Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number ☐☐☐☐☐ Candidate Number ☐☐☐☐

Pearson Edexcel Level 3 GCE

Wednesday 17 May 2023

Morning (Time: 2 hours 15 minutes)

Paper reference **9GE0/01**

Geography

Advanced

PAPER 1

You must have:
Resource Booklet (enclosed)
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions in Section **A**, and Section **C**.
- Answer **either** Question 2 **or** Question 3 in Section **B**.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 105.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

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SECTION A

Tectonic Processes and Hazards

Answer ALL questions in this section. Write your answers in the spaces provided.

You must use the Resource Booklet provided.

1 Study Figure 1 below.

The data was collected to investigate whether there was a significant relationship between the population living within 5km of a volcanic location and the years since the last eruption, at 10 selected locations.

Volcanic location	Population within 5km, in millions	Rank	Years since last eruption	Rank	d	d^2
Michoacán-Guanajuato	5.8	1	70	8	–7	49
Tatun Volcanic Group	5.1	2	1374	1	1	1
Campi Flegrei	2.2	3	484	4	–1	1
Ilopango	2.0	4	142	5	–1	1
Hainan Volcanic Field	1.7	5	89	7	–2	4
San Pablo Volcanic Field	1.3	6.5	672	2	4.5	20.25
Ghegham Volcanic Ridge	1.3	6.5	122	6	0.5	0.25
Dieng Volcanic Complex	1.1	8	1	9.5	–1.5	2.25
Auckland Volcanic Field	1.0	9.5	576	3	6.5	42.25
Masaya	1.0	9.5	1	9.5	0	0
						Σd^2

Figure 1

The population living within 5km of a volcanic location and the years since the last eruption, at 10 selected locations.

(a) (i) Calculate Σd^2.

(1)

$\Sigma d^2 =$ ....

(ii) The formula for Spearman's rank correlation coefficient value r_s is given below.

In this data set n = 10.

$$r_s = 1 - \frac{6\sum d^2}{n^3 - n}$$

Calculate the value of r_s, to two decimal places, for the data given.

You must show your working.

(2)

$r_s =$ ....

(iii) The tables below show the two hypotheses that are being tested and the critical values of Spearman's rank r_s when n = 10.

Null Hypothesis: There is no significant relationship between the number of people living within 5km of a volcanic location and the years since the last eruption.
Alternative Hypothesis: There is a significant relationship between the number of people living within 5km of a volcanic location and the years since the last eruption.

Confidence level	0.10 (90%)	0.05 (95%)	0.01 (99%)
Critical value	0.44	0.56	0.73

Using the Spearman's rank correlation r_s value calculated in (a)(ii), state which hypothesis can be accepted.

(1)

....

(b) Assess the effectiveness of strategies used to manage the impacts of volcanic hazards.

(12)

(Total for Question 1 = 16 marks)

TOTAL FOR SECTION A = 16 MARKS

SECTION B

Landscape Systems, Processes and Change

Answer ONE question in this section – either Question 2 OR Question 3.

Indicate which question you are answering by marking a cross in the box ☒. If you change your mind, put a line through the box ☒ and then indicate your new question with a cross ☒.

If you answer Question 2, put a cross in the box ☐ .

Glaciated Landscapes and Change

You must use the Resource Booklet provided.

2 Study Figure 2a in the Resource Booklet.

(a) Explain the contribution of meltwater to the movement of temperate glaciers.

(6)

Study Figure 2b in the Resource Booklet.

(b) Explain the role of feedback in changing the size of ice sheets and sea ice.

(6)

(c) Explain the role of melting and refreezing cycles in forming distinctive periglacial landforms.

(8)

(d) Evaluate the view that the management of active and relict glaciated landscapes is likely to be unsuccessful.

(20)

(Total for Question 2 = 40 marks)

Do not answer Question 3 if you have answered Question 2.

Indicate which question you are answering by marking a cross in the box ☒. If you change your mind, put a line through the box ☒ and then indicate your new question with a cross ☒.

If you answer Question 3, put a cross in the box ☐ .

Coastal Landscapes and Change

You must use the Resource Booklet provided.

