nd</sup> May 2018
TIME:	4:00 p.m. to 6:05 p.m.

Answer **THREE** questions in total, one from each section. Questions carry equal marks.

### SECTION A: HUMAN GEOGRAPHY AND THE DEVELOPING WORLD

Choose **ONE** question from this section.

- The continuing growth of primate cities is one phenomenon that has multiple implications. Paris is one example of a primate city (Figure 1).



Figure 1: Paris – a Primate City  
 (<https://en.parisinfo.com/>)

- Briefly explain what is meant by 'primacy'. (2 marks)
  - Explain **THREE** positive and **THREE** negative effects of primate cities on a country's economic development. (12 marks)
  - Although projections indicate that several cities will continue to grow in the future, a recent phenomenon in developed countries, and to a lesser extent in developing ones, is that of counterurbanisation. This is one main determinant of urban decline and depopulation. Discuss **TWO** causes of urban growth and **THREE** causes of counterurbanisation. (10 marks)
- Migration involves the movement of people and can be classified by its duration.
    - Briefly explain **THREE** types of migration based on duration. (6 marks)
    - Explain **FIVE** main causes of migration. (10 marks)
    - Explain the Gravity Model and discuss how it relates to migration. (8 marks)

3. Figure 2 is a representation of the Human Development Index per country across the globe in 2016.

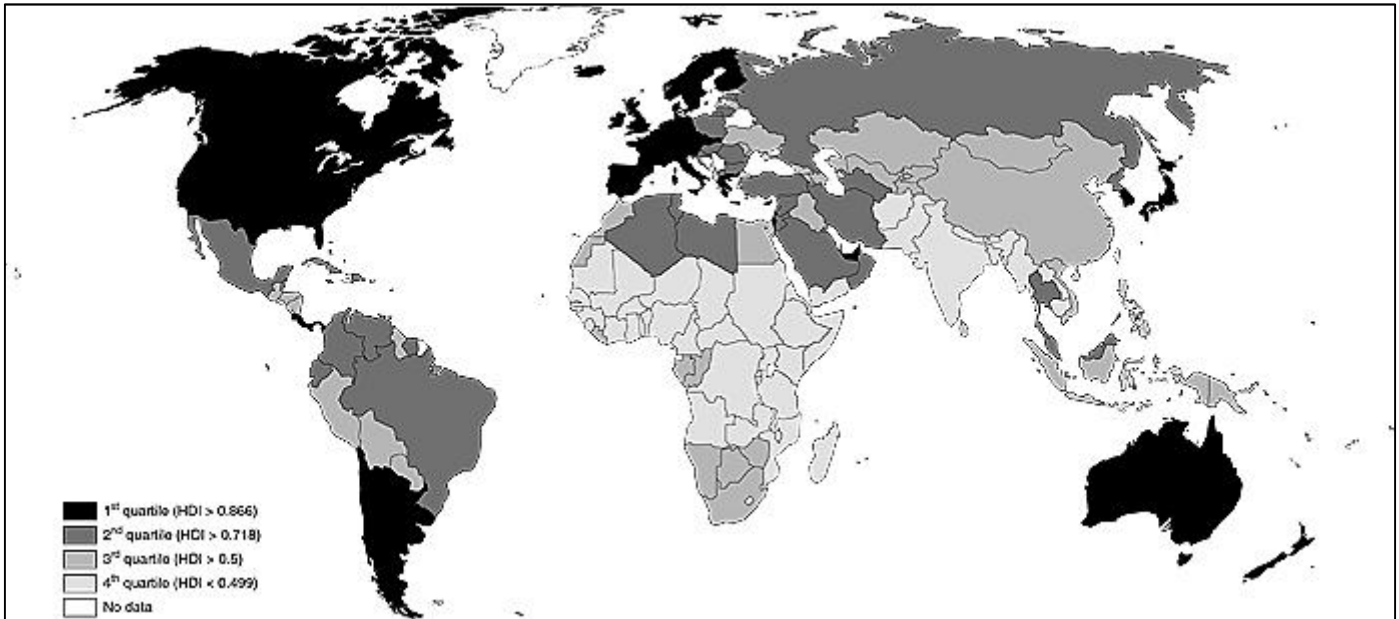


Figure 2: Human Development Index across the globe in 2016  
(<http://www.fao.org/docrep/W6199T/w6199t09.htm>)

