



Surname _____

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I declare this is my own work.

A-level GEOGRAPHY

Paper 1 Physical Geography

7037/1

Wednesday 17 May 2023 Morning

Time allowed: 2 hours 30 minutes

At the top of the page, write your surname and forename(s), your centre number, your candidate number and add your signature.

[Turn over]



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.
- 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 on blank pages.
- If you need 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.

DO NOT TURN OVER UNTIL TOLD TO DO SO



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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[Turn over]



FIGURE 1, on pages 2 and 3 of the insert, shows information about freshwater abstraction in Finland in 2020.

0 1 . 2

Analyse the data shown in FIGURE 1. [6 marks]

[illegible]

FIGURE 2, on pages 4 and 5 of the insert, shows global proposed carbon sequestration rates compared to implemented carbon sequestration rates between 2000 and 2020.

0 1 . 3

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

[6 marks]

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0 1 . 4

Evaluate the potential impact of changes in the carbon budget on a tropical rainforest that you have studied. [20 marks]

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[illegible]

[End of Section A]

[Turn over for Section B]



SECTION B

Answer ONE question in this section.

Answer EITHER Question 2 OR Question 3 OR Question 4.

QUESTION 2 Hot desert systems and landscapes

0 2 . 1

Outline weathering processes in hot deserts. [4 marks]

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[Turn over]



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 (millions of km²) 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** **Σ = sum of** **σ = standard deviation** **n = number in sample****Standard deviation formula**

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

Space for working **$\sigma =$** **[Turn over]**

0	2	.	2
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Complete the table and standard deviation calculation in FIGURE 3 and evaluate the usefulness of the technique in analysing this data. [6 marks]

[illegible]

FIGURES 4a, 4b and 4c are in the insert, and show information about a town in Egypt (El-Sheikh El-Shazli) which is prone to desert flash flooding.

FIGURE 4a, on page 6 of the insert, shows the location of El-Sheikh El-Shazli relative to a number of wadis in the area shown on a satellite image.

FIGURE 4b, on page 7 of the insert, shows sketch maps of the town and area flooded before and after increased urbanisation.

FIGURE 4c, on page 8 of the insert, is a photograph of the town looking towards the hills in FIGURE 4b.

0 2 . 3

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]





0	2	.	4
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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. [20 marks]

[illegible]







36

[End of Question 2]

[Turn over]



QUESTION 3 Coastal systems and landscapes

0 3 . 1

**Outline processes of mass movement at the coastline.
[4 marks]**

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[Turn over]



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 high and low tide (m) 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/ 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** **Σ = sum of** **σ = standard deviation** **n = number in sample****Standard deviation formula**

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

Space for working **σ =****[Turn over]**

0	3	.	2
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Complete the table and standard deviation calculation in FIGURE 5 and evaluate the usefulness of the technique in analysing this data. [6 marks]

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FIGURE 6a, on page 9 of the insert, shows a photograph of mangrove taken above and below the water line.

FIGURE 6b, on page 10 of the insert, shows the major benefits of mangrove for people.

FIGURE 6c, on pages 12 and 13 of the insert, shows the proportion of protected and unprotected mangrove in the ten largest nations with mangrove forests.

0 3 . 3

Using FIGURES 6a, 6b, 6c and your own knowledge, assess the sustainability of mangrove forests in coastal management. [6 marks]



0	3	.	4
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To what extent do natural processes account for the changes in a local scale coastal landscape that you have studied? [20 marks]









[End of Question 3]

[Turn over]



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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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 (millions of km²) 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
$\Sigma x = 72.39$			$\Sigma(x - \bar{x})^2 = 7.123$
$\bar{x} = 5.171$			



KEY **x = minimum extent** **\bar{x} = mean** **Σ = sum of** **σ = standard deviation** **n = number in sample****Standard deviation formula**

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

Space for working **σ =****[Turn over]**

0	4	.	2
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Complete the table and standard deviation calculation in FIGURE 7 and evaluate the usefulness of the technique in analysing this data. [6 marks]

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FIGURE 8a, on pages 14 and 15 of the insert, shows trends in the onset of winter freeze-up in the Arctic Ocean and surrounding areas, 1979–2019.

FIGURE 8b, on page 16 of the insert, shows the change in the age of ice in the Arctic Ocean, 1985–2019.

0 4 . 3

Using FIGURE 8a, FIGURE 8b and your own knowledge, assess the potential future for Arctic sea ice. [6 marks]

[illegible]

0	4	.	4
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Analyse the relative importance of erosion and deposition in the development of fluvioglacial landscapes. [20 marks]

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[End of Question 4]

[Turn over for Section C]



SECTION C

Answer ONE question in this section.

Answer EITHER Question 5 OR Question 6.

QUESTION 5 Hazards

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



[Turn over]



FIGURE 9, on pages 18, 19, 20 and 21 of the insert, shows information about wildfires in Australia.

0	5	.	2
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To what extent does FIGURE 9 show that wildfires are increasing in intensity and severity? [6 marks]

[illegible]



FIGURE 10, on pages 22 and 23 of the insert, shows information about areas at risk following a seismic event based upon underlying geology in Waikato District and the surrounding area, New Zealand.

0 5 . 3

Using FIGURE 10 and your own knowledge, discuss likely approaches to seismic hazard management in this area. [9 marks]

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How far do you agree that mudflows are more hazardous than nuées ardentes? [9 marks]



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]









[Turn over]



QUESTION 6 Ecosystems under stress

0	6	.	1
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Outline the concept of net primary production. [4 marks]

[illegible]

[Turn over]



FIGURE 11, on pages 24 and 25 of the insert, shows data related to the number of endangered species across the Mediterranean Basin in 2017.

06.2

Analyse the data shown in FIGURE 11. [6 marks]

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FIGURE 12, on pages 26 and 27 of the insert, shows information about the Ainsdale Sand Dunes National Nature Reserve (NNR) in north-west England.

0 6 . 3

**Using FIGURE 12 and your own knowledge, assess the challenges in managing this local scale ecosystem.
[9 marks]**

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0	6	.	4
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Assess the relative importance of different physical factors in a region experiencing ecological change.
[9 marks]



How far do you agree that the development pressures facing savanna grassland are more extreme than those facing tropical rainforest? [20 marks]









Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

Additional page, if required.

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Section	Mark
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