

Exam Paper Analysis

Target: 2012 – 2021 HKDSE Geography Examinations

Paper 1 (Compulsory Part)

M: Multiple-choice Questions (MCQs) F: Fieldwork-based Question D: Data/Skill-based/Structured Questions

E : Short Essay Questions

Module	Topic	Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		
1	Opportunities and Risks	Earth's structure and plates	M	M	M		M		M		M	M		
		Internal forces and processes	Compressional, tensional & lateral forces		M		M							
			Folding, faulting & vulcanicity		M	M	M	M		M	M	M		M
		Plate boundaries	Constructive, destructive, conservative	M	E		M					M		
		Plate movement and resultant landforms	Along constructive plate boundaries	M	M			M						
			Along destructive plate boundaries	M	E	M		E			M, D	M, D	E	D
			Along conservative plate boundaries	D										
			Away from plate boundaries							M				
		Hazards caused by internal forces	Earthquakes	D	E		D	E		M	D	D	E	
			Volcanic eruptions		E	D	M			D			E	D
			Tsunamis		E		D							
Factors affecting the degree of loss & destruction of tectonic hazards	M, D	M	M	D	M		D	D	D		D			
Measures used to reduce losses during tectonic hazards	D	E	D	D			M, D		D	E	D			
Opportunities & risks in hazard-prone areas		M	D		E		D							
2	Managing River and Coastal Environments	Rivers	Water cycle	M		M			M	M				
			Factors affecting the river energy		M		D	M						
			Fluvial processes (erosion, transportation & deposition)	M			D			M		E		
			Characteristics of a river at different courses / hydrograph	M		D	D			M	M	M		M
			Landform features at different courses & conditions	E	M	D		M			M		D	
			How human activities influence & alter the river environments	E	M	M, D	M	M			M	E	D	
	Coasts	Types of waves			M									
		Wave processes (erosion, transportation & deposition)	M			M				M	F	M	E	
		Factors controlling the rate & location of wave processes		D		M	D		E		F			
		Coastal landforms	By wave erosion		M, D	M	M	D		M	D	M		
			By wave deposition		M, D						D		M	M
How human activities influence & alter the coastal environments	M	D	M	M	D		E	D			E			
3	Changing Industrial Location	Manufacturing system / mode			D						D			
		Locational factors / industrial agglomeration / industrial inertia	M, E	M, D	M, D	E	D		M	M, E	M	D	M	
		Manufacturing industries in HK	M		M	M	M		M	M		M		
		Iron & steel industry in China	M	D	M	E	D		M	E	M	D	E	
		IT industry in the US			D	M	M		E	E	E	D	M	
		Impact of industrial relocation & changes in new production mode	M, E	M	D	M	D		E		E	M, D	E	

Recent Trends

- * MCQs: often asked about **internal processes** and **Earth's structure and plates**, and started to ask about **plate boundaries**
- * Data/Skill-based/Structured Questions: focused on resultant landforms and tectonic hazards (mainly **earthquakes**) **along destructive plate boundaries** and **factors affecting the degree of loss & destruction**; also asked about **measures used to reduce losses during tectonic hazards** and **opportunities / risks in hazard-prone areas**
- * Short Essay Questions: less common, but asked about **earthquakes and volcanic eruptions at convergent (destructive) plate boundaries** and the **effectiveness of land use zoning in reducing loss resulted** in 2020
- * Module for **field-work-based questions in 2023**

Essential Topics

- * Internal processes and resultant landforms
- * Major landforms of three types of plate boundaries
- * Causes of the tectonic hazards
- * Factors affecting the degree of loss & destruction
- * Measures used to reduce losses
- * Opportunities / risks in hazard-prone areas

Recent Trends

- * MCQs: focused more on **rivers** in recent years, but also asked about **wave processes** and the **resulting coastal landforms**
- * Data/Skill-based/Structured Questions: focused on **coastal environments**, but asked about **fluvial features** and **river management strategy** in 2020
- * Short Essay Questions: more common in recent years, mainly asked about **fluvial /coastal processes** and **their management strategies**
- * Module for **field-work-based questions in 2022, 2023 and 2024 (River)**

