



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

GEOGRAPHY P1

2022

MARKS: 150

TIME: 3 hours

This question paper consists of 19 pages.

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.

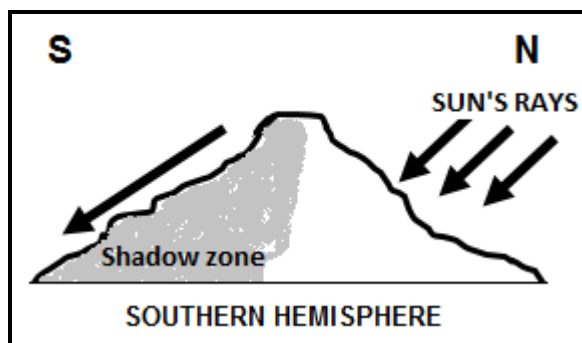
SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY**QUESTION 1: CLIMATE AND WEATHER**

- 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.



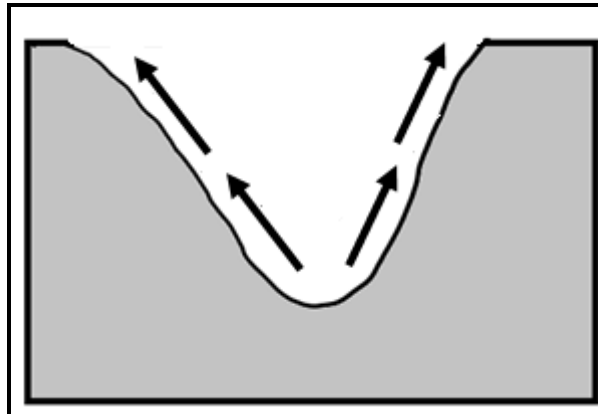
[Examiner's own sketch]

- 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

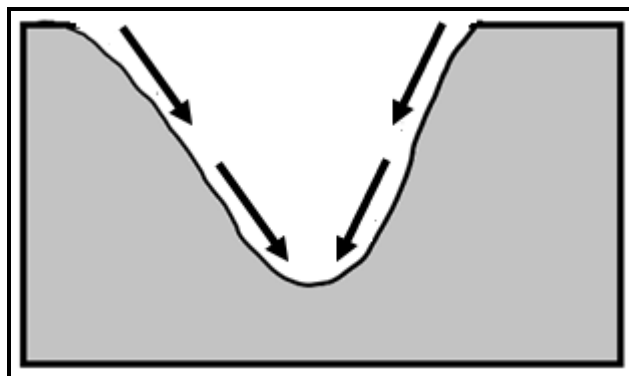
1.1.4 The air movement shown in the sketch can result in ...



[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

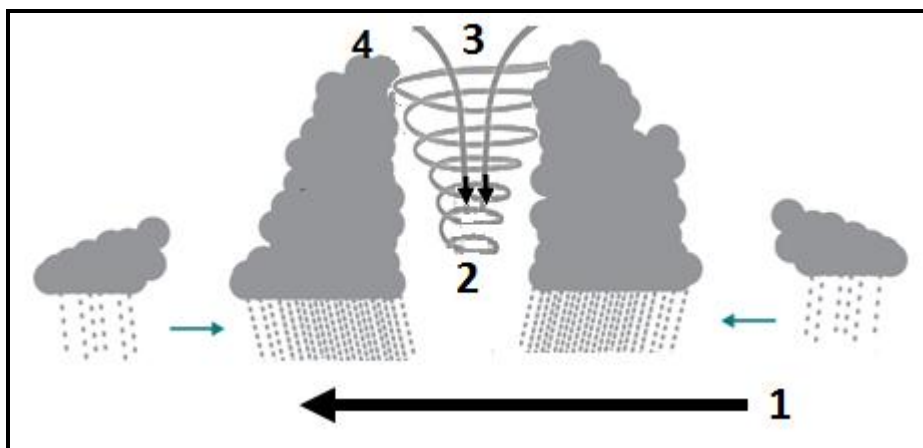
1.1.8 The CORRECT sequence in which a temperature inversion develops:

- (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/>]