3 Study Figure 3a in the Resource Booklet.

(a) Explain the contribution of erosional processes in producing sediment.

(6)

Study Figure 3b in the Resource Booklet.

(b) Explain the role of global warming in changing mean sea level since 1920.

(6)

(c) Explain the role of geology in the formation of contrasting cliff profiles.

(8)

(d) Evaluate the view that without hard engineering there is little future for coastal communities threatened by coastal recession and flooding.

(20)

(Total for Question 3 = 40 marks)

TOTAL FOR SECTION B = 40 MARKS

SECTION C

Physical Systems and Sustainability

Answer ALL questions in this section. Write your answers in the spaces provided.

You must use the Resource Booklet provided.

4 Study Figure 4a in the Resource Booklet.

(a) Explain **one** possible impact on local communities of the development of onshore wind farms.

(3)

....

....

....

....

....

....

(b) Explain how adaptation strategies, such as water conservation, may help communities cope with a changed climate.

(6)

(c) Explain how water insecurity can cause both social and economic problems.

(8)

Turn over ▶

(d) Study Figure 4b and 4c in the Resource Booklet, which show two neighbouring upland river catchments and their hydrographs following a local storm event.

Assess the extent to which land use affects the shape of these storm hydrographs.

(12)

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(e) The processes of the carbon cycle operate at longer and slower (geological) and shorter and faster (biological) timescales.

Evaluate the view that human activities are having a greater impact on shorter term biological processes than on longer term geological processes.

(20)

(Total for Question 4 = 49 marks)

TOTAL FOR SECTION C = 49 MARKS
TOTAL FOR PAPER = 105 MARKS

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Geography

Advanced

PAPER 1

Resource Booklet

Do not return this Booklet with the question paper.

Turn over ▶

P72619A

N:1/1/1/1/1/1

P 7 2 6 1 9 A

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SECTION B

The following resources relate to Question 2.