Essential Topics

- * Fluvial processes and landforms along a river course
- * Coastal processes and landforms
- * Hard and soft approaches of river and coastal management strategies

Recent Trends

- * MCQs: often asked about the **locational factors of manufacturing industries**, the **manufacturing industries in HK** and the **iron & steel industry in China**
- * Data/Skill-based/Structured Questions: focused on mainly asked about the **iron & steel industry in China** and the **IT industry in the US**, e.g. **location advantages and limitations**
- * Short Essay Questions: more common, mainly asked about the **locational factors of the iron & steel industry in China / IT industry in the US** and the **impact of industrial relocation & changes in new production mode**

Essential Topics

- * Locational factors and changes of the iron & steel industry in China
- * Locational factors and production modes of the IT industry in the US
- * Impact of industrial relocation & changes in new production mode

Demonstration

Fieldwork-based Question

(Modified from: 2019 HKDSE Geography Examination Paper 1 Section B Question 1)

Question 1

A group of Geography students carried out a coastal field study of the longshore drift along beaches P and Q respectively. A photograph is provided to show four different tools and instruments used in the field study. A map is given to show the sketch of the field study area. Data of wave frequency and the rate of longshore drift of the field study sites are also given.

(a) Describe the use of tools and instruments for data collection in the field study. (4 marks)

(b) Students collected five sets of data at beaches P and Q successively. Each data collection lasted for one minute.

Suggest the demerits of the above methods of data collection. Explain how such demerits affect data reliability. (5 marks)

(c) The students concluded that ‘the higher the wave frequency, the lower the rate of longshore drift’ in the field study.

Based on the given data, discuss whether the students’ conclusion is appropriate. (3 marks)

(d) Suggest another field study topic to be carried out in the study area. Describe and explain the method(s) of data collection. (6 marks)

Level 5** Answer

(a) Tools and instruments used for data collection in the coastal field study are timer / stopwatch, measuring tape, floating object and ranging pole.

The timer is used for recording the time of data collection, e.g. wave frequency per minute. 1

The measuring tape is used for measuring the distance and direction travelled by the floating object, e.g. measuring the distance between ranging poles. 1

Floating object is used for measuring the distance of load movement along a shore, e.g. plastic bottles, buttons or painted corks. 1

Ranging poles are used for indicating the floating object’s movement from the starting point of a swash to the finishing point of a backwash. 1

[4]

Answering Guidelines

* Candidates need to describe accurately the use of **two or more** types of tools / instruments

Short Essay Question

(Modified from: 2019 HKDSE Geography Examination Paper 1 Section D Question 8)

Question 1

Account for the characteristics of the main nutrient components in a tropical rainforest. Discuss whether plantation has greater influences on these nutrient components than shifting cultivation.

Level 5** Answer

The three main components in the **nutrient cycle** of tropical rainforests (TRF, for short) are biomass, soil and litter, forming **3 different nutrient compartments which are interrelated**. Through **nutrient cycling**, **nutrient flows** from the vegetation to the soil and back, i.e. **biomass – litter – soil – biomass**. Their **characteristics** - mainly **nutrient storage** and **nutrient flow** – are influenced by the physical conditions, esp. the **all-year unchanging hot wet climate**.

The hot wet climate causes **rapid chemical weathering** of bedrock, which is the primary source of **nutrient input in soil**, for **absorption by plants** to maintain healthy plant growth in the ecosystem. Through **litter fall** and **decomposition**, nutrient returns to the soil for **re-cycling**. Nutrient cycling is rapid and continuous. There is a rapid nutrient flow due to high temperature.

Among the 3 nutrient compartments, **biomass has the greatest nutrient storage, smaller in soil, and smallest in litter**.

In fact, nutrient in TRF is **mainly stored in the biomass**. The luxuriant vegetation with a 4-5 layered structure stores a huge amount of nutrient, and is a result of **optimum climatic conditions** – hot wet all the year. Located in low latitudes, within the tropics, the TRF has **high solar radiation** throughout the year, thus constant high temperature throughout the year, high annual temperature of 26-28°C, and **small annual and diurnal ranges of temperature**. It has high annual rainfall, exceeding 2 000 mm, which provides a constant **moisture budget surplus**.