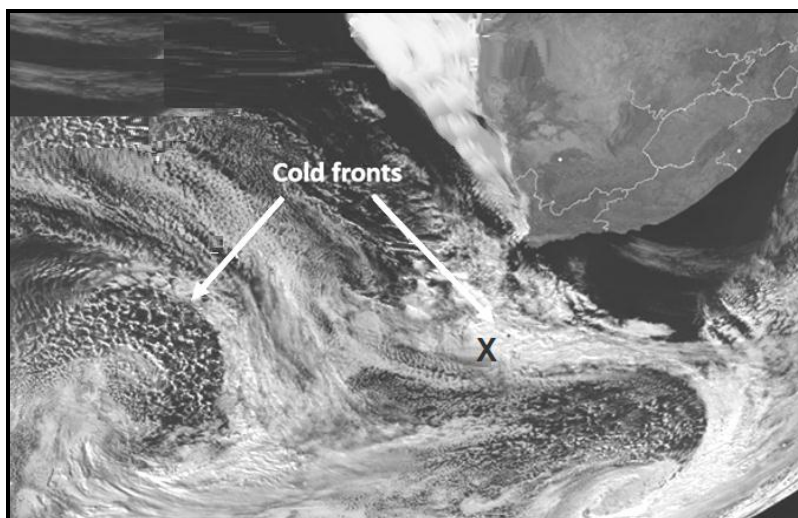
COLUMN A		COLUMN B	
1.2.1	Wind 1 that steers the tropical cyclone is known as the ...	Y	westerlies
		Z	easterlies
1.2.2	2 is known as the ...	Y	eye
		Z	centre
1.2.3	Circulation of air around 2 is ...	Y	clockwise
		Z	anticlockwise
1.2.4	The air pressure at 2 ...	Y	decreases
		Z	increases
1.2.5	The air 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.

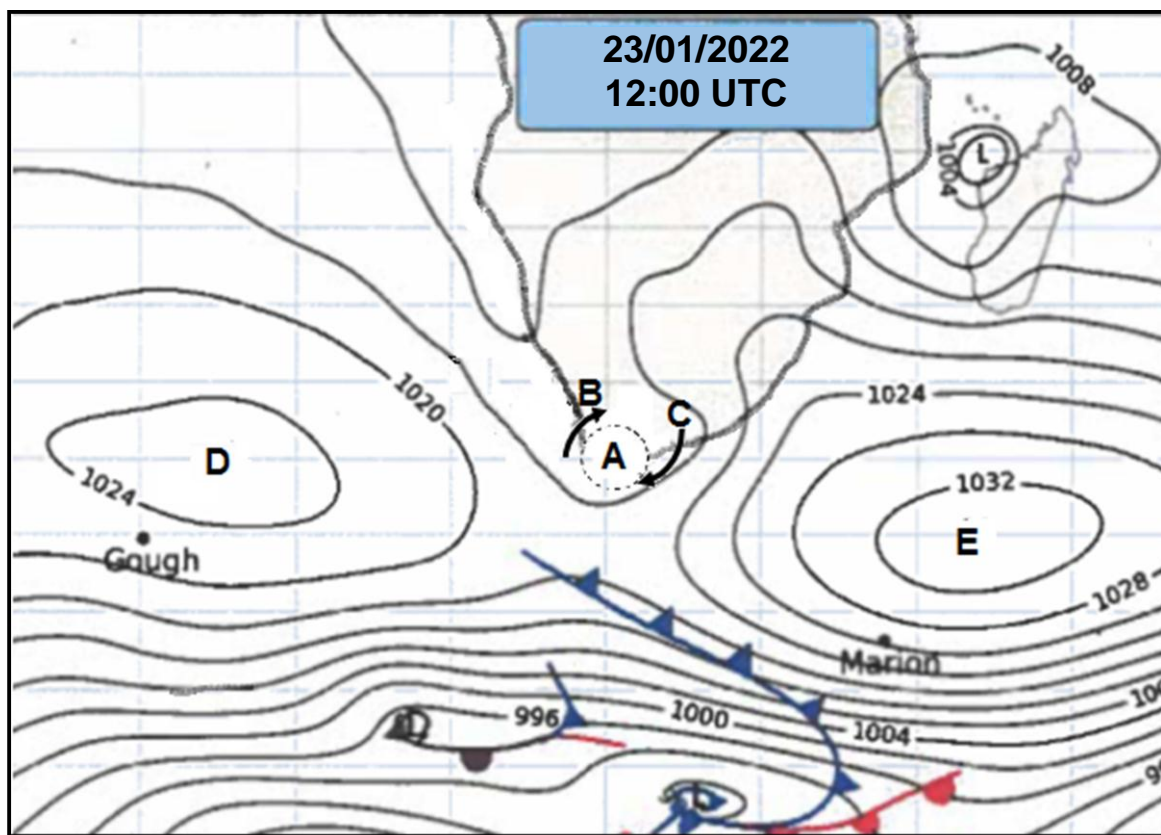
As the last and strongest cold front makes landfall on Sunday morning, widespread rain will start over the Peninsula, the Cape Winelands and the Overberg, where weather prediction models have currently indicated a further 20–30 mm of rain in Cape Town and more than 50 mm in the mountainous areas. With 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) |