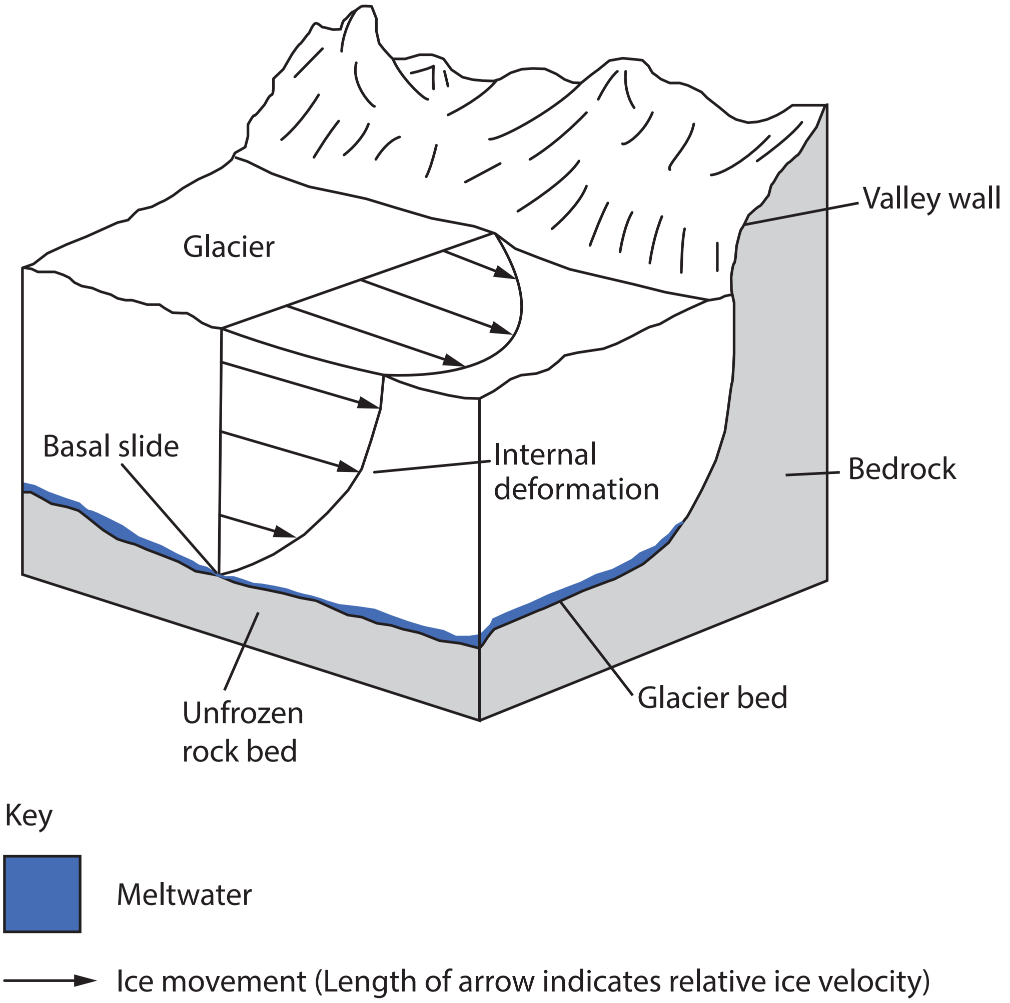

Figure 2a

Distribution of velocity in a temperate glacier

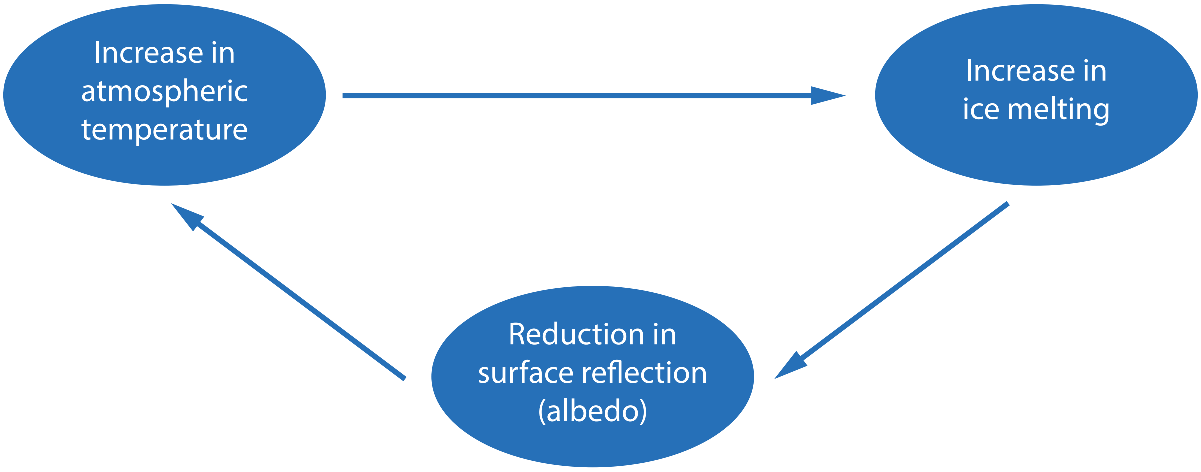
Increase in atmospheric temperature
Increase in ice melting
Reduction in surface reflection (albedo)

Figure 2b

Impact of increases in atmospheric temperature on the size of ice sheets and sea ice

The following resources relate to Question 3.