Therefore, **without seasonal change**, no distinct dry season, and lack of seasonality, the unchanging hot wet climate is favourable for **evergreen plant** growth. **Insolation** is evenly distributed throughout the year, which is ideal for photosynthesis. Therefore, plants **grow luxuriantly** throughout the year. As a result, there is **continuous nutrient absorption by evergreen plants**, meaning **continuous and large amount of nutrient flow, transferring from soil to biomass**.

The **nutrient storage in soil is smaller**. The hot wet climate speeds up **chemical weathering of bedrock, providing nutrient input to soil**. Hot wet climate also **speeds up decay of organic matter**, thereby **returning nutrient from litter to the soil for recycling**. However, nutrients are mainly stored in biomass, but limited in soil. This is because large amount of nutrient is either taken up by the luxuriant vegetation, or is lost through **heavy / strong leaching** because of the heavy rainfall which

Answering Guidelines

Introduction:
Outline the **main ideas** of the essay

Argument ①

✧ Describe and explain the characteristics of the **biomass compartment**, illustrating the factors affecting the **large nutrient storage in biomass**

Argument ②

✧ Describe and explain the characteristics of the **soil compartment**, illustrating the factors affecting the **smaller nutrient storage in soil**

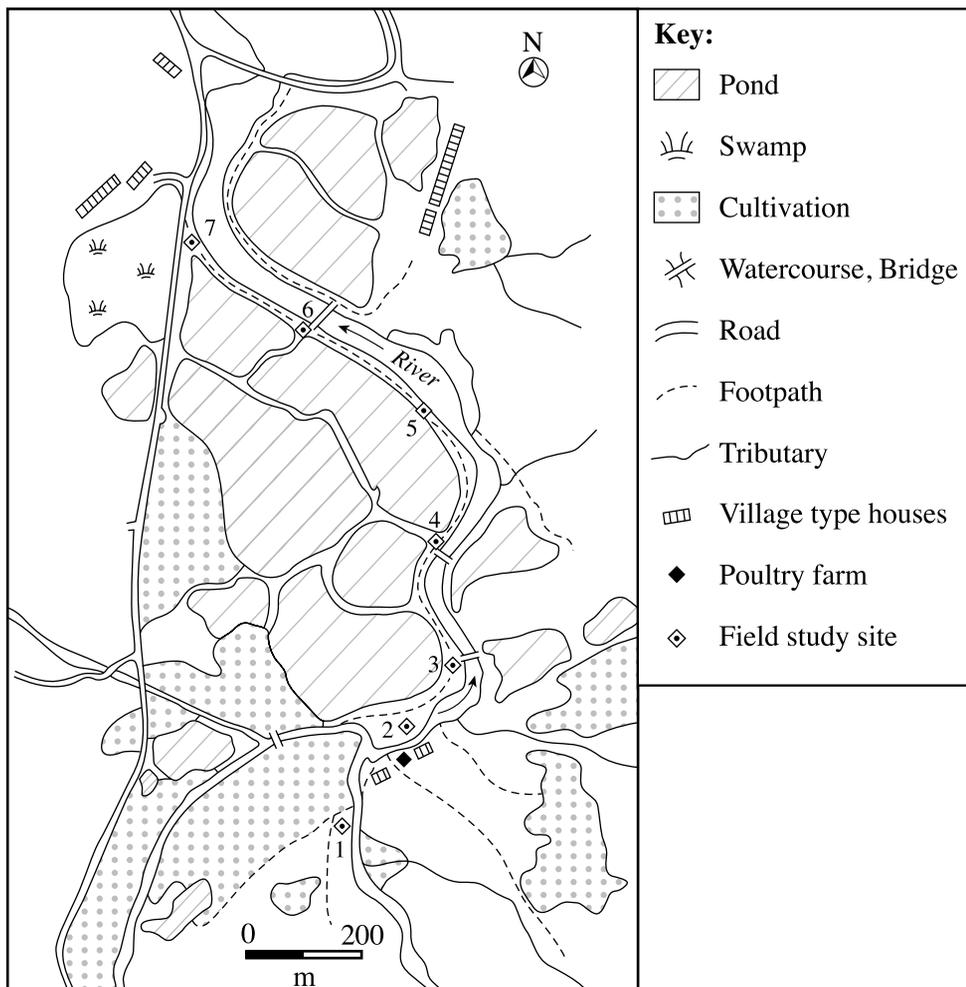
Section B: The fieldwork-based question is COMPULSORY. This question carries 18 marks.