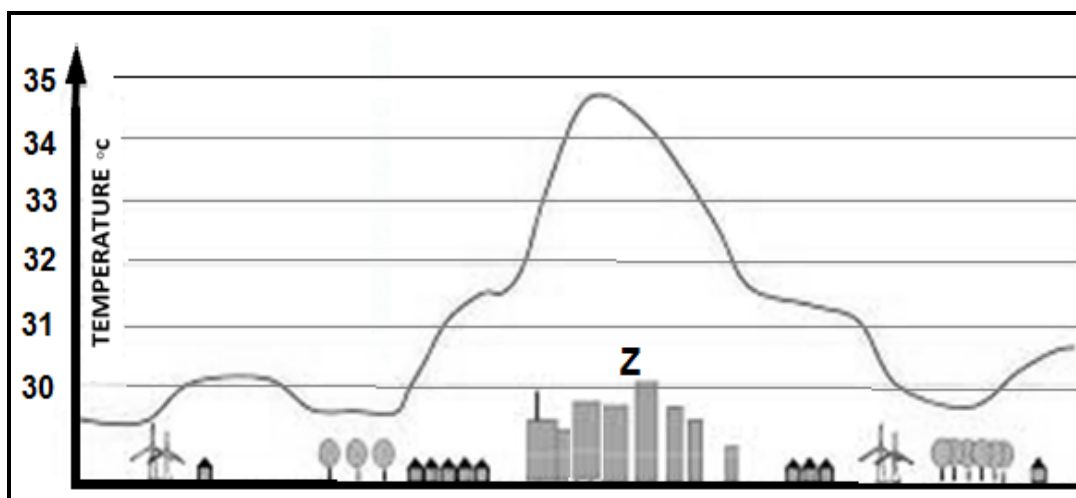
1.4 Refer to the South African synoptic weather map.



[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 <i>urban heat island</i> . | (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

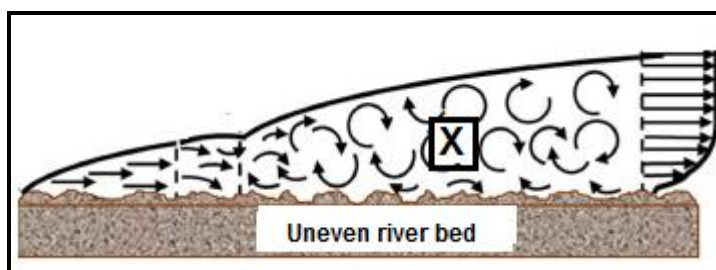
2.1.3 ... rivers originate in a high-rainfall region and flow through a dry region.

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

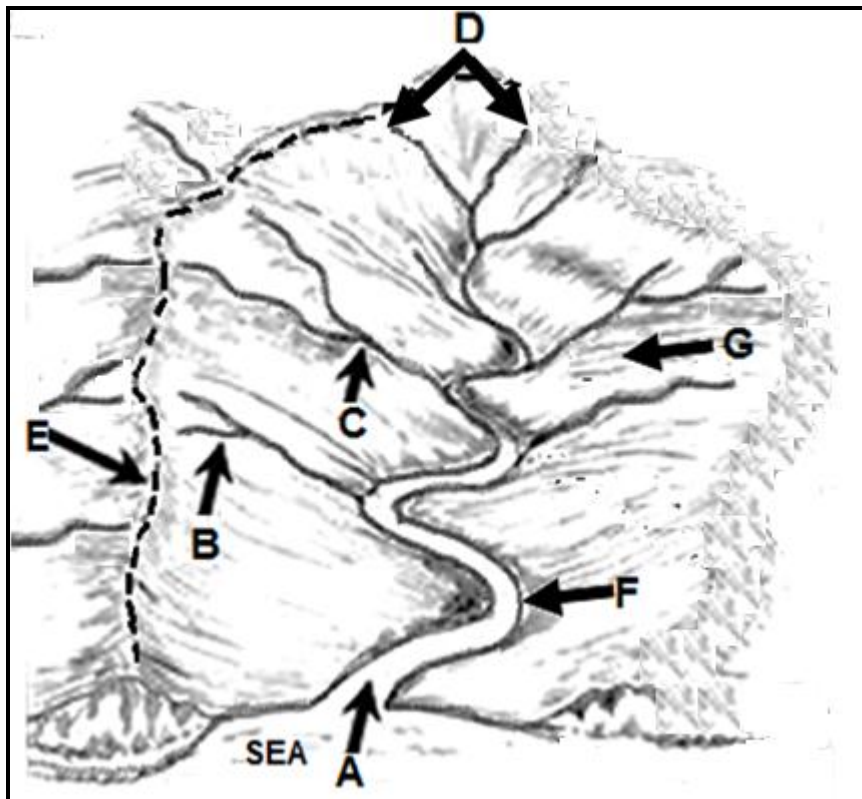
2.1.8 A higher rate of infiltration will result in a:

- (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.

