basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

GEOGRAPHY P1

2022

MARKS: 150

TIME: 3 hours

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This question paper consists of 19 pages.

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INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO SECTIONS.

   SECTION A
   QUESTION 1: CLIMATE AND WEATHER (60 MARKS)
   QUESTION 2: GEOMORPHOLOGY (60 MARKS)

   SECTION B
   QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES (30 MARKS)

2. Answer ALL THREE questions.

3. ALL diagrams are included in the QUESTION PAPER.

4. Leave a line between the subsections of questions answered.

5. Start EACH question at the top of a NEW page.

6. Number the answers correctly according to the numbering system used in this question paper.

7. Do NOT write in the margins of the ANSWER BOOK.

8. Draw fully labelled diagrams when instructed to do so.

9. Answer in FULL SENTENCES, except when you have to state, name, identify or list.

10. Units of measurement MUST be indicated in your final answer, e.g. 1 020 hPa, 14 °C and 45 m.

11. You may use a non-programmable calculator.

12. You may use a magnifying glass.

13. Write neatly and legibly.

SPECIFIC INSTRUCTIONS AND INFORMATION FOR SECTION B

14. A 1 : 50 000 topographic map 3422AA MOSSEL BAY and a 1 : 10 000 orthophoto map 3422AA 18, AA 19 and AA 23 MOSSEL BAY are provided.

15. The area demarcated in RED/BLACK on the topographic map represents the area covered by the orthophoto map.

16. Show ALL calculations. Marks will be allocated for this.

17 You must hand in the topographic and orthophoto map to the invigilator at the end of the examination.

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SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY

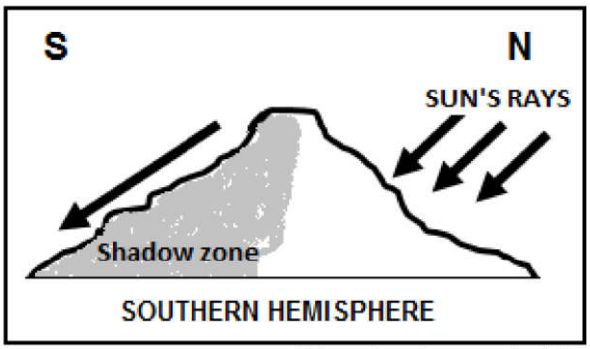
QUESTION 1: CLIMATE AND WEATHER

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.8) in the ANSWER BOOK, e.g. 1.1.9 D.

1.1.1 Climate of a very small area is known as a …

A city climate.
B microclimate.
C macroclimate.
D valley climate.

1.1.2 The slope in the diagram that receives the direct rays of the sun is …-facing.



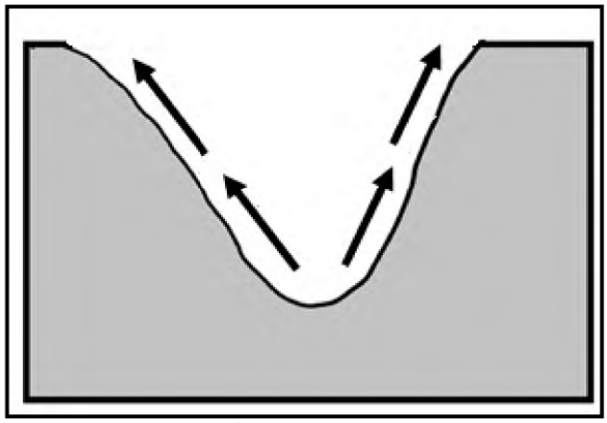
[Examiner's own sketch]

A south
B east
C north
D west

1.1.3 South-facing slopes in the Southern Hemisphere can be described as … natural vegetation.

A dry with sparse
B moist with dense
C moist with sparse
D dry with dense

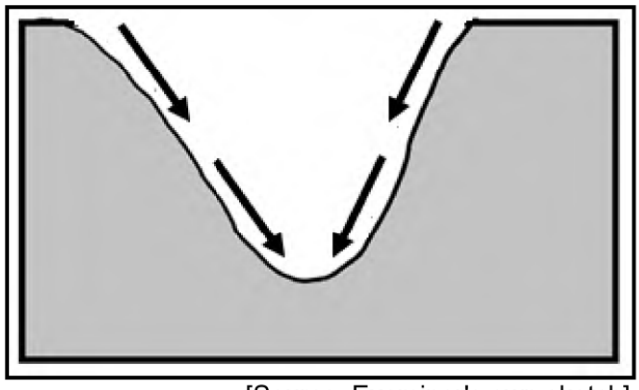
1.1.4 The air movement shown in the sketch can result in …



[Source: Examiner's own sketch]

A frost pockets.
B the dispersal of pollutants.
C radiation fog.
D a thermal belt.

