GCSE GEOGRAPHY

Paper 1  Living with the Physical Environment

Tuesday 21 May 2019   Afternoon   Time allowed: 1 hour 30 minutes

Materials
For this paper you must have:
• a pencil
• a rubber
• a ruler.
You may use a calculator.

Instructions
• Use black ink or black ball-point pen.
• Fill in the boxes at the top of this page.

Answer all questions in Section A and Section B.
Answer two questions in Section C.

• You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
• Do all rough work in this book. Cross through any work you do not want to be marked.

Information
• The marks for questions are shown in brackets.
• The total number of marks available for this paper is 88.
• Spelling, punctuation, grammar and specialist terminology will be assessed in Question 01.10.
For the multiple-choice questions, shade the circle next to the correct answer.

**CORRECT METHOD** ✔️

**WRONG METHODS** ✗ ✗ ✗ ✗

If you want to change your answer you must cross out your original answer as shown.

If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.

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Section A  The challenge of natural hazards

Answer all questions in this section.

**Question 1**  The challenge of natural hazards

01.1 State what is meant by extreme weather.  

[1 mark]

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________________________________________________________

01.2 Which one of the following statements does not describe an extreme weather event in the UK? 

Shade one circle only.

[1 mark]

A  A snow blizzard in the Midlands. ✔️

B  A heatwave in the Lake District. ✗

C  A tornado in the Isle of Wight. ✗

D  A wet winter in western Scotland. ✗
Study Figure 1, a map showing a weather forecast for the UK on 1 March 2018.

**Figure 1**

Key:
- Yellow snow warning
- Amber snow warning
- Red snow warning

Using Figure 1, which one of the following statements is true?

Shade one circle only.

A. The London area has an amber snow warning.

B. The whole of the UK has a snow warning.

C. Cardiff has a red snow warning.

D. Edinburgh is not forecast to have snow.

Question 1 continues on the next page
Study Figure 2, information about extreme weather in the UK in March 2018.

Figure 2

Snow warnings
Yellow:
- Some impacts
- Disrupted travel

Amber:
- Severe impacts
- Road and rail closures
- Potential risk to life and buildings

Red:
- Dangerous weather
- Risk to life
- Major disruption to travel and power supplies

‘Beast from the East’ causes chaos across Britain. The killer freeze costs the UK £1 billion per day as transport routes are disrupted by snow and ice. Businesses and schools are forced to close.

Suggest how extreme weather in the UK can have economic and social impacts.

Use Figure 2 and your own understanding.

[6 marks]
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Question 1 continues on the next page
Study Figure 3, a map showing the distribution and frequency of tropical storms.

Figure 3

Key
Average number of tropical storms per year
- Less than 1.0
- 1.0 – 2.9
- 3.0 or more

Tropical storm tracks
(Jun – Oct) Months when tropical storms are most frequent

Using Figure 3, complete the following paragraph.

[3 marks]

Most tropical storms happen between latitudes 5 degrees and 30 degrees north and south of the ____________________________ .

On average, three or more tropical storms per year take place in the East Pacific and ____________________________ . In the Caribbean the main months for tropical storms are between ____________________________ .
Give **two** reasons why tropical storms form in the areas shown in **Figure 3**.

[2 marks]

1. 

2. 

**Question 1 continues on the next page**
Study Figure 4, a table listing some of the most severe tropical storms over the past 50 years.

**Figure 4**

<table>
<thead>
<tr>
<th>Tropical storm</th>
<th>Number of deaths</th>
<th>Max wind speed (km per hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970 Bhola cyclone, Bangladesh</td>
<td>350 000</td>
<td>205</td>
</tr>
<tr>
<td>1975 Typhoon Nina, China</td>
<td>230 000</td>
<td>250</td>
</tr>
<tr>
<td>2008 Cyclone Nargis, Myanmar</td>
<td>138 000</td>
<td>215</td>
</tr>
<tr>
<td>1998 Hurricane Mitch, Caribbean</td>
<td>19 300</td>
<td>295</td>
</tr>
<tr>
<td>2013 Typhoon Haiyan, Philippines</td>
<td>7 300</td>
<td>310</td>
</tr>
<tr>
<td>1980 Hurricane Allen, Caribbean, Mexico and USA</td>
<td>260</td>
<td>305</td>
</tr>
<tr>
<td>2017 Hurricane Irma, Caribbean and USA</td>
<td>134</td>
<td>298</td>
</tr>
</tbody>
</table>

01.7 'As maximum wind speeds increase, so does the number of deaths linked to tropical storms.'

Do you agree?

Use evidence from **Figure 4** to support your answer. [2 marks]

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01.8 Suggest one way the distribution of tropical storms could change if global ocean temperatures continue to rise. [1 mark]

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01.9

Explain how alternative energy production and planting trees may help to reduce the rate of climate change.