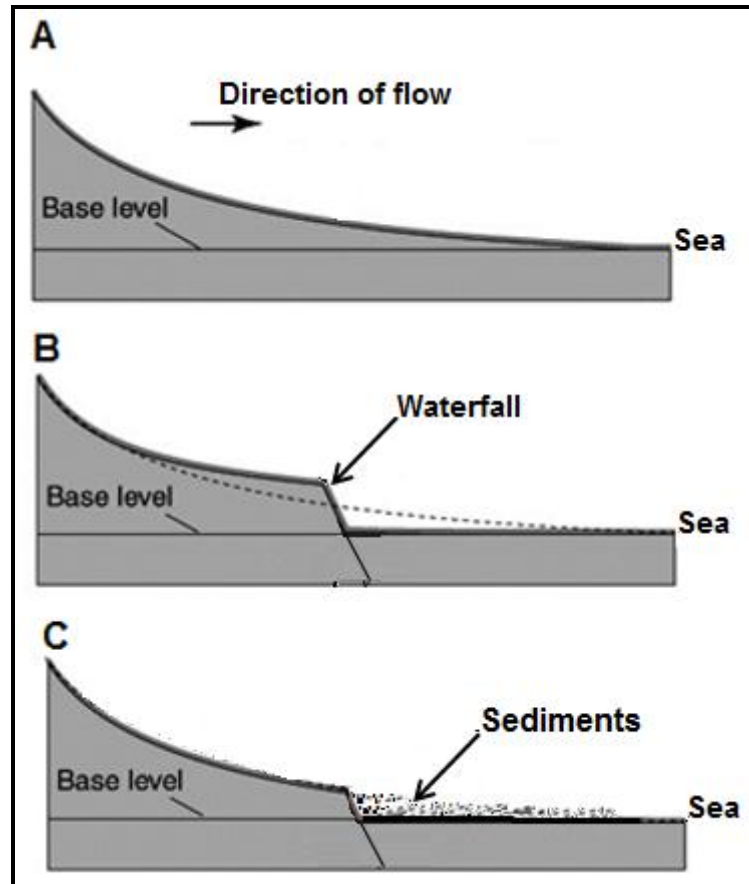


[Adapted from [https://www.google.com/url?sa=i&url=https%3A%2Fdrainage-basin-gram%](https://www.google.com/url?sa=i&url=https%3A%2Fdrainage-basin-gram%2F)]

- 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>]

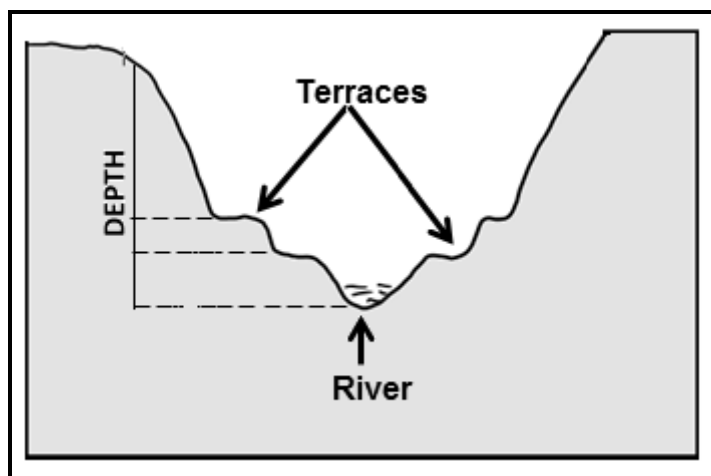
Refer to sketch **A**.

- 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)

2.4 Refer to the sketch on river rejuvenation.



[Source: Examiner's own sketch]

- | | | | |
|-------|---|---------|-----|
| 2.4.1 | Define the concept <i>river rejuvenation</i> . | (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

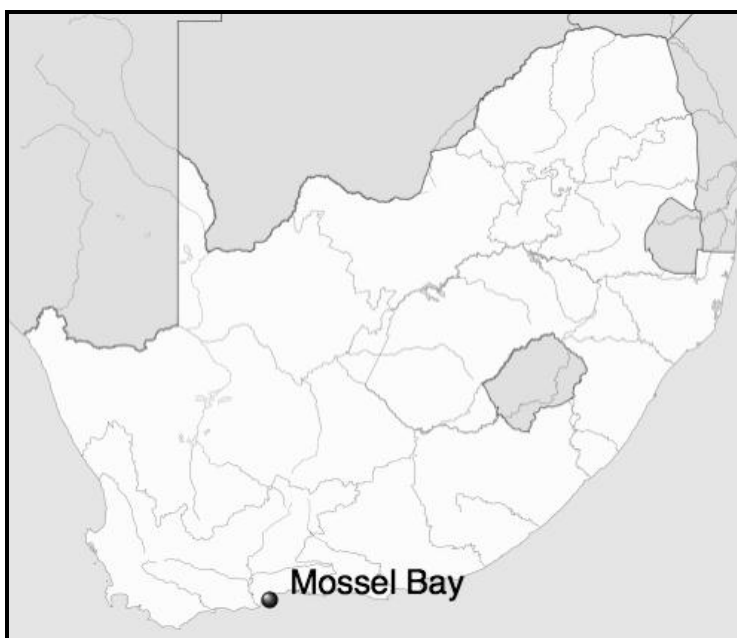
The Olifants River is one of Southern Africa's most important river catchments. The river is critical to the economies of both South Africa and Mozambique. The 30 dams along the course supply three provinces with water in times of drought. Ten million people rely on this river for water.

