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I declare this is my own work.

# A-level GEOGRAPHY

## Paper 1 Physical Geography

Wednesday 17 May 2023

Morning

Time allowed: 2 hours 30 minutes

### Materials

For this paper you must have:

- the colour insert (enclosed)
- 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.
- Answer **either** Question 2 **or** Question 3 **or** Question 4 in Section B.
- Answer **either** Question 5 **or** Question 6 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.
- If you need additional extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- 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 120.

| For Examiner's Use |      |
|--------------------|------|
| Section            | Mark |
| A                  |      |
| B                  |      |
| C                  |      |
| <b>TOTAL</b>       |      |



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G/KL/Jun23/E4

**7037/1**

**Section A****Water and carbon cycles**

Answer **all** questions in this section.

**0 1 . 1** Outline the purpose of a flood hydrograph.

**[4 marks]**

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**Figure 1** shows information about freshwater abstraction in Finland in 2020.

Analyse the data shown in **Figure 1**.

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**Figure 2** shows global proposed carbon sequestration rates compared to implemented carbon sequestration rates between 2000 and 2020.

Using **Figure 2** and your own knowledge, assess the challenges associated with carbon sequestration.

[illegible]

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Evaluate the potential impact of changes in the carbon budget on a tropical rainforest that you have studied.

[illegible]

[illegible]

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**36****End of Section A****Turn over for Section B****Turn over ►**

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Answer **either** Question 2 **or** Question 3 **or** Question 4.

**[4 marks]**

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**Question 2 continues on the next page**

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**Figure 3** shows the changing size of the Sahara Desert between 1980 and 1990. A standard deviation calculation has been started.

**Figure 3**

| Year              | Area<br>(millions of km <sup>2</sup> )<br>$x$ | $x - \bar{x}$ | $(x - \bar{x})^2$              |
|-------------------|-----------------------------------------------|---------------|--------------------------------|
| 1980              | 8.6                                           | -0.609        | 0.371                          |
| 1981              | 8.9                                           | -0.309        | 0.095                          |
| 1982              | 9.25                                          | 0.041         | 0.002                          |
| 1983              | 9.4                                           | 0.191         | 0.036                          |
| 1984              | 10.0                                          |               |                                |
| 1985              | 9.25                                          | 0.041         | 0.002                          |
| 1986              | 9.1                                           | -0.109        | 0.012                          |
| 1987              | 9.4                                           | 0.191         | 0.036                          |
| 1988              | 8.9                                           | -0.309        | 0.095                          |
| 1989              | 9.2                                           | -0.009        | 0.000                          |
| 1990              | 9.3                                           | 0.091         | 0.008                          |
| $\sum x = 101.3$  |                                               |               | $\sum (x - \bar{x})^2 = 1.283$ |
| $\bar{x} = 9.209$ |                                               |               |                                |

**Key**

$x$  = area of Sahara Desert

$\bar{x}$  = mean

$\sum$  = sum of

$\sigma$  = standard deviation

$n$  = number in sample

**Standard deviation formula**

$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

Space for working

$\sigma =$



Complete the table and standard deviation calculation in **Figure 3** and evaluate the usefulness of the technique in analysing this data.

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**Figure 4a** shows the location of El-Sheikh El-Shazli relative to a number of wadis in the area shown on a satellite image.

**Figure 4b** shows sketch maps of the town and area flooded before and after increased urbanisation.

**Figure 4c** is a photograph of the town looking towards the hills in **Figure 4b**.

Using **Figures 4a, 4b, 4c** and your own knowledge, assess the relative importance of physical and human factors contributing to the flash flooding events in this area.

**[6 marks]**

[illegible]

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With reference to a hot desert that you have studied, assess the relative importance of different sources of energy in landscape development.

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[illegible]

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**End of Question 2**

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**[4 marks]**

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**Figure 5** shows the variation in tidal ranges at various locations across the British Isles. A standard deviation calculation has been started.

**Figure 5**

| Location               | Difference between<br>high and low tide (m)<br>$x$ | $x - \bar{x}$ | $(x - \bar{x})^2$                |
|------------------------|----------------------------------------------------|---------------|----------------------------------|
| Plymouth               | 4.7                                                | -0.808        | 0.653                            |
| Southampton            | 4.0                                                | -1.508        | 2.274                            |
| Dover                  | 5.9                                                | 0.392         | 0.154                            |
| Aberdeen               | 3.7                                                | -1.808        | 3.269                            |
| Liverpool              | 8.4                                                |               |                                  |
| Avonmouth              | 12.3                                               | 6.792         | 46.131                           |
| Belfast                | 3.1                                                | -2.408        | 5.798                            |
| Derry /<br>Londonderry | 2.2                                                | -3.308        | 10.943                           |
| St Helier              | 9.8                                                | 4.292         | 18.421                           |
| Swansea                | 8.4                                                | 2.892         | 8.364                            |
| Lowestoft              | 1.9                                                | -3.608        | 13.018                           |
| Lerwick                | 1.7                                                | -3.808        | 14.501                           |
| $\sum x = 66.1$        |                                                    |               | $\sum (x - \bar{x})^2 = 131.890$ |
| $\bar{x} = 5.508$      |                                                    |               |                                  |

**Key**

$x$  = tidal range  
 $\bar{x}$  = mean  
 $\sum$  = sum of  
 $\sigma$  = standard deviation  
 $n$  = number in sample

Standard deviation formula

$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

Space for working

$\sigma =$



Complete the table and standard deviation calculation in **Figure 5** and evaluate the usefulness of the technique in analysing this data.