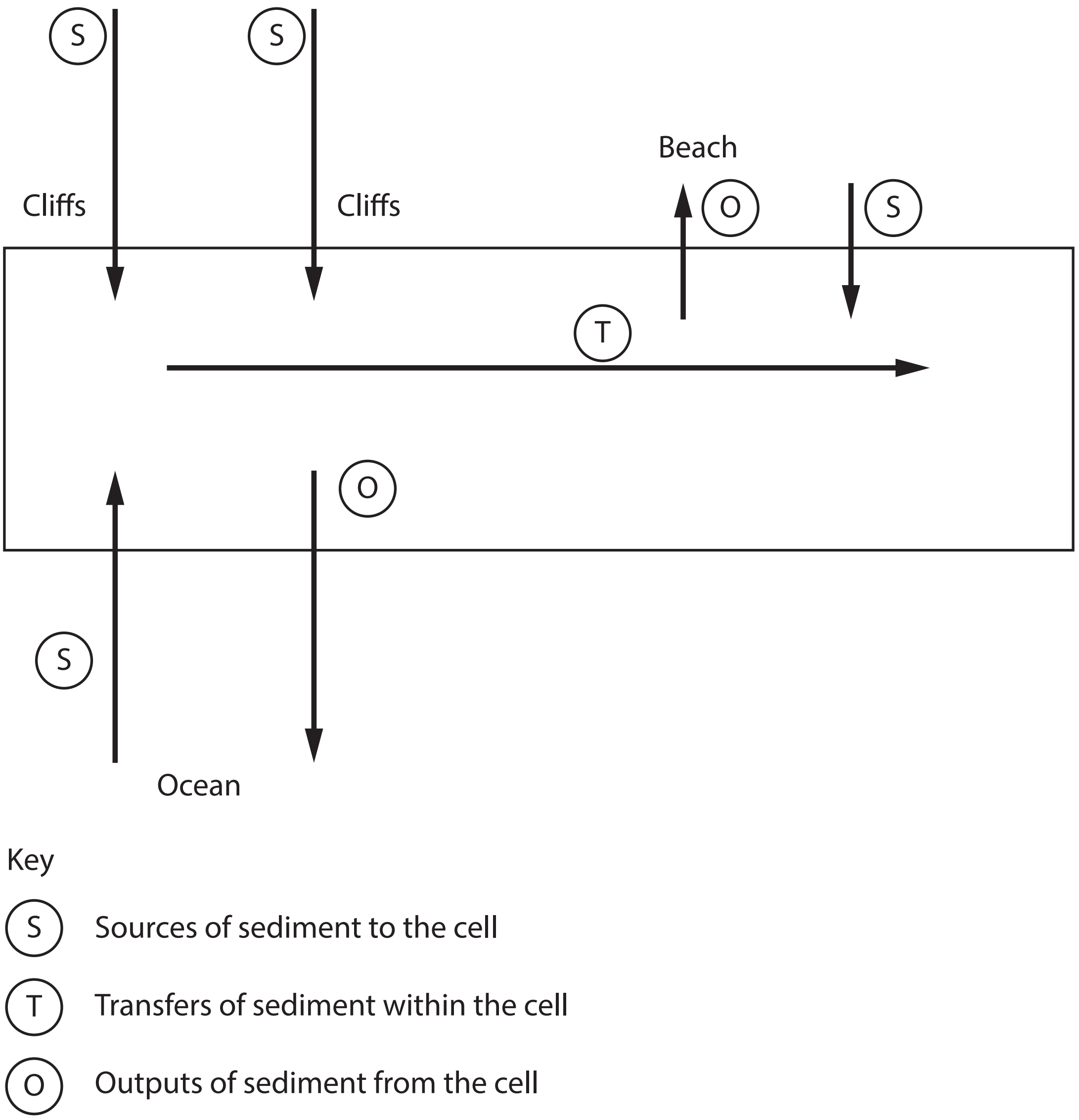
S
S
Cliffs
Cliffs
Beach
O
S
T
O
S
Ocean
Key
S Sources of sediment to the cell
T Transfers of sediment within the cell
O Outputs of sediment from the cell