1.1.5 The downslope movement of air occurs because of cooling due to …



[Source: Examiner's own sketch]

A solar radiation.
B reflection.
C terrestrial radiation.
D insolation.

1.1.6 Precipitation that forms due to terrestrial cooling at night:

A Radiation fog
B Drizzle
C Snow
D Advection fog

1.1.7 The wind associated with a temperature inversion in a valley is a/an … wind.

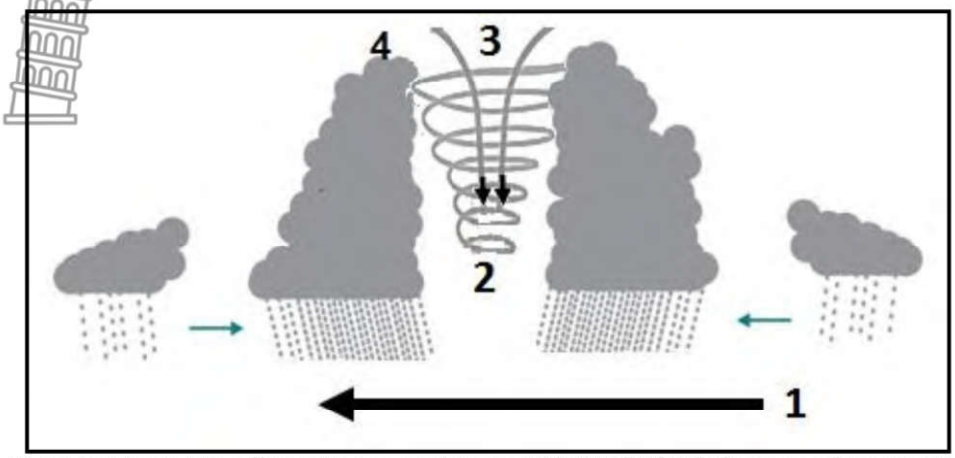
A anabatic
B offshore
C onshore
D katabatic

1.1.8 The CORRECT sequence in which a temperature inversion develops:

(i) Mountain slopes cool
(ii) Warm air is displaced and rises from the valley floor
(iii) Cold air sinks due to the force of gravity
(iv) Temperature increases with height

A (i), (ii), (iii), (iv)
B (iv), (iii), (ii), (i)
C (i), (iii), (ii), (iv)
D (i), (ii), (iv), (iii) (8 x 1) (8)

1.2 The sketch shows a cross-section through a tropical cyclone in the Southern Hemisphere. Choose the word/term from COLUMN B that completes the statement in COLUMN A. Write only **Y** or **Z** next to the question numbers (1.2.1 to 1.2.7) in the ANSWER BOOK, e.g. 1.2.8 **Z**.



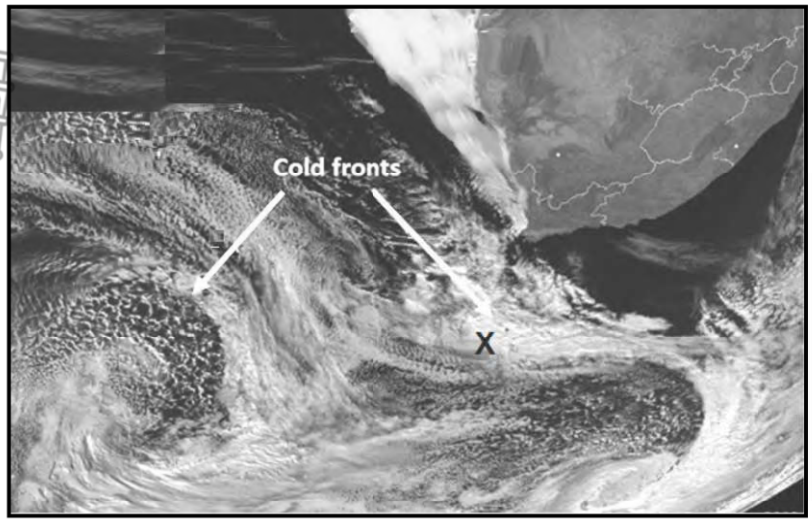
[Adapted from https://maritimesa.org/grade-11/2016/09/23/influence-of-weather]