[illegible]

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**Figure 6c** shows the proportion of protected and unprotected mangrove in the ten largest nations with mangrove forests.

Using **Figures 6a, 6b, 6c** and your own knowledge, assess the sustainability of mangrove forests in coastal management.

**[6 marks]**

[illegible]

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To what extent do natural processes account for the changes in a local scale coastal landscape that you have studied?

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#### Question 4    Glacial systems and landscapes

**0 4 . 1** Outline the processes by which ice moves within a glacier.

**[4 marks]**

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**Question 4 continues on the next page**

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**Figure 7** shows the minimum extent of Arctic ice between 2002 and 2015.  
A standard deviation calculation has been started.

**Figure 7**

| Year              | Minimum extent<br>(millions of km <sup>2</sup> )<br>$x$ | $x - \bar{x}$ | $(x - \bar{x})^2$              |
|-------------------|---------------------------------------------------------|---------------|--------------------------------|
| 2002              | 5.95                                                    | 0.779         | 0.607                          |
| 2003              | 6.13                                                    | 0.959         | 0.920                          |
| 2004              | 6.04                                                    | 0.869         | 0.755                          |
| 2005              | 5.56                                                    | 0.389         | 0.151                          |
| 2006              | 5.91                                                    | 0.739         | 0.546                          |
| 2007              | 4.29                                                    |               |                                |
| 2008              | 4.72                                                    | −0.451        | 0.203                          |
| 2009              | 5.38                                                    | 0.209         | 0.044                          |
| 2010              | 4.92                                                    | −0.251        | 0.063                          |
| 2011              | 4.61                                                    | −0.561        | 0.315                          |
| 2012              | 3.62                                                    | −1.551        | 2.406                          |
| 2013              | 5.35                                                    | 0.179         | 0.032                          |
| 2014              | 5.28                                                    | 0.109         | 0.012                          |
| 2015              | 4.63                                                    | −0.541        | 0.293                          |
| $\sum x = 72.39$  |                                                         |               | $\sum (x - \bar{x})^2 = 7.123$ |
| $\bar{x} = 5.171$ |                                                         |               |                                |

**Key**

$x$  = minimum extent

$\bar{x}$  = mean

$\sum$  = sum of

$\sigma$  = standard deviation

$n$  = number in sample

**Standard deviation formula**

$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

Space for working

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**[6 marks]**

[illegible]

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**Figure 8a** shows trends in the onset of winter freeze-up in the Arctic Ocean and surrounding areas, 1979–2019.

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Using **Figure 8a**, **Figure 8b** and your own knowledge, assess the potential future for Arctic sea ice.

**[6 marks]**

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Analyse the relative importance of erosion and deposition in the development of fluvio-glacial landscapes.

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End of Question 4

End of Section B

Turn over ►



Answer **one** question in this section.

Answer **either** Question 5 **or** Question 6.

**0 5 . 1** Outline the concept of mitigation in relation to the management of hazards. **[4 marks]**

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**Figure 9** is in the insert.

**Figure 9** shows information about wildfires in Australia.

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To what extent does **Figure 9** show that wildfires are increasing in intensity and severity?

**[6 marks]**

[illegible]

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**Question 5 continues on the next page**

**Turn over ►**



**Figure 10** shows information about areas at risk following a seismic event based upon underlying geology in Waikato District and the surrounding area, New Zealand.

Using **Figure 10** and your own knowledge, discuss likely approaches to seismic hazard management in this area.

[illegible]

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How far do you agree that mudflows are more hazardous than nuées ardentes?

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0 5 . 5

With reference to a hazardous location at a local scale, assess the importance of the physical processes and factors which have contributed to the scale and nature of the hazard.

**[20 marks]**

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End of Question 5



**06.1** Outline the concept of net primary production.

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**Figure 11** is in the insert.

**Figure 11** shows data related to the number of endangered species across the Mediterranean Basin in 2017.

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Analyse the data shown in **Figure 11**.

[6 marks]

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**Figure 12** shows information about the Ainsdale Sand Dunes National Nature Reserve (NNR) in north-west England.

Using **Figure 12** and your own knowledge, assess the challenges in managing this local scale ecosystem.

[illegible]

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Assess the relative importance of different physical factors in a region experiencing ecological change.

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0 6 . 5

How far do you agree that the development pressures facing savanna grassland are more extreme than those facing tropical rainforest?

**[20 marks]**

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END OF QUESTIONS



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