Figure 3a

A coastal sediment cell showing sources, transfers and outputs

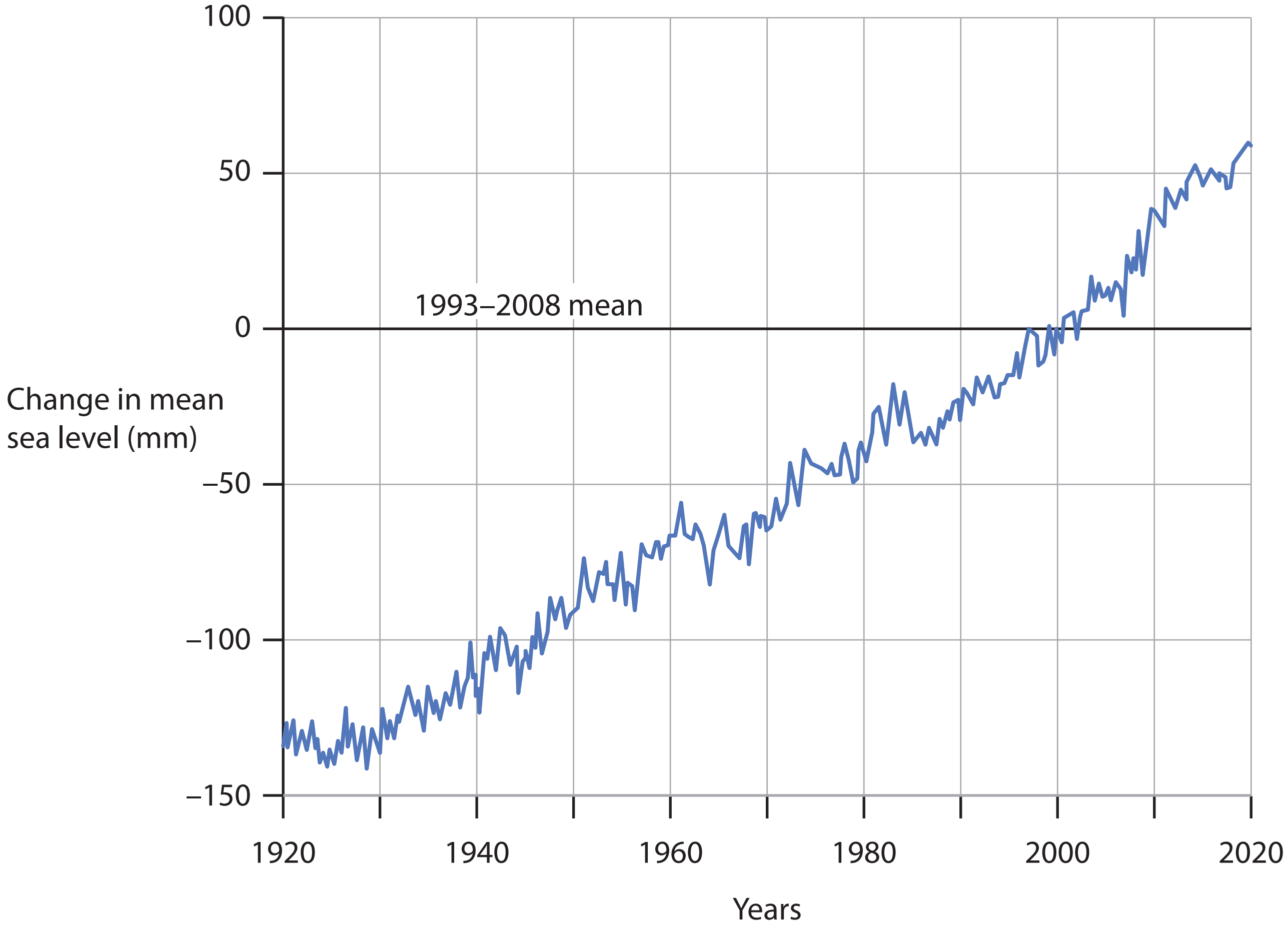

Figure 3b

Mean sea level, 1920–2020, compared to 1993–2008 mean

SECTION C

The following resources relate to Question 4.