1. A group of Geography students carried out a field study on river pollution. Figure 1a shows the tools and instruments required for the field study. Figure 1b is a sketch map of the field study site and the surrounding areas. Figure 1c is a transect of the field study sites. Table 1d shows the summary of data collected in the field study.

Figure 1a



Figure 1b

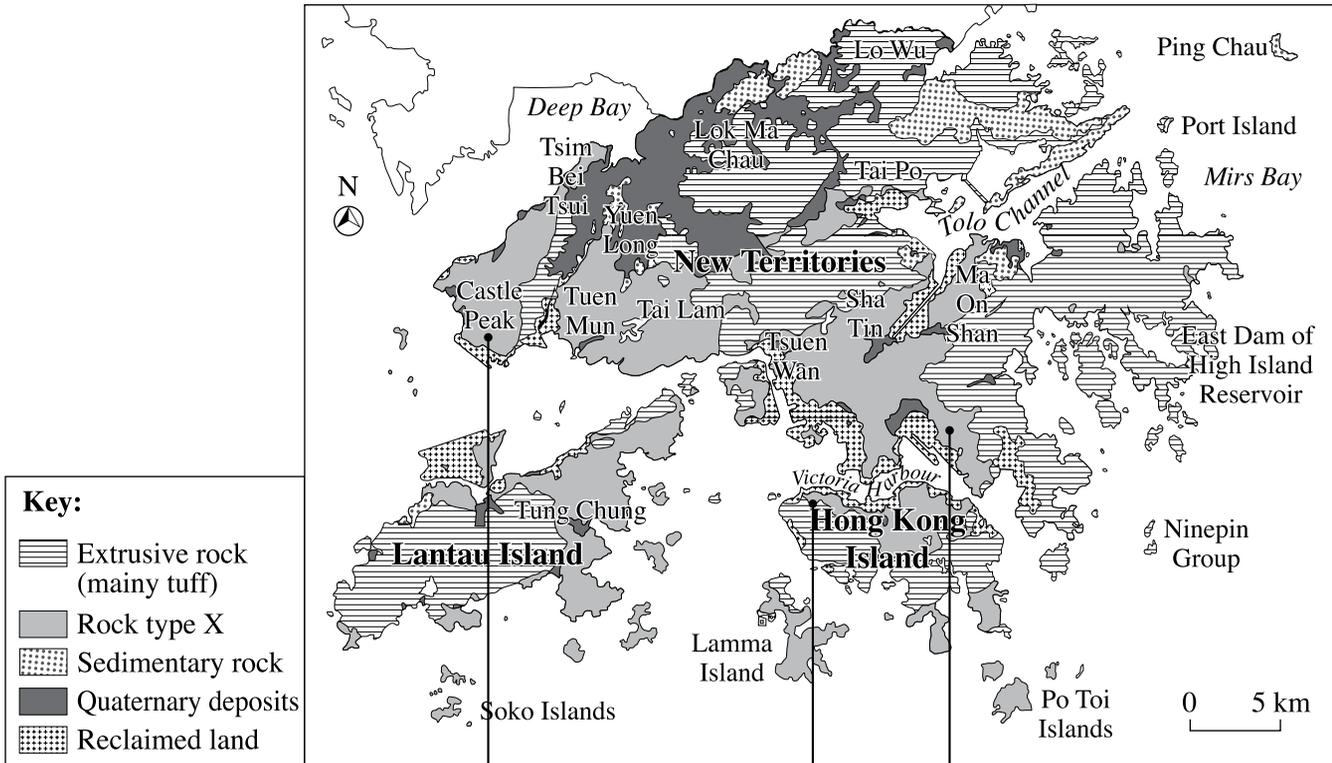


Section E: Answer any ONE question from this section. Each question carries 18 marks.

1. Elective: Dynamic Earth

Figure 1a shows the distribution of the major rock types in Hong Kong. Photographs 1b, 1c and 1d show three different landscapes in three areas consisting of similar rock type (X) in Hong Kong.