COLUMN A		COLUMN B
1.2.1	Wind **1** that steers the tropical cyclone is known as the …	**Y** westerlies **Z** easterlies
1.2.2	**2** is known as the …	**Y** eye **Z** centre
1.2.3	Circulation of air around **2** is …	**Y** clockwise **Z** anticlockwise
1.2.4	The air pressure at **2** …	**Y** decreases **Z** increases
1.2.5	The air at **3** is …	**Y** ascending **Z** descending
1.2.6	The cloud type at **4** is …	**Y** cumulonimbus **Z** stratus
1.2.7	The type of precipitation associated with cloud type **4** is …	**Y** drizzle **Z** thunderstorms

(7 x 1) (7)

1.3 Refer to the extract and the satellite image of mid-latitude cyclones.

COLD FRONTS MOVE OVER THE WESTERN CAPE: AUGUST 2021



Parts of the Western Cape are already in the grips of cold and rainy weather and this will continue as a series of cold fronts reach the province this weekend.

As the last and strongest cold front makes landfall on Sunday morning, widespread rain will start over the Peninsula, the Cape Winelands and the Overberg, where weather prediction models have currently indicated a further 20–30 mm of rain in Cape Town and more than 50 mm in the mountainous areas. With the area already becoming water-logged, this heavy rainfall may lead to localised flooding. Rainfall will spread along the south coast, west coast and Namakwa districts on Sunday.

Maximum temperatures will drop to 12 °C in the Western Cape. Snow will start falling on Sunday evening into Monday morning across the high ground of the Western and Northern Cape, reaching the Eastern Cape and Lesotho on Monday. Snowfalls will not be confined to the mountains of these provinces as some towns and mountain passes can expect light snowfall as well.

[Adapted from https://www.enca.com/weather/here-comes-the-cold]

1.3.1 Give the general direction of movement of the mid-latitude cyclones. (1 x 1) (1)

1.3.2 Give a reason for the direction of movement of the mid-latitude cyclones. (1 x 2) (2)

1.3.3 Quote evidence from the extract for the localised flooding. (1 x 2) (2)

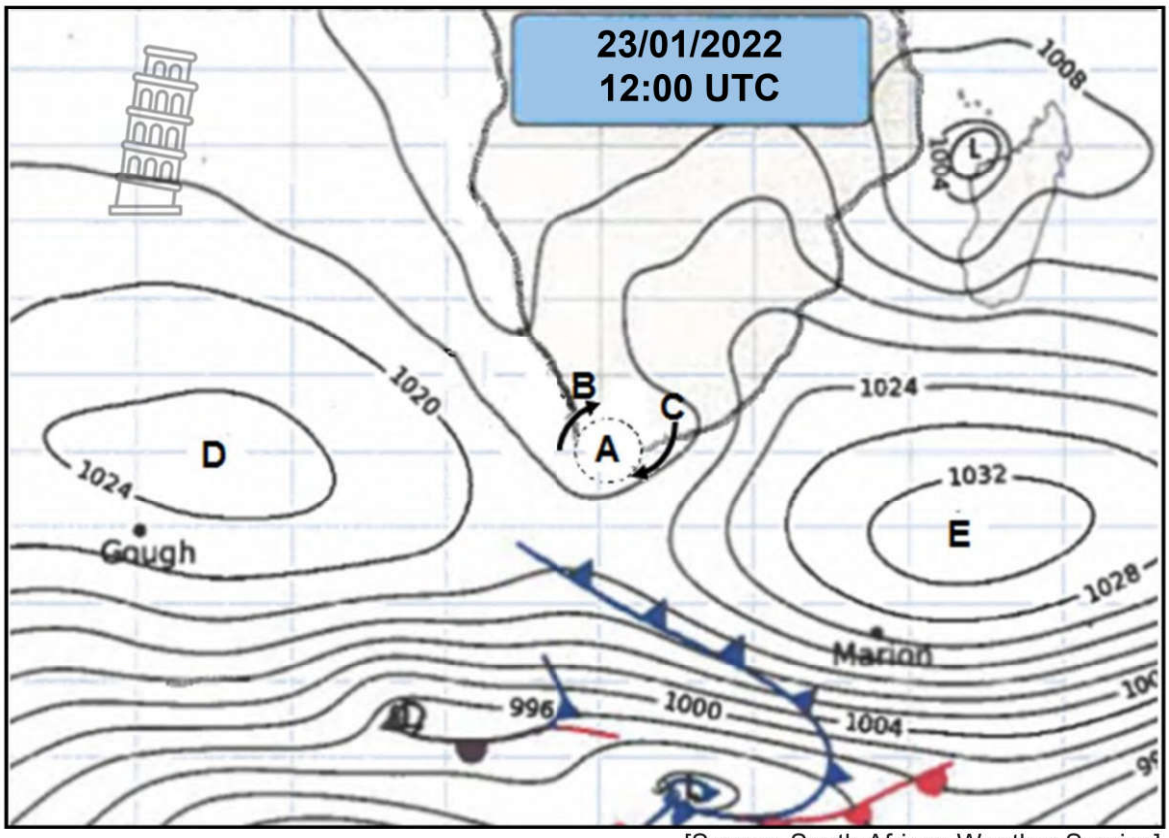
1.3.4 Why do cold fronts affect the Western Cape mainly in winter? (1 x 2) (2)