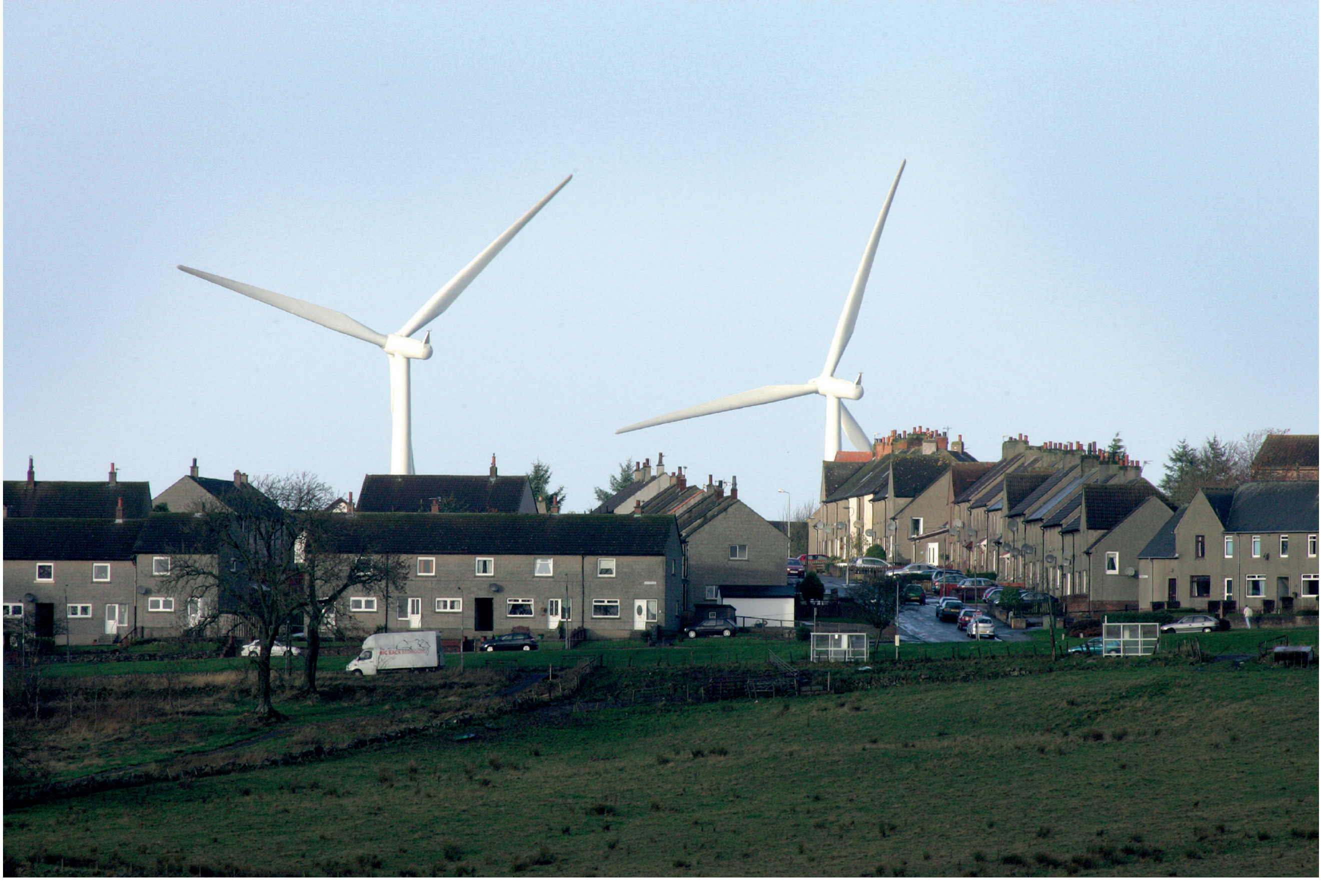

Figure 4a

An onshore wind farm

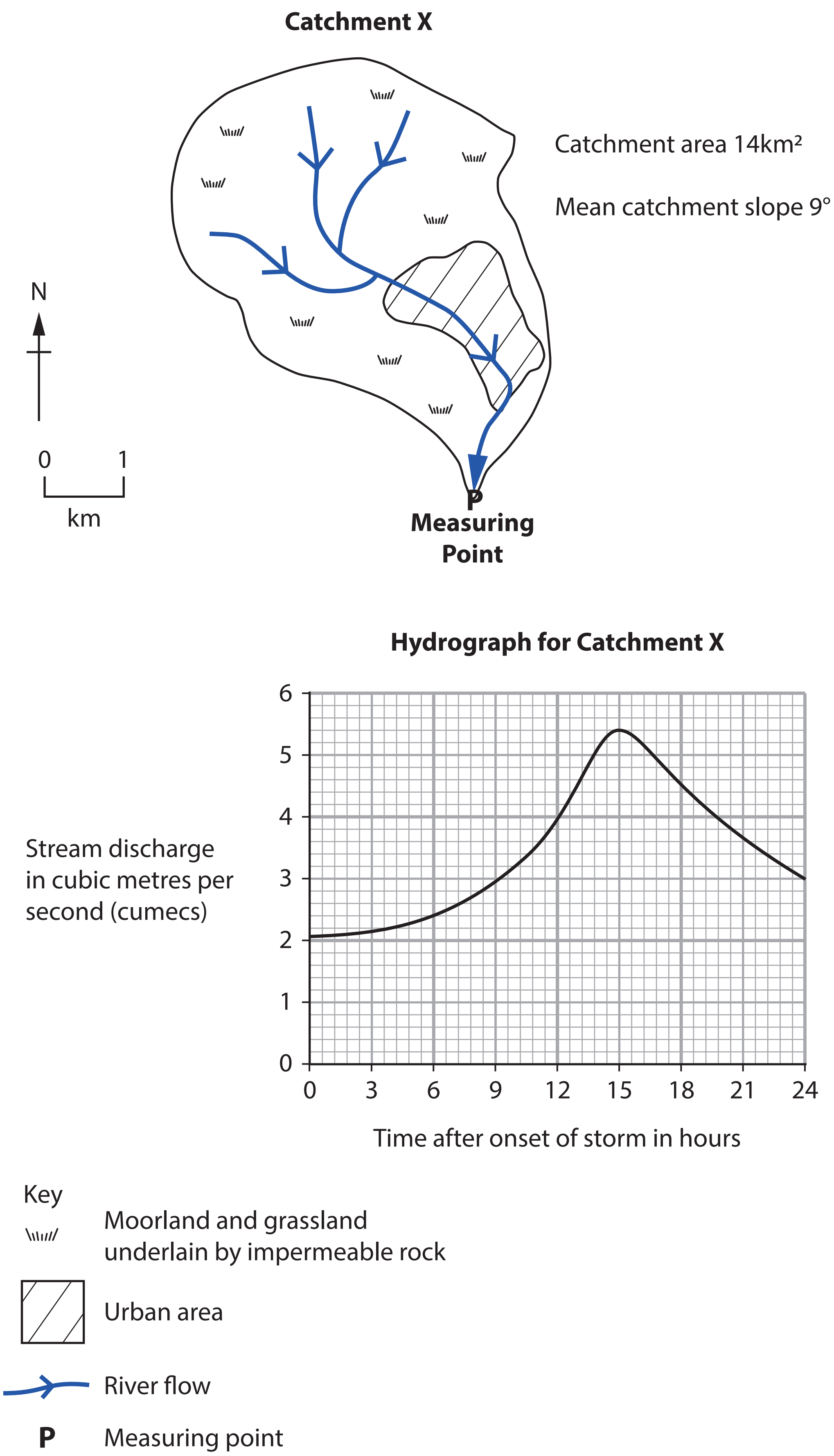
Catchment X
Catchment area 14km²
Mean catchment slope 9°
N
0
1
km
P
Measuring Point
Hydrograph for Catchment X
Stream discharge in cubic metres per second (cumecs)
6
5
4
3
2
1
0
0
3
6
9
12
15
18
21
24
Time after onset of storm in hours
Key
Moorland and grassland underlain by impermeable rock
Urban area
River flow
P
Measuring point