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 <i>river management</i> ? | (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; 34°06'S; 22°03'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

Diggings
Golf Course
River
Sewerage Works
Estate
Mud flats
Nature Reserve

AFRIKAANS

Delwerye
Gholfbaan
Rivier
Rioolwerke
Landgoed
Modderplate
Natuurreservaat

3.1 MAP SKILLS AND CALCULATIONS

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

	45'	22°	15'	30'
45'	3321DD	3322CC	3322CD	
34°	3421BB	MOSSEL BAY 3422AA	3422AB	
15'	3421BD			
30'				

- 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: **Average gradient** = $\frac{\text{vertical interval (VI)}}{\text{horizontal equivalent (HE)}}$

(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.



[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 <i>data layer</i> . | (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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GEOGRAPHY P1

2022

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 pages.

PRINCIPLES FOR MARKING GEOGRAPHY- NSC NOVEMBER 2021 AND SC JUNE 2022

The following marking principles have been developed to standardise marking in all provinces.

MARKING

- ALL questions **MUST** be marked, irrespective of whether it is correct or incorrect
- Where the maximum marks have been allocated for a particular question, place an **M** over the remainder of the text to indicate the maximum marks have been achieved.
- A clear, neat tick must be used: ✓
 - If **ONE** mark is allocated, **ONE** tick must be used: ✓
 - If **TWO** marks are allocated, **TWO** ticks must be used: ✓✓
 - The tick must be placed at the **FACT** that a mark is being allocated for
 - Ticks must be kept **SMALL**, as various layers of moderation may take place
- Incorrect answers must be marked with a clear, neat cross: ✕
 - Use **MORE** than one cross across a paragraph/discussion style questions to indicate that all facts have been considered
 - Do **NOT** draw a line through an incorrect answer
 - Do **NOT** underline the incorrect facts

For the following action words, **ONE** word answers are acceptable: **list, name, state, identify**

For the following action words, a **FULL** sentence must be written: **describe, explain, evaluate, analyse, suggest, differentiate, distinguish, define, discuss, why, how**

The following action words need to be read within its context to determine whether a **ONE-** word answer or **FULL** sentence is required: **provide, what, tabulate** and **give**

NOTE THE FOLLOWING

- If the numbering is incorrect or left out, as long as the sequence of answers to questions is followed candidates can be credited
- Spelling errors if recognisable, award the marks provided the meaning is correct.
- Be sensitive to the sense of an answer, which may be stated in a different way
- In questions where a letter is the accepted response but the learner writes the actual answer- award marks. This concession remains until June 2022.

TOTALLING AND TRANSFERRING OF MARKS

- Each sub-question must be totalled
 - Questions in Section A has five sub-sections, therefore five sub-totals per question required. Section B has three sub-sections and three sub-totals.
 - Sub-section totals to be written in the right hand margin at the end of the sub-section and underlined
 - Sub-totals must be written legibly
 - Leave room to write in moderated marks on different levels
- Total sub-totals and transfer total to top left hand margin next to question number
- Transfer total to cover of answer book

30

QUESTION 1

- 1.1.1 A (South Atlantic High) (1) ✓
 1.1.2 B (Kalahari High) (1) ✓
 1.1.3 B (South Indian) (1) ✗

2

- 1.2.1 Melting snow ✓
 1.2.2 Mouth ✗
 1.2.3 Third order ✓

2

- 1.3.1 Katabatic ✗
 1.3.2 1 occurs during the day while 2 occurs at night ✓✓
 1.3.3 Cold air rolls down into the valley and forms an inversion ✓✓

6

- 1.4.1 Shape of front concave ✗
 Steep gradient of front ✓
 1.4.2 Warm air undercuts the cold air ✗
 1.4.3 Air behind the cold front is colder than the air in front. Cold air moves faster than warm air ahead of it. Cold front catches up with the warm front. ✓✓

