AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

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.

For Examiner's Use	
Section	Mark
A	
B	
C	
TOTAL	

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.

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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 is in the insert.

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

0 1 . 2 Analyse the data shown in **Figure 1**.

[6 marks]

Extra space

Question 1 continues on the next page

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Figure 2 is in the insert.

Figure 2 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]

Extra space

Do not write outside the box

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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Extra space

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End of Section A

Turn over for Section B

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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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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 (millions of km^2) 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
σ = standard deviation
n = number in sample

Standard deviation formula

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

Space for working

σ =

Do not write outside the box

0 2 . 2 Complete the table and standard deviation calculation in **Figure 3** and evaluate the usefulness of the technique in analysing this data.

[6 marks]

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Question 2 continues on the next page

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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 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**.

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]

Extra space

Do not write outside the box

0 2 . 4 With reference to a hot desert that you have studied, assess the relative importance of different sources of energy in landscape development.

[20 marks]

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Extra space

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End of Question 2

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Question 3 Coastal systems and landscapes

0 3 . 1 Outline processes of mass movement at the coastline.

[4 marks]

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Question 3 continues on the next page

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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 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

$\sum$ = sum of

σ = standard deviation

n = number in sample

Standard deviation formula

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

Space for working

σ =

Do not write outside the box

0 3 . 2 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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Question 3 continues on the next page

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Figures 6a, **6b** and **6c** are in the insert.

Figure 6a shows a photograph of mangrove taken above and below the water line.

Figure 6b shows the major benefits of mangrove for people.

Figure 6c 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]

Extra space

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

[20 marks]

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Extra space

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End of Question 3

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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 (millions of km^2) 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
σ = standard deviation
n = number in sample

Standard deviation formula

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

Space for working

σ =

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0 4 . 2 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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Question 4 continues on the next page

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Figures 8a and **8b** are in the insert.

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

Figure 8b 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]

Extra space

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0 4 . 4 Analyse the relative importance of erosion and deposition in the development of fluvioglacial landscapes.

[20 marks]

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Extra space

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End of Question 4

End of Section B

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Section C

Answer **one** question in this section.

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

Question 5 Hazards

0 5 . 1 Outline the concept of mitigation in relation to the management of hazards.

[4 marks]

Extra space

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Figure 9 is in the insert.

Figure 9 shows information about wildfires in Australia.

0 5 . 2 To what extent does **Figure 9** show that wildfires are increasing in intensity and severity?

[6 marks]

Extra space

Question 5 continues on the next page

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Figure 10 is in the insert.

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.

0 5 . 3 Using **Figure 10** and your own knowledge, discuss likely approaches to seismic hazard management in this area.

[9 marks]

Extra space

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0 5 . 4 How far do you agree that mudflows are more hazardous than nuées ardentes?

[9 marks]

Do not write outside the box

Extra space

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

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Question 6 Ecosystems under stress

0 6 . 1 Outline the concept of net primary production.

[4 marks]

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Question 6 continues on the next page

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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.

0 6 . 2 Analyse the data shown in **Figure 11**.

[6 marks]

Extra space

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Figure 12 is in the insert.

Figure 12 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]

Extra space

Do not write outside the box

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

[9 marks]

Do not write outside the box

Extra space

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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