Figure 1a



Photograph 1b



Photograph 1c



Photograph 1d



- (a) Refer to Figure 1a, Photographs 1b, 1c and 1d.
- (i) Identify the rock type X. (1 mark)
 - (ii) Of the three landscapes shown in the photographs, which one is a geological resource, and which one is a geological hazard? Explain your answer with evidence quoted from the photographs. (4 marks)
- (b) Refer to Photographs 1b and 1d.
- (i) **In table form**, contrast the external processes leading to the formation of the landscapes in the photographs with reference to the following:
 - agent
 - place of occurrence
 - onset speed (4 marks)
 - (ii) Explain how slope gradient and rainstorms may favour the formation of the landscape in Photograph 1d in Hong Kong.
 - gradient (topographical factor)
 - rainstorms (4 marks)
- (c) Discuss the effectiveness of subsurface drainage systems in preventing the occurrence of landslides in Hong Kong. (5 marks)

Mock Exam Paper 1

Marking Guidelines

Paper 1

Section A

1. **B**
 $(0.8 \text{ cm} \times 20\,000) \times (1.3 \text{ cm} \times 20\,000)$
 $= 0.16 \text{ km} \times 0.26 \text{ km} = 0.04 \text{ km}^2$
2. **D**
 Mud flat is below the coastline.
3. **B**
 The photograph was taken from the main dam (294755) facing SE where Po Pin Chau is seen.
4. **C**
 The small streams will dry up in the winter.
5. **A**
 Pak Fu Shan (spot height 156) is located between Kei Tau Kok Teng (spot height 96) and Pak Lap Wan (below 20 metres).
6. **B**
 A high dam was built between a narrow channel of Fa Shan and Bin Tsin Kok. The location of High Island Reservoir was a fishing settlement in the 1960s.
7. **A**
 The Pacific Plate and the North American Plate move towards the northwest, but at different speeds. The former moves at about 6 cm per year, and the latter 1 cm per year. As the Pacific Plate moves faster, the North American Plate is situated further in the southeastern direction.
8. **C**
 The thickness of continental crust can be more than 200 km, while new oceanic crust can be smaller than 15 km in thickness.
9. **B**
 The greater the river channel roughness, the greater the resistance and therefore the slower the stream velocity.
10. **D**
 The headland was eroded by destructive waves, leaving the stack.
11. **A**
 Manufacturing processes of the dairy industry usually take place on the ranches, where cheese and other dairy products are made. Other examples include the canned fruit industry.
12. **A**
 Due to the loss in advantages of the supply of raw materials or energy, industries experience reduced profits and usually relocate. Due to industrial inertia, industries remain to operate in the same place, given the high costs / lack of funds for relocation and the presence of existing infrastructure and workers.
13. **C**
 The percentage of urban population appears to have reduced from 60% to 55%, but the actual population increased from 3 million to 3.025 million. Therefore, the population did not decrease when comparing the data in 2005 and 2015.
14. **B**
 The external walls of this building apparently underwent repairs and maintenance. However, the messy conditions of the clothes drying racks have not improved, indicating that it is an example of rehabilitation.
15. **A**
 Raising more livestock, or overgrazing, is a way for pastoralists to address food shortages.
16. **D**
 Mixed farming refers to the simultaneous cultivation of crops and raising of livestock on the same farm. For example, wheat is cultivated while cattle and sheep are raised in Australia. It is a mutually beneficial agroecosystem that enhances soil fertility.
17. **A**
 Tropical rainforest has high relative humidity and thick cloud cover.
18. **D**
 These measures do not cause harm to the environment, and they bring about economic benefits.
19. **D**
 Being below the baseline at zero began in 1940, not in 1880 as stated in option (1). The difference between the variables in 1940 (0.06) and 1950 (−0.18) is 0.24, which exceeds 0.2, therefore option (3) is correct.
20. **A**
 Global warming extends the growing season in high-latitude areas, therefore option (3) is incorrect. When atmospheric CO₂ concentrations increase, protein, iron, and zinc contents in crops decline, thereby causing the crisis of human malnutrition; hence, option (1) is correct.