7

- 1.5.1 (a) A river that only flows all year round ✗
 (b) The river channel is wide ✗
 (c) Regularity of rainfall and the soil type over which the streams flow. ✓✓

- 1.5.2 Gauteng and the Eastern Cape ✗

- 1.5.3 The cost of food production will increase as it is costly to buy purified water. Farmers will have to buy more chemicals to purify water. Chemicals cost a lot and this will increase production costs. It will be costly to purify water for use in electricity generation. These costs will be included in electricity prices. Costs will increase the price of electricity during production. There will be less clean water to generate hydro- electricity. M

13

SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY**QUESTION 1: CLIMATE AND WEATHER**

1.1 1.1.1 B (1)

1.1.2 C (1)

1.1.3 B (1)

1.1.4 B (1)

1.1.5 C (1)

1.1.6 A (1)

1.1.7 D (1)

1.1.8 C (1)

(8 x 1) (8)

1.2 1.2.1 Z (1)

1.2.2 Y (1)

1.2.3 Y (1)

1.2.4 Y (1)

1.2.5 Z (1)

1.2.6 Y (1)

1.2.7 Z (1)

(7 x 1) (7)

1.3	1.3.1	West to east/eastwards (1)	(1 x 1) (1)
	1.3.2	Driven by the westerlies (2)	(1 x 2) (2)
	1.3.3	'series of cold fronts' (2) <small>QUOTE EVIDENCE FOR LOCALISED FLOODING</small> 'widespread rain' (2) '20-30 mm of rain' (2) 'more than 50 mm' (2) 'waterlogged' (2) 'heavy rainfall' (2) [ANY ONE]	(1 x 2) (2)
	1.3.4	Shifting of the ITCZ to the north (2) <small>WHY DO COLD FRONTS AFFECT MAINLY IN WINTER?</small> South Atlantic High has migrated northwards (2) Mid-latitude cyclones migrate further north (2) Pressure belts follow the perpendicular sunrays northwards (2). [ANY ONE]	(1 x 2) (2)
	1.3.5	Increases (2) <small>HOW WILL SNOWFALL INFLUENCE WATER SUPPLY?</small>	(1 x 2) (2)
	1.3.6	The cold air undercuts the warm air (2) <small>DESCRIBE THE PROCESSES THAT RESULTED IN CB CLOUDS</small> Rapid upliftment of warm air occurs (2) Rising warm air cools and condenses (2) Condensation results in cumulonimbus clouds (2) [ANY THREE]	(3 x 2) (6)
1.4	1.4.1	Coastal Low (1)	(1 x 1) (1)
	1.4.2	It is a moving system (2)	(1 x 2) (2)
	1.4.3	Moist air is carried over the land at B (2) <small>WHY IS THERE A GREATER POSSIBILITY OF PRECIPITATION AT B THAN C?</small> Onshore winds at B (2) Dry air is moving from land to sea at C (2) Offshore winds at C (2) [ANY TWO]	(2 x 2) (4)
	1.4.4	23.01.2022 (Date) (2) <small>EVIDENCE FOR TYPICAL SUMMER CONDITIONS</small> The high pressure cells are in a Southerly position (2) Cold fronts/mid-latitude cyclones are further south (2) A tropical depression is evident (2) [ANY TWO]	(2 x 2) (4)
	1.4.5	(a) E (2) <small>USE THE PRESSURE READINGS TO SUPPORT YOUR ANSWER</small> (b) E has a higher pressure (1032hPa) reading than D (1024hPa) (2) D has a lower pressure (1024hPa) reading than E (1032hPa) (2) [ANY ONE]	(1 x 2) (2) (1 x 2) (2)

- 1.5 1.5.1 An urban area of higher temperature surrounded by a rural area of lower temperature (2)
DEFINITION
URBAN HEAT
ISLAND
[CONCEPT] (1 x 2) (2)
- 1.5.2 **Accept:** 34,6 °C to 34,8 °C (1) (1 x 1) (1)
- 1.5.3 High building density traps in heat (2)
EXPLAIN TWO
WAYS
BUILDINGS AT
Z
CONTRIBUTE
TO HIGH
TEMPERATURES
 Tall buildings create a larger surface area for heating (2)
 Multiple reflections of heat between the buildings (2)
 Dark painted buildings/roofs absorb heat (2)
 Building materials (accept examples) result in more heat being absorbed (2)
 Taller buildings limit air flow in cities (2)
 Air conditioning used in the buildings cause more heat (2)
[ANY TWO] (2 x 2) (4)
- 1.5.4 Paint roofs or buildings with light colours (2)
PARAGRAPH