[4 marks]

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Question 1 continues on the next page
Study Figure 5, photographs showing different types of response to a tectonic hazard.

**Figure 5**

Immediate response to a tectonic hazard in Haiti

Long-term response to a tectonic hazard in Haiti

‘Long-term responses to a tectonic hazard are more important than immediate responses.’

Do you agree?

Using Figure 5 and one or more examples, explain your answer.

[9 marks]

[+3 SPaG marks]
**Section B  The living world**

Answer all questions in this section.

**Question 2  The living world**

Study Figure 6, which shows a food web for a small scale ecosystem in the UK.

**Figure 6**

- **Tertiary consumers**: Sparrowhawk, Fox, Tawny owl
- **Secondary consumers**: Small birds, Mole, Mouse, Badger
- **Primary consumers**: Caterpillar, Rabbit, Beetle, Vole
- **Primary producers**: Plants

Photosynthesis

Sunlight

**Using Figure 6, which one of the following statements is true?**

Shade one circle only.

A  Sparrowhawks eat plants.
B  Voles eat moles.
C  Moles eat beetles.
D  Badgers eat small birds.

[1 mark]
02.2 Suggest what would happen in the food web shown in Figure 6 if foxes became extinct.

[2 marks]

State one role of decomposers in an ecosystem.

[1 mark]

Question 2 continues on the next page
Study Figure 7, a graph showing the biomass at different levels of a food chain.

### Figure 7

<table>
<thead>
<tr>
<th>Number (weight of biomass)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tertiary consumer</td>
<td>1 Sparrowhawk</td>
</tr>
<tr>
<td>Secondary consumer</td>
<td>300 Small bird</td>
</tr>
<tr>
<td>Primary consumer</td>
<td>12 000 Caterpillar</td>
</tr>
<tr>
<td>Primary producer</td>
<td>100 000 Deciduous tree leaves</td>
</tr>
</tbody>
</table>

Biomass is the total quantity or weight of organisms in a given area.

02.4 Calculate the percentage loss in biomass between the primary consumer and secondary consumer levels.

Shade one circle only.

A 2.5%  
B 97.5%  
C 25.2%  
D 95.5%  

02.5 Give two reasons why the biomass changes between each level in the food chain.

[2 marks]

1 ____________________________________________________________

__________________________________________________________

2 ____________________________________________________________

__________________________________________________________
Study **Figure 8**, a diagram showing the structure of the tropical rainforest.

**Figure 8**

- **Height above ground (m)**
  - 0
  - 5
  - 10
  - 15
  - 20
  - 25
  - 30
  - 35
  - 40

- **Emergent layer** (trees widely spaced)
- **Upper canopy** (medium-spaced trees)
- **Lower canopy**
- **Understorey** (shrubs and saplings)
- **Ground cover** (herbs and ferns)

**02.6** Using **Figure 8**, which part of the rainforest matches the following description?

'An almost continuous layer of branches and leaves between 15 and 30 metres high.'

Shade one circle only.

A. Emergent layer  [ ]
B. Upper canopy  [ ]
C. Lower canopy  [ ]
D. Understorey  [ ]

**02.7** Using **Figure 8**, describe one characteristic of the base of the taller trees.

[1 mark]

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**02.8** Give one effect of deforestation on the soils of the rainforest.

[1 mark]

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Turn over ▶
Study either Figure 9 or Figure 10.

**Figure 9** (plants and animals in a hot desert)

**Figure 10** (plants and animals in a cold environment)
(02.9) ‘Plants and animals adapt in order to survive in a hostile environment.’

Explain this statement.

Use either Figure 9 or Figure 10 and your own understanding.

Tick (✓) the box to show which environment you have chosen.

Hot desert environment (Figure 9) ☐

Cold environment (Figure 10) ☐

[6 marks]

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Question 2 continues on the next page
Either

To what extent is human activity the cause of desertification in areas on the fringes of hot deserts?

or

To what extent are cold environments at risk from economic development, and therefore in need of protection?

Tick (✓) the box to show which environment you have chosen.

Hot desert environment (Figure 9)

Cold environment (Figure 10)

[9 marks]
End of Section B

Turn over for Section C
Section C  Physical landscapes in the UK

Answer two questions from the following:

Question 3 (Coasts), Question 4 (Rivers), Question 5 (Glacial).

Question 3  Coastal landscapes in the UK

Study Figure 11, diagrams of destructive and constructive waves.

Figure 11

Destructive wave

Constructive wave

Using Figure 11, compare two features of destructive and constructive waves.