- (a) Define the Human Development Index and explain the key trend visible in Figure 2. (5 marks)
- (b) Explain the significance of the 'Brandt Report' with reference to the answer given in (a). (4 marks)
- (c) Briefly explain **FIVE** problems of international debt. (15 marks)

**SECTION B: ISSUES IN RESOURCE MANAGEMENT**

Choose **ONE** question from this section.

- 4. The Deepwater Horizon oil spill that occurred in the Gulf of Mexico in 2010 is considered as one of the largest oil spills in recent history.
  - (a) Define the term 'oil spill' and briefly explain **TWO** main causes. (6 marks)
  - (b) Discuss the main impacts of oil spills and how these have a far-reaching effect on the natural and anthropogenic environment. Use examples to illustrate your answer. (18 marks)
- 5. Tidal power is one form of renewable energy. The UK's tidal power resource is estimated to be more than 10 Gigawatts (GW), about 50% of Europe's tidal energy capacity.
  - (a) Define the term 'tidal energy'. (2 marks)
  - (b) Explain **THREE** benefits related to the use of tidal energy. (6 marks)

- (c) Explain **THREE** environmental impacts associated with tidal energy. (6 marks)
- (d) Discuss the significance of renewable energy within the concept of sustainable development. Use **FIVE** examples to support your answer. (10 marks)
6. The energy sector in Africa is characterised by a low consumption of modern energy in a continent endowed with extensive but under-developed energy resources. The majority of the population depends on wood-fuels (charcoal and firewood) (Sawe, 2011). Nevertheless, the increasing demand for firewood has several implications, including the shortage of the same resource.
- (a) Explain **FOUR** reasons why forests are an essential resource for people. (8 marks)
- (b) Provide a brief explanation on why people in the African continent need to rely on firewood as one of their main sources of energy. (2 marks)
- (c) Explain **TWO** human costs caused by firewood shortages. (6 marks)
- (d) Describe **FOUR** environmental problems caused by the reliance on firewood. (8 marks)

### **SECTION C: THE GEOGRAPHY OF TOURISM AND RECREATION**

**Choose ONE question from this section.**

7. Transport systems and services themselves can be at the heart of tourist activities (International Transport Forum, 2015).
- (a) Identify and explain **THREE** characteristics that make transport an integral part of the tourism industry. (12 marks)
- (b) Discuss in detail **TWO** possible ways how transport technologies can help the tourism of a country to expand. Use examples to support your answer. (12 marks)
8. "Tourism can bring many economic benefits, particularly in rural areas and developing countries, but mass tourism is also associated with negative effects. Tourism can only be sustainable if it is carefully managed so that potential negative effects on the host community and the environment are not permitted to outweigh the financial benefits" (<http://traveltips.usatoday.com/positive-negative-effects-tourism-63336.html>).
- (a) Discuss in detail **THREE** economic benefits of tourism in host countries. Support your answer with examples. (12 marks)
- (b) Discuss in detail **THREE** economic problems that tourism creates for the host countries. Support your answer with examples. (12 marks)

***Questions continue on next page***



9. Figure 3 shows a picturesque village found along the Italian coast. The Mediterranean region is dotted with similar coastlines.



Figure 3: Cinque Terre, Italy

(<https://images.walks.org/italy/cinque-terre-tours-from-rome/rome-to-cinque-terre-hero.jpg>)

- (a) Discuss **FOUR** types of development found along Mediterranean coastal regions that negatively influence the physical environment. Support your answer with examples. (12 marks)
- (b) Discuss **THREE** conservation measures that can improve the natural landscape of the Mediterranean coastline. (12 marks)