SUGGEST
SUSTAINABLE
BUILDING
STRATEGIES
TO REDUCE
URBAN HEAT
ISLAND
EFFECT
 Develop rooftop gardens (2)
 Replace tar and concrete with cobble stones (2)
 Minimise large glass windows/ structures (2)
 Using green energy in buildings (2)
 Use low energy light bulbs (2)
 Decrease building density (2)
 Improve insulation in buildings (2)
 Use eco-friendly/natural building materials (2)
 Restrict the height of buildings (2)
 Use mirrored glass which is more reflective (2)
 Planned areas for parks/planting trees/water features (2)
[ANY FOUR] (4 x 2) (8)
[60]

QUESTION 2

- 2.1 2.1.1 D (1)
- 2.1.2 A (1)
- 2.1.3 C (1)
- 2.1.4 B (1)
- 2.1.5 C (1)
- 2.1.6 A (1)
- 2.1.7 D (1)
- 2.1.8 A (1) (8 x 1) (8)
- 2.2 2.2.1 D (1)
- 2.2.2 C (1)
- 2.2.3 E (1)
- 2.2.4 F/A (1)
- 2.2.5 B (1)
- 2.2.6 G (1)
- 2.2.7 A (1) (7 x 1) (7)
- 2.3 2.3.1 The **side view** of a river from **source to mouth** (2)
[CONCEPT] (1 x 2) (2)
- 2.3.2 Smooth/Graded (1)
STATE TWO CHARACTERISTICS OF LONGITUDINAL PROFILE
Concave shaped (1)
Steeper in the high-lying area (1)
Gentle in the low-lying area (1)
(Accept) Permanent base level (1)
(Accept) No temporary base levels/ waterfall (1)
[ANY TWO] (2 x 1) (2)
- 2.3.3 Graded (1) (1 x 1) (1)
- 2.3.4 Temporary base levels not evident (2)
GIVE A REASON FOR ANSWER
It has a smooth concave profile (2)
[ANY ONE] (1 x 2) (2)

- 2.3.5 Temporary base level: waterfall (1)
Permanent base level: sea (1) (2 x 1) (2)
- 2.3.6 DESCRIBE THE PROCESSES THAT RIVER IN SKETCH B AND C UNDERGO TO REACH A GRADED STATE
Erosion of softer layers of rock below waterfall (2)
Headward/backward erosion will cause the waterfall to migrate upstream (2)
Downward erosion deepens the plunge pool (2)
Hard layer of rock falls into plunge pool as not supported by underlying softer rock (2)
Deposition of sediments in plunge pool and continues towards the lower course (2)
Equilibrium between erosion and deposition will maintain a graded state (2)
[ANY THREE] (3 x 2) (6)
- 2.4 2.4.1 RIVER REJUVENATION
The **increase** in the energy of a river to **erode** (2)
[CONCEPT] (1 x 2) (2)
- 2.4.2 STATE ONE FACTOR THAT CAUSES RIVER REJUVINATION
Change in the gradient (1)
Accept: Isostatic uplift (1)
Drop in sea level (1)
Increase in volume of water (1)
Accept: River capture (1)
Increase in precipitation (1)
Fast flowing river joining (1)
[ANY ONE] (1 x 1) (1)
- 2.4.3 DESCRIBE RELATIONSHIP BETWEEN VERTICAL EROSION AND DEPTH
Directly proportional relationship (2)
The greater the vertical erosion the deeper the valley (2)
[ANY ONE] (2) (1 x 2)
- 2.4.4 IDENTIFY TWO FEATURES OF REJUVINATION
Terraces (1)
Valley in a valley (1) (2 x 1) (2)
- 2.4.5 EXPLAIN HOW REJUVINATION IS RESPONSIBLE FOR FORMATION OF FEATURES
As a result of vertical erosion the floor of the old river valley forms terraces on either side of the river (2)
Due to vertical erosion a new valley is carved into the old valley resulting in a valley in a valley (2) (2 x 2) (4)
- 2.4.6 WHAT NEGATIVE IMPACT-REJUVINATED RIVER-ON PHYSICAL ENVIRONMENT
Increase in erosion (2)
Erosion results in the loss of fertile soil/arable land (2)
Erodes/collapse of river banks (2)
River can overflow its banks (2)
Soils become saturated/water-logged (2)
Destruction of fluvial landforms (accept examples) (2)
Disruption of food chains / food webs (2)
Damages the natural vegetation/biodiversity (2)
Less land available for natural habitats (2)
[ANY TWO] (2 x 2) (4)