Section B

Section B

Question 1

Marks

(a) Use of tools and instruments:

- **flow meter:** measuring the **velocity of stream flow**, and it connects to the sensor of an impeller stick for flow measurements
- **clinometer:** measuring the **slope angle by sighting at the same height of the opposite rule**
- **ranging poles / rods:** indicating **starting**(downstream) and **finishing**(upstream) **points of slope angle measurement**

[4]

Marking criteria:

• Accurate description of data collection with 2 or more types of tools/ instruments	4
• Accurate description of data collection with 1 type of tool/ instrument and appropriate description of the use(s) of 1/ more type(s) of tool(s)/ instrument(s), OR describe appropriately the uses of 3 types of tools/ instruments	3
• Describe appropriately the use(s) of 2 types of tools/ instruments, OR accurate description of data collection with 1 type of tool/ instrument only	2
• Describe appropriately the uses of 1 type of tool/ instrument, OR describe briefly the uses of different types of tools/ instruments	1

(b) (i) Formation of the waterfall near field study site Q:

- **A more resistant rock layer lies across the stream course** 1
- **Hydraulic action undercuts the soft and less resistant rocks underneath** 1
- **A step is formed** in the stream bed 1
- **With a sudden break of slope, the fast flowing water forms a waterfall** 1

(Any 2) [2]

(ii) How fluvial processes shape the landforms of the field study area:

- **Erosion is the major fluvial process at the field study area**, i.e. formation of stream valley and waterfall 1
- **Deposition is not common in the section of study stream**, i.e. limited amount of pebbles and sand are deposited at the front edge of the plunge pool 1
- **Roughness of stream bed causes turbulence and eddy currents**, resulting in the formation of potholes 1
- **Stream channel gradient is low**, i.e. from 1 in 16 to 1 in 22, resulting in **lower stream velocity**, i.e. 0.29 to 0.33 m/s **in the stream valley** 1
- **River energy is highest in the waterfall and plunge pool areas** and is **lower at the other stream courses due to lower speed of flow** 1

(Any 3) [3]

(c) Discuss whether the conclusion that 'the steeper the channel slope, the greater the velocity' is appropriate:(Maximum marks should be given to sound **discussion with judgement**.)

- Field study site R has higher stream velocity than field study site P and has lower gradient than field study site P 1
- Field study site Q has slower stream velocity than field study site P and has lower gradient than field study site P 1
- **Stream velocity along the stream channel is also affected by many factors**, i.e. channel slope, amount of channel water, discharge, channel path and roughness, and channel shape 1
- **Stream velocity is affected by anomalous data** (0.26m/s) **in field study site Q** 1
- **Thus to a greater extent / in general the steeper the channel slope, the greater the velocity of the field study area** 1

(Any 3) [3]

(d) Suggest another field study topic to be carried in the area shown in Figure 1b:

Field study topic: **Impacts of human activities on the fluvial environment**

Enquiry question: The field study area is located in the Country Park area. Streams within this area are conserved and protected legally from human activities and developments

Question: **How do human activities influence the fluvial environment?**

Data collection:

• **Method and items:**

1. **Route:** A route covering roads, footpaths, picnic areas, camping areas and sections of the stream, is planned in the field study area
2. **Observation:** human activities and impacts along the route
3. **Counting / recording:** the numbers of positive and negative impacts

• **Tools and equipment:**

- **Data recording sheet** (occurrences of impacts):

	Pollution (littering)	Pollution (noise/ water/ air)	Removal/ damage of plants	Removal of sand and stones	Illegal trapping	Notice board (code for visitors/ dengue fever)
Games						
Barbecue						
Camping						
Aquatic activities						
Picnicking						
Hiking						
Drone flying						
Guided tour						

- **Others:**

Camera: recording the positive and positive impacts

[6]

Marking criteria:

<ul style="list-style-type: none"> • Appropriate field study topic that can be carried out by students in the area, reliable data collected relevant to field study topic, detailed and logical description and explanation of data collection method(s) 	6
<ul style="list-style-type: none"> • Appropriate but general field study topic, relevant data collection method(s) and relevant description and explanation of data collection method(s) 	3 – 5
<ul style="list-style-type: none"> • Inappropriate field study topic, irrelevant data collection method(s) and brief description and explanation of data collection method(s) 	1 – 2