1.3.5 How will snowfall influence the water supply in the Western Cape? (1 x 2) (2)

1.3.6 Describe the processes that resulted in the formation of cumulonimbus clouds along the cold front at **X**. (3 x 2) (6)

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1.4 Refer to the South African synoptic weather map.



[Source: South African Weather Service]

1.4.1 Name low-pressure cell **A**. (1 x 1) (1)

1.4.2 Why is pressure cell **A** known as a travelling disturbance? (1 x 2) (2)

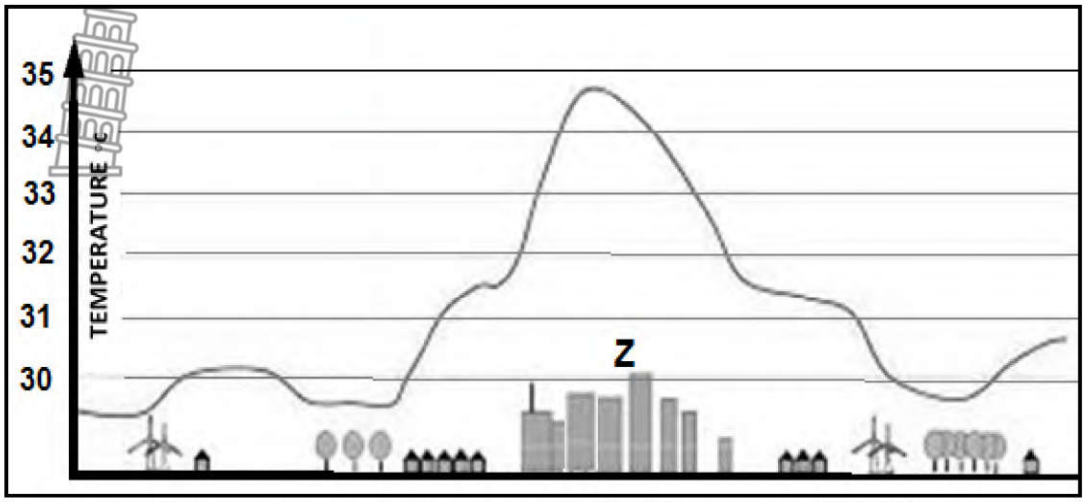
1.4.3 Why is there a greater possibility of precipitation at **B** than at **C**? (2 x 2) (4)

1.4 4 Give evidence that this synoptic weather map represents typical summer conditions. (2 x 2) (4)

1.4.5 (a) Which anticyclone, **D** or **E**, has a greater subsidence (descending) of air? (1 x 2) (2)

(b) Use the pressure readings on the synoptic weather map to support your answer to QUESTION 1.4.5(a). (1 x 2) (2)

1.5 Refer to the graph showing the difference between rural and urban temperatures.



[Source: https://www.google.com/url?sa=i&url=https%3A%environment%2F2021-heat-island]

1.5.1 Define the concept *urban heat island*. (1 x 2) (2)

1.5.2 Give the highest temperature recorded. (1 x 1) (1)

1.5.3 Explain TWO ways in which the buildings at **Z** contribute to the high temperatures. (2 x 2) (4)

1.5.4 In a paragraph of approximately EIGHT lines, suggest sustainable building strategies to reduce the urban heat island effect. (4 x 2) (8)

[60]

QUESTION 2: GEOMORPHOLOGY

2.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (2.1.1 to 2.1.8) in the ANSWER BOOK, e.g. 2.1.9 D.

2.1.1 This type of river only flows after heavy rainfall:

A Perennial
B Periodic
C Exotic
D Episodic

2.1.2 … rivers are found mostly in the eastern half of South Africa.