Figure 4b

A map and hydrograph of upland Catchment X

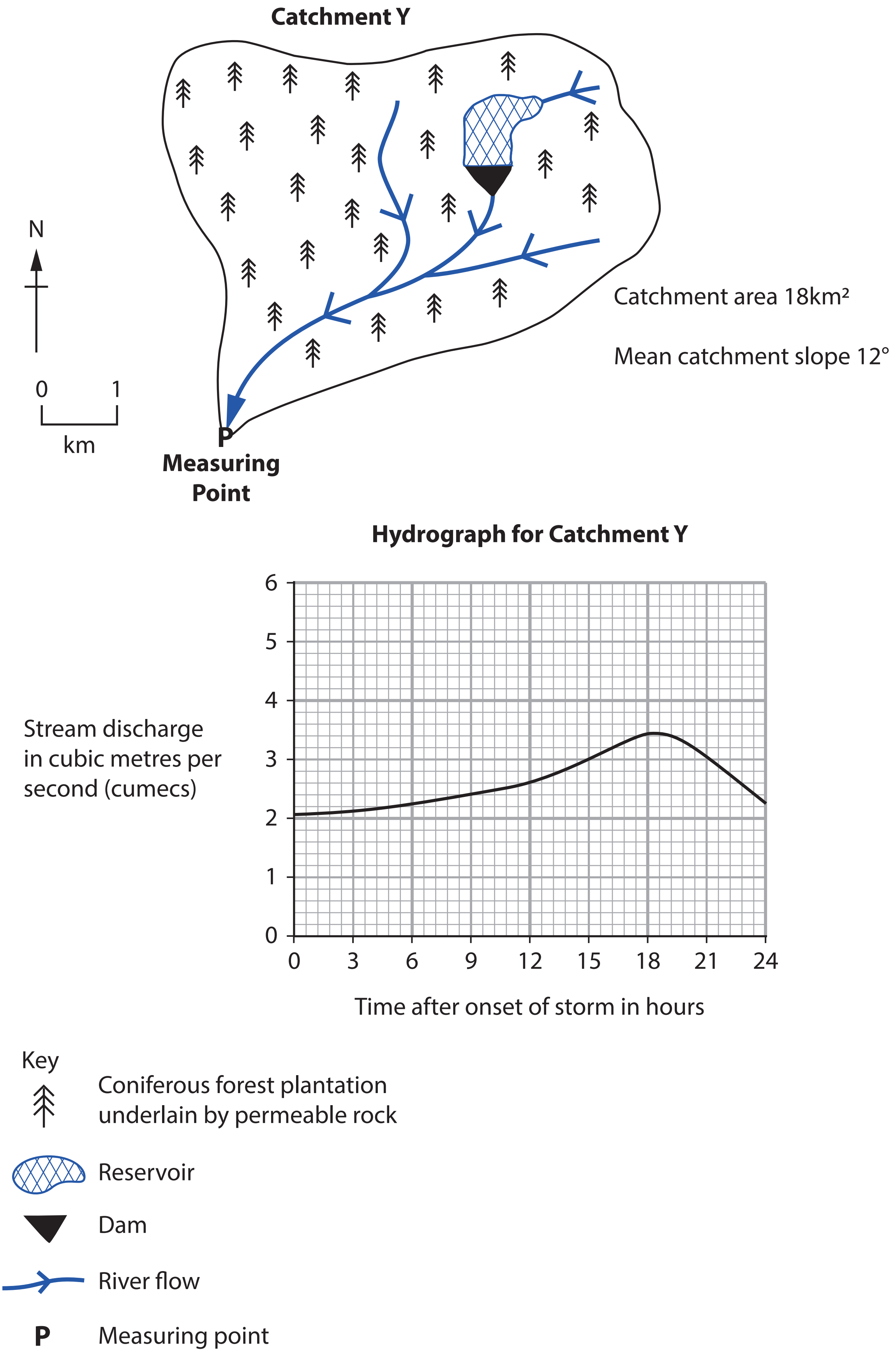
Catchment Y
N
0
1
km
P
Measuring Point
Catchment area 18km²
Mean catchment slope 12°
Hydrograph for Catchment Y
Stream discharge in cubic metres per second (cumecs)
6
5
4
3
2
1
0
0
3
6
9
12
15
18
21
24
Time after onset of storm in hours
Key
Coniferous forest plantation underlain by permeable rock
Reservoir
Dam
River flow
P
Measuring point

Figure 4c

A map and hydrograph of upland Catchment Y

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Acknowledgements

Pearson Education Ltd. gratefully acknowledges all the following sources used in the preparation of this paper:

Figure 1 volcano.si.edu

Figure 3b https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level

Figure 4a © Peter Devlin/Alamy Stock Photo