2.5	2.5.1	The management of water sources (2)	
	<small>RIVER MANAGEMENT</small>	[CONCEPT]	(1 x 2) (2)
	2.5.2	Ten million (1)	(1 x 1) (1)
	2.5.3	'30 dams along the course supply three provinces with water'	
	<small>QUOTE USAGE OF WATER FROM OLIFANTS RIVER</small>	'irrigates farms' (1)	
		'powers Eskom's coal-fired power stations' (1)	
		'supplying water to valleys' (1)	
		'irrigating farms' (1)	
		'providing water to the Kruger National Park' (1)	
		[ANY TWO]	(2 x 1) (2)
	2.5.4	Water will be polluted (accept examples) (2)	
	<small>WHAT NEGATIVE IMPACT- ESKOM'S COAL FIRED POWER STATIONS -ON OLIFANTS RIVER</small>	Quality of the water decreases (2)	
		It raises the temperature of the water (2)	
		It will influence the aquatic ecosystems negatively (accept examples) (2)	
		Negative impact on biodiversity (2)	
		[ANY ONE]	(1 x 2) (2)
	2.5.5	Create a buffer zone to prevent development too close to the river (2)	
	<small>PARAGRAPH- EXPLAIN FOUR STRATEGIES COULD BE IMPLEMEN TED SO THAT THE OLIFANTS RIVER BECOMES A SUSTAINAB LE SOURCE OF WATER</small>	Implement legislation to discourage pollution of the river (2)	
		Issue fines for illegal dumping/polluting of the river (2)	
		Monitoring/testing the quality of the water to ensure it is suitable for domestic and industrial use (2)	
		Educate farmers on sustainable farming methods (2)	
		Educating people about the importance of river management (2)	
		Awareness campaigns to prevent dumping and pollution of river (accept examples) (2)	
		Encourage or promote the planting of trees to reduce surface run-off or soil erosion (2)	
		Protect natural vegetation to reduce surface run-off or soil erosion (2)	
		Promote recycling of waste water before releasing back into river (2)	
		Conserve wetlands to preserve the quality of the water (2)	
		[ANY FOUR]	(4 x 2) (8)
			[60]

QUESTION 3

- 3.1 3.1.1 C (1) (1 x 1) (1)
- 3.1.2 B (1) (1 x 1) (1)
- 3.1.3 Formula: Area = **Length x Breadth**
- Area = 2.1 km x 1.9 km
= 3.99 km² (1) (1 x 1) (1)
- 3.1.4 The scale of the topographic map is (5 times) smaller (1)
The scale of the orthophoto map is (5 times) larger (1)
[ANY ONE] (1 x 1) (1)
- 3.1.5 Formula: **Average gradient** = $\frac{\text{vertical interval (VI)}}{\text{horizontal equivalent (HE)}}$
- VI: 70m – 20m = 50 (1) m
- HE: 5.4 (1) cm x 100m (RANGE: 5.3cm – 5.5cm)
= 540 (1) m (RANGE: 530m – 550m)
- Average Gradient = $\frac{50(m)}{540 (m)}$ (1) (For correct substitution)
- Average Gradient = $\frac{1}{10.8}$
- Average Gradient = 1:10.8 (1) (RANGE: 1:10.6 – 1:11.0) (5 x 1) (5)
- 3.1.6 Steep (1) (1 x 1) (1)
- 3.2 3.2.1 Katabatic wind (1) (1 x 1) (1)
- 3.2.2 Decreases temperature which might affect crops that are sensitive to low temperatures (2)
Can contribute to the formation of frost that might damage crops (2)
[ANY ONE] (1 x 2) (2)
- 3.2.3 Small (1) (1 x 1) (1)
- 3.2.4 Close proximity to the ocean (2)
The influence of the onshore airflow (2)
[ANY ONE] (1 x 2) (2)
- 3.2.5 C (1) (1 x 1) (1)

3.2.6	<small>GIVE EVIDENCE FROM A4/ B4 FOR LOWER COURSE OF RIVER</small> River is wider (2) River is meandering (2) Evidence of deposition (2) Presence of mud flats (2) Evidence of a flood plain (2) Gradual/flat slope (2) [ANY ONE]	(1 x 2) (2)
3.2.7	A (1)	(1 x 1) (1)
3.2.8	Contour lines are far apart at high lying area (8) and close together at low lying area (9) (2)	(1 x 2) (2)
3.3	3.3.1 pixels (1)	(1 x 1) (1)
	3.3.2 A (1)	(1 x 1) (1)
	3.3.3 <small>GIVE REASON FOR HIGH RESOLUTION- A</small> Image A has a higher amount of pixels (2) Image A has more clarity (clearly visible) (2) [ANY ONE]	(1 x 2) (2)
	3.3.4 <small>DATA LAYER</small> A layer of information (based on a theme) (2) [CONCEPT]	(1 x 2) (2)
	3.3.5 <small>HOW- DRAINAGE DATA LAYER ENCOURAGES CROP FARMING</small> Supply water for irrigation of crops (2) There is no need for water infrastructure like pipe lines/furrows/canals (2) The layer will supply information on water supply for the purpose of cultivation (2)	(1 x 2) (2)
		[30]

TOTAL: 150