A Perennial
B Periodic
C Exotic
D Episodic

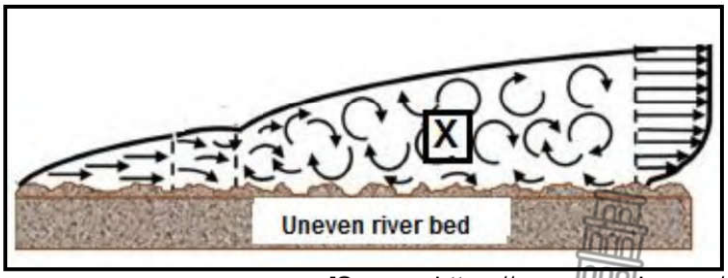
2.1.3 … rivers originate in a high-rainfall region and flow through a dry region.

A Perennial
B Periodic
C Exotic
D Episodic

2.1.4 … rivers only cut through the water table in the wet season.

A Perennial
B Periodic
C Exotic
D Episodic

2.1.5 **X** illustrates a … flow.



[Source: https://www.google.com/url?sa=i&url=https%2Fwww.sciencedirect.com]

A laminar
B base
C turbulent
D sheet

2.1.6 The ability of rock to allow water to pass through:

A Permeability
B Evaporation
C Porosity
D Precipitation

2.1.7 TWO factors that will result in a higher rate of infiltration:

(i) Drizzle
(ii) Thunderstorms
(iii) Steep gradient
(iv) Gentle gradient

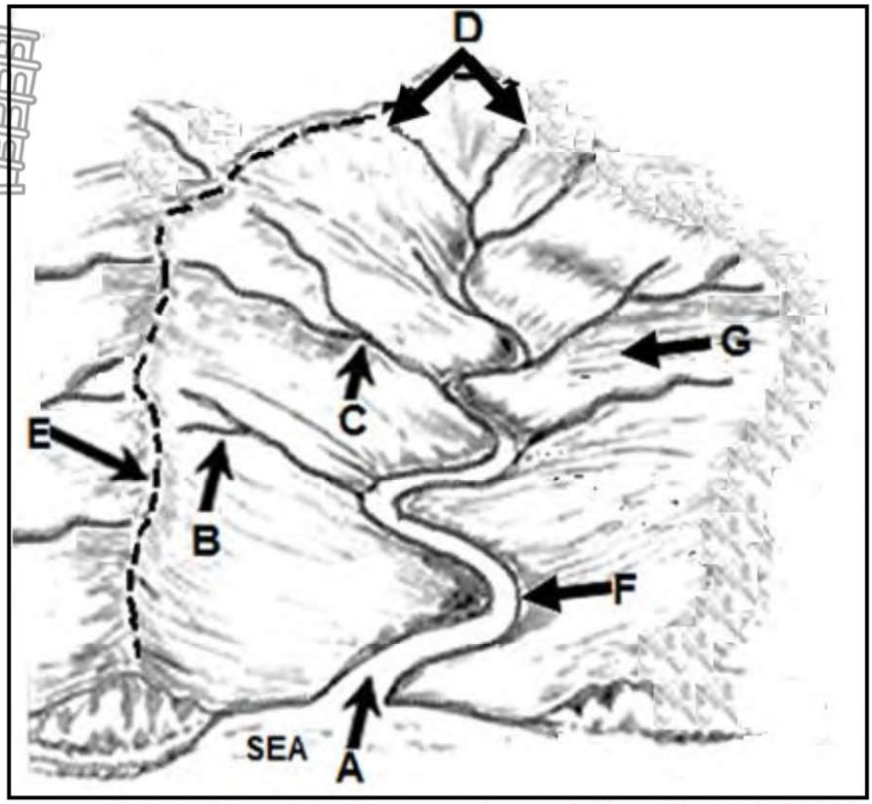
A (i) and (ii)
B (ii) and (iii)
C (iii) and (iv)
D (i) and (iv)

2.1.8 A higher rate of infiltration will result in a:

(i) Lower stream order
(ii) Lower drainage density
(iii) Lower water table
(iv) Lower soil moisture content

A (i) and (ii)
B (ii) and (iii)
C (iii) and (iv)
D (i) and (iv) (8 x 1) (8)

2.2 Refer to the drainage basin and match the labels (**A** to **G**) with the term/concept (2.2.1 to 2.2.7), e.g. 2.2.8 **H**.