[2 marks]

1

2
Study Figure 12, showing sediment size at two locations along a coastal spit.

**Figure 12**

<table>
<thead>
<tr>
<th>Location X</th>
<th>Location Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment size (cm)</td>
<td>Sediment size (cm)</td>
</tr>
<tr>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Mean: 11.2</td>
<td>Mean:</td>
</tr>
</tbody>
</table>

Complete the table in Figure 12 by calculating the mean sediment size, in cm, for location Y.

[1 mark]

Suggest one reason for the difference in sediment size between location X and location Y.

[1 mark]

Question 3 continues on the next page
Which of these is a process of mass movement in coastal environments?

Shade one circle only. [1 mark]

A  Frost shattering
B  Slumping
C  Attrition
D  Longshore drift
Study **Figure 13**, a photograph showing sea defences in Hornsea, Yorkshire.

**Figure 13**

Explain how the sea defences shown in **Figure 13** help to protect the coastline from erosion.

[4 marks]

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**Question 3 continues on the next page**
Study Figure 14, a photograph showing a coastal landscape in Pembrokeshire, South Wales.

**Figure 14**

Explain how different coastal landforms are created by erosion.

Use Figure 14 and your own understanding.

[6 marks]
Question 4  River landscapes in the UK

Study Figure 15, a diagram showing the long and cross profiles of a typical river and its valley.

Figure 15

Describe how the cross profile of the river valley changes downstream.

[2 marks]
Study **Figure 16**, showing velocity data for a meandering river.

**Figure 16**

**Velocity of river at X**

<table>
<thead>
<tr>
<th>Velocity of river at X (in metres per second)</th>
<th>Velocity of river at Y (in metres per second)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4</td>
<td>1.2</td>
</tr>
<tr>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>0.3</td>
<td>1.1</td>
</tr>
<tr>
<td>0.4</td>
<td>1.7</td>
</tr>
<tr>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>0.6</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Median: 0.5

Complete the table in **Figure 16** by calculating the median velocity, in metres per second, at point Y.

**[1 mark]**

Suggest one reason for the difference in river velocity between point X and point Y.

**[1 mark]**

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**Question 4 continues on the next page**
Which of these is a process by which a river transports sediment?

Shade one circle only.

A  Abrasion
B  Traction
C  Deposition
D  Hydraulic power

[1 mark]
Study **Figure 17**, a diagram showing floodplain zoning.

**Figure 17**

**Key**
- Pasture for grazing
- Crops, playing fields
- Roads, car parking
- Settlement
- River

Height above sea level (metres)

0 10 20 30

Explain how soft engineering strategies can help to reduce the impact of river flooding.

Use **Figure 17** and your own understanding.

[4 marks]

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Turn over ▶
Study Figure 18, a photograph showing some features of a river in the Lake District.

**Figure 18**

Explain how the landforms shown in Figure 18 are created by physical processes.

[6 marks]

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04.6
Extra space

End of Question 4
Question 5  Glacial landscapes in the UK

Study Figure 19, a map showing the extent of ice cover across the British Isles during the last ice age.

Using Figure 19, describe the extent of ice cover across the British Isles during the last ice age.

[2 marks]

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Study **Figure 20**, showing the size of glacial sediment at two locations.

**Figure 20**

<table>
<thead>
<tr>
<th>Location A</th>
<th>Size of sediment (cm)</th>
<th>Location B</th>
<th>Size of sediment (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.3</td>
<td></td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>18.6</td>
<td></td>
<td>6.9</td>
</tr>
<tr>
<td></td>
<td>26.7</td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>4.1</td>
<td></td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>14.0</td>
<td></td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td></td>
<td>7.2</td>
</tr>
<tr>
<td><strong>Range:</strong></td>
<td>25.3</td>
<td><strong>Range:</strong></td>
<td></td>
</tr>
</tbody>
</table>

**05.2** Complete the table in **Figure 20** by calculating the range of sediment size, in cm, at location B.

**05.3** Suggest one reason for the difference in the range of sediment size between location A and location B.

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Question 5 continues on the next page
Which of these is a process of glacial erosion?

Shade one circle only.

A  Freeze-thaw
B  Plucking
C  Rotational slip
D  Transportation

[1 mark]
Study **Figure 21**, showing some land uses in a glaciated area.

**Figure 21**

- Tourism
- Quarrying
- Farming
- Forestry

Explain why there may be land use conflicts in glaciated upland areas.

Use **Figure 21** and your own understanding.

[4 marks]

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Question 5 continues on the next page
Study Figure 22, a diagram showing landforms of glacial deposition.

**Figure 22**

- **Drumlins**
- **Terminal moraine**
- ‘Retreating’ glacier

**05.6**

Explain the formation of different landforms of glacial deposition.

Use Figure 22 and your own understanding.

[6 marks]
END OF QUESTIONS
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