[Adapted from https://www.google.com/url?sa=i&url=https%3A%2Fdrainage-basin-gram%]

2.2.1 Source

2.2.2 Confluence

2.2.3 Watershed

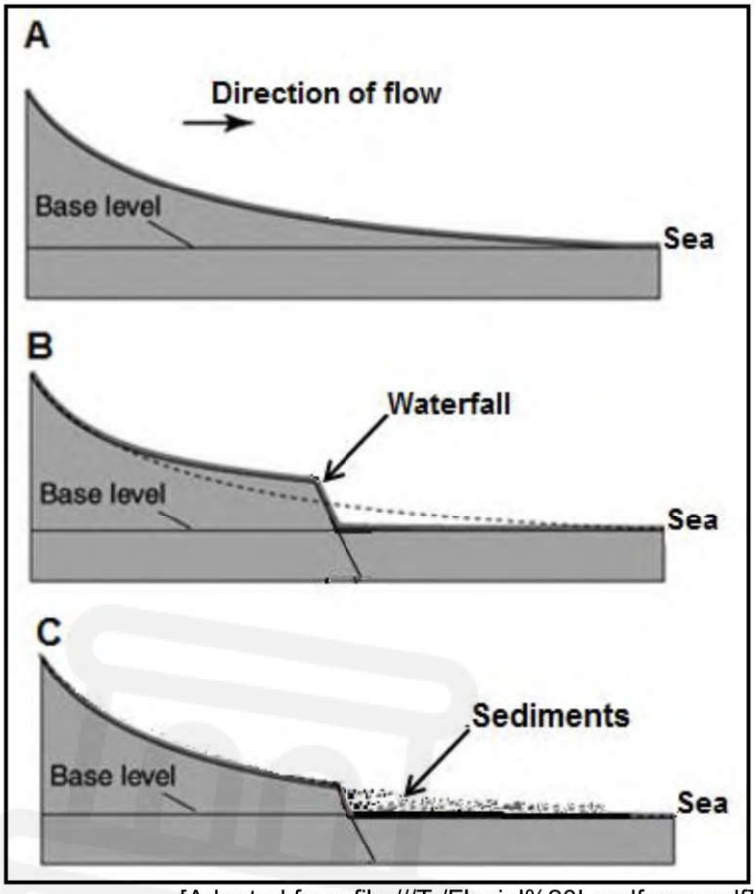
2.2.4 Main stream

2.2.5 Tributary

2.2.6 Interfluve

2.2.7 Mouth (7 x 1) (7)

2.3 Refer to the sketches showing the profile and grading of a river.



[Adapted from file:///T:/Fluvial%20Landforms.pdf]

Refer to sketch **A**.

2.3.1 Define the concept *longitudinal profile*. (1 x 2) (2)

2.3.2 State TWO characteristics of the longitudinal profile evident in sketch **A**. (2 x 1) (2)

2.3.3 Does sketch **A** represent a graded or an ungraded river? (1 x 1) (1)

2.3.4 Give a reason for your answer to QUESTION 2.3.3. (1 x 2) (2)

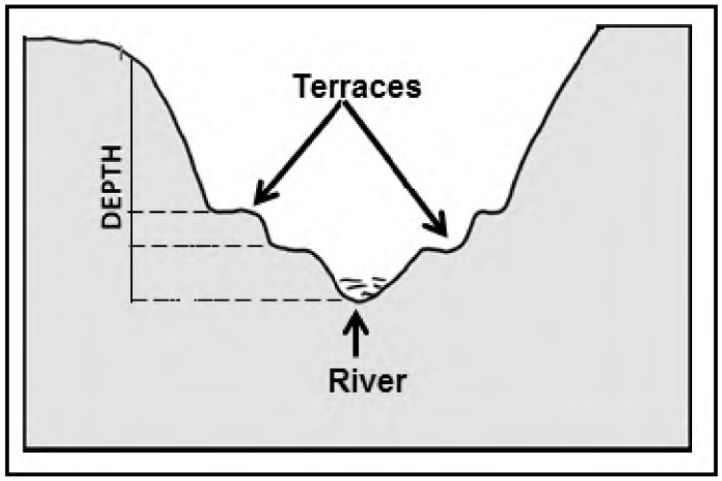
Refer to sketches **B** and **C**.

2.3.5 Identify a temporary and a permanent base level of erosion in sketch **B**. (2 x 1) (2)

2.3.6 Describe the processes that the river in sketches **B** and **C** would undergo to reach a graded state. (3 x 2) (6)

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2.4 Refer to the sketch on river rejuvenation.



[Source: Examiner's own sketch]

2.4.1 Define the concept *river rejuvenation.* (1 x 2) (2)

2.4.2 State ONE factor that causes river rejuvenation. (1 x 1) (1)

2.4.3 Describe the relationship between vertical erosion and the depth of the valley. (1 x 2) (2)

2.4.4 Identify TWO features of river rejuvenation evident in the sketch. (2 x 1) (2)

2.4.5 Explain how river rejuvenation is responsible for the formation of the features identified in QUESTION 2.4.4. (2 x 2) (4)

2.4.6 What negative impact will a rejuvenated river have on the physical environment? (2 x 2) (4)

2.5 Refer to the extract on catchment and river management.

A RIVER OF POLLUTION FLOWS THROUGH OUR LAND

The Olifants River is one of Southern Africa's most important river catchments. The river is critical to the economies of both South Africa and Mozambique. The 30 dams along the course supply three provinces with water in times of drought. Ten million people rely on this river for water.

The water from the Olifants River irrigates farms in western Mpumalanga and powers Eskom's coal-fired power stations in the area. The river flows through Limpopo's platinum belt, supplying water to valleys that otherwise would be dry. The river cuts through the Drakensberg irrigating farms in the Lowveld, providing water to the Kruger National Park and finally joining the Limpopo River in Mozambique.

The above-mentioned activities have had a negative impact on the quality of water in the river. Management strategies implemented so far have proven to be ineffective. This puts the water of the Olifants River in danger of being declared too contaminated (polluted) to be used. Strategies need to be put in place to improve the quality of water in the river in order to ensure a sustainable source of water.

[Adapted from https://mg.co.za/article/2017-04-13-00-a-river-of-sewage-chemicals-metals-flows-through-our-land/]

2.5.1 What is *river management*? (1 x 2) (2)

2.5.2 According to the extract, how many people rely on the Olifants River for water? (1 x 1) (1)

2.5.3 Quote evidence from the extract indicating how water from the Olifants River is used. (2 x 1) (2)

2.5.4 What negative impact would Eskom's coal-fired power stations have on the Olifants River? (1 x 2) (2)

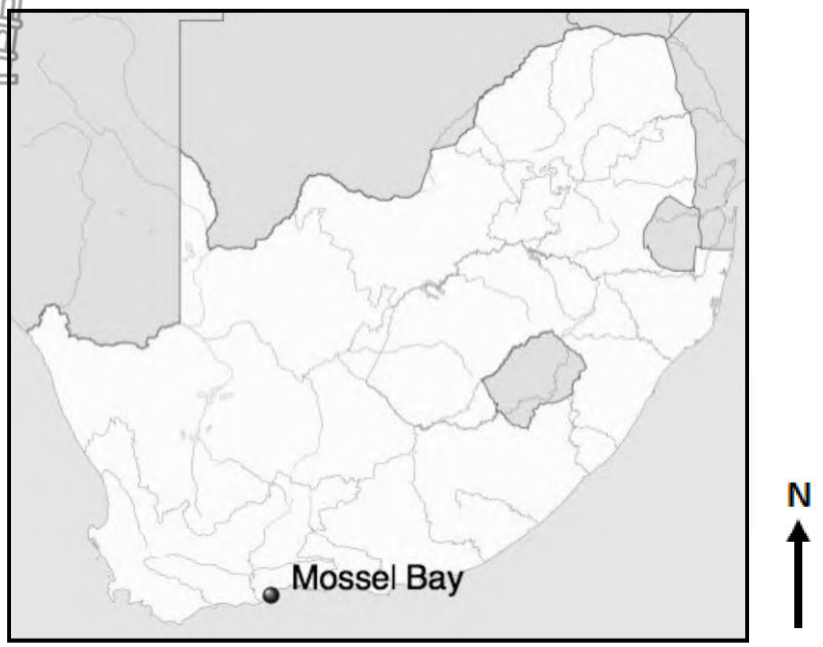
2.5.5 In a paragraph of approximately EIGHT lines, explain FOUR strategies that could be implemented so that the Olifants River becomes a sustainable source of water. (4 x 2) (8)

[60]

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

GENERAL INFORMATION ON MOSSEL BAY



Coordinates; 34º06'S; 22º03'E

Mossel Bay is a coastal town with a population of 99 319. It lies at the western end of a stretch of scenic coastline called the Garden Route. Mossel Bay is a bustling holiday resort in summer and an ideal retreat in winter as it is located on a spectacular sun-washed peninsula embraced by the warm Indian Ocean. The onshore winds bring cool sea breezes creating pleasant conditions for tourists.

The average annual difference between the maximum and minimum temperature for Mossel Bay is 6 °C. This temperature range is small due to the moderating influence of the ocean. Mossel Bay has warm temperatures and a significant amount of rainfall throughout the year.

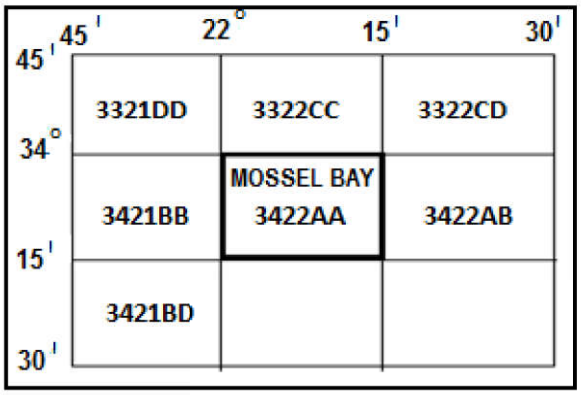
[Adapted from https//:www.visitmosselbay.co.za]

The following English terms and their Afrikaans translations are shown on the topographic map:

ENGLISH	AFRIKAANS
Diggings	Delwerye
Golf Course	Gholfbaan
River	Rivier
Sewerage Works	Rioolwerke
Estate	Landgoed
Mud flats	Modderplate
Nature Reserve	Natuurreservaat

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 3322CD is located … of Mossel Bay on the index sheet.



A south-east
B north-west
C north-east
D south-west (1 x 1) (1)

3.1.2 The value of the index contour line **F** in block **C2** on the topographic map is … metres.

A 80
B 100
C 103
D 120 (1 x 1) (1)

3.1.3 Calculate, in km², the area covered by the orthophoto map using the following converted measurements:

Length: 2,1 km
Breadth: 1,9 km

Formula: **Area = Length x Breadth** (1 x 1) (1)

3.1.4 Why does the demarcated area of the orthophoto map appear smaller on the topographic map? (1 x 1) (1)

3.1.5 Calculate the average gradient from **6** in block **B3** to **7** in block **B4** on the orthophoto map.

Formula: $\textbf{Average gradient} = \frac{\textbf{vertical interval (VI)}}{\textbf{horizontal equivalent (HE)}}$

(5 x 1) (5)

3.1.6 Is the average gradient calculated in QUESTION 3.1.5 generally considered steep or gentle? (1 x 1) (1)

3.2 MAP INTERPRETATION

Refer to **G** in block **D3** on the topographic map.

3.2.1 Name the wind that blows down the slopes of the valley at **G** during the night. (1 x 1) (1)

3.2.2 Explain how the wind identified in QUESTION 3.2.1 negatively influences crops grown on the valley floor at **G**. (1 x 2) (2)

Refer to block **A4** on the orthophoto map and the general information on Mossel Bay.

3.2.3 The annual temperature range for Mossel Bay is considered to be (small/large). (1 x 1) (1)

3.2.4 Why does the holiday resort, labelled **10**, experience a moderate climate? (1 x 2) (2)

Refer to blocks **A4** and **B4** on the topographic map.

3.2.5 The Hartenbos River in blocks **A4** and **B4** on the topographic map is in the … course.

A upper
B middle
C lower
D youth (1 x 1) (1)

3.2.6 Give evidence from blocks **A4** and **B4** to support your answer to QUESTION 3.2.5. (1 x 2) (2)

Refer to block **A3** on the orthophoto map.

3.2.7 The slope found between **8** and **9** in block **A3** is a … slope.

A convex
B concave
C uniform
D terrace (1 x 1) (1)

3.2.8 Use the evidence from the orthophoto map to support your answer to QUESTION 3.2.7. (1 x 2) (2)

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

Refer to the images, **A** and **B**, of a school in Mossel Bay.

A



B



[Source: Ridge+view+school+mossel bay]

3.3.1	Images **A** and **B** are stored as (pixels/symbols).	(1 x 1)	(1)
3.3.2	Which image, **A** or **B**, has a higher resolution?	(1 x 1)	(1)
3.3.3	Give a reason for your answer to QUESTION 3.3.2.	(1 x 2)	(2)

Refer to block **A1** on the topographic map.

3.3.4	Define the concept *data layer*.	(1 x 2)	(2)
3.3.5	How will the drainage data layer encourage crop farming in the area?	(1 x 2)	(2)

[30]

TOTAL: 150

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