



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2026

10781

GEOGRAPHY
(PAPER 1)

GEOGRAPHY: Paper 1



10781E

TIME: 3 hours

MARKS: 150

18 pages

X05



INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO SECTIONS.

SECTION A

QUESTION 1: CLIMATE AND WEATHER (60)

QUESTION 2: GEOMORPHOLOGY (60)

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES (30)

2. Answer ALL THREE questions.
3. All diagrams are included in the QUESTION PAPER.
4. Leave a line open 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 topographical map of 3319 DD ROBERTSON and a 1 : 10 000 orthophoto map 3319 DD 8 ROBERTSON are provided.
15. The area demarcated in RED/BLACK on the topographical map represents the area covered by the orthophoto map.
16. Marks will be allocated for steps in calculations.
17. You must hand in the topographical and the orthophoto map to the invigilator at the end of this examination session.

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 The term *urban heat island* refers to:

- A A natural rise in temperatures over mountains because of the aspect
- B Warmer temperatures in urban areas compared to their rural surroundings
- C A heatwave in urban areas during summer
- D An increase in global temperatures

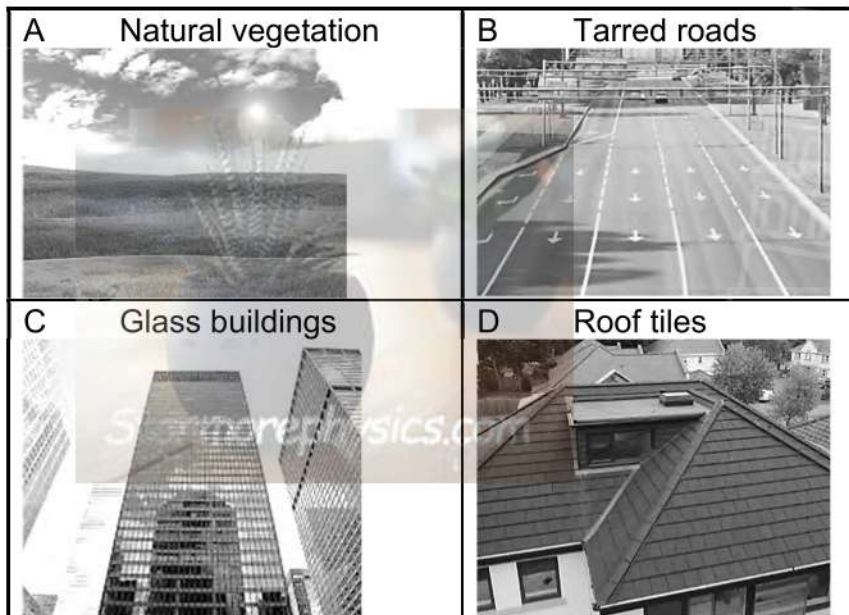
1.1.2 ... contributes most to the urban heat island effect.

- A The presence of wetlands
- B Dense vegetation cover
- C Heat retention by concrete
- D High levels of rainfall

1.1.3 Urban heat islands are typically more intense during ...

- A midday.
- B sunset.
- C the night.
- D early morning.

1.1.4 Which of the following surfaces has the highest albedo?





1.1.5 A reduction of vegetation in urban areas results in ... evaporation and ... surface temperatures.

- (i) increased
- (ii) decreased
- (iii) higher
- (iv) lower

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

1.1.6 Human activities, such as the use of air conditioners, ... the urban heat island effect by transferring ... air outside of buildings.

- (i) decreases
- (ii) increases
- (iii) warm
- (iv) cool

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



1.1.7 Air pollution contributes to the urban heat island effect by ...

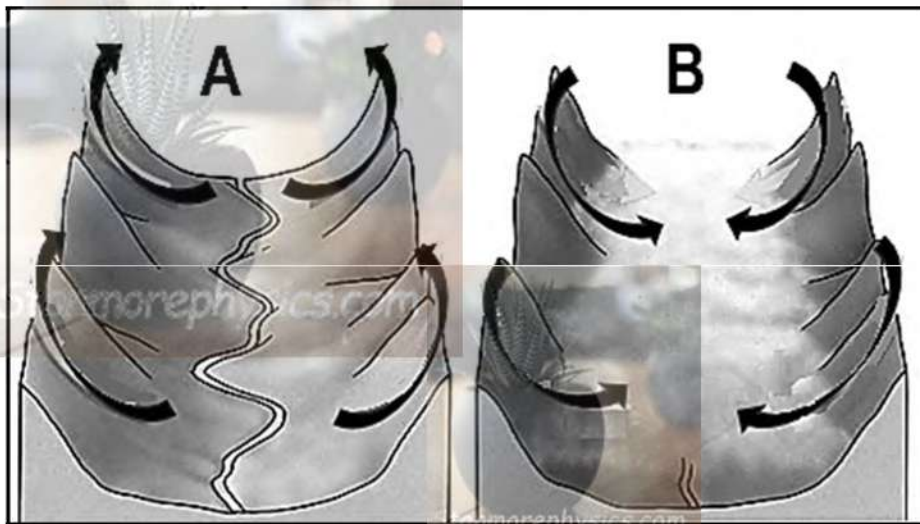
- A increasing humidity.
- B blocking sunlight completely.
- C cooling the atmosphere.
- D absorbing heat energy.

1.1.8 Which city design can reduce the urban heat island effect?

- A Narrow streets with tall, dark buildings
- B Inclusion of large open green (natural) spaces
- C Densely packed industrial areas
- D Wide concrete pavements

(8 x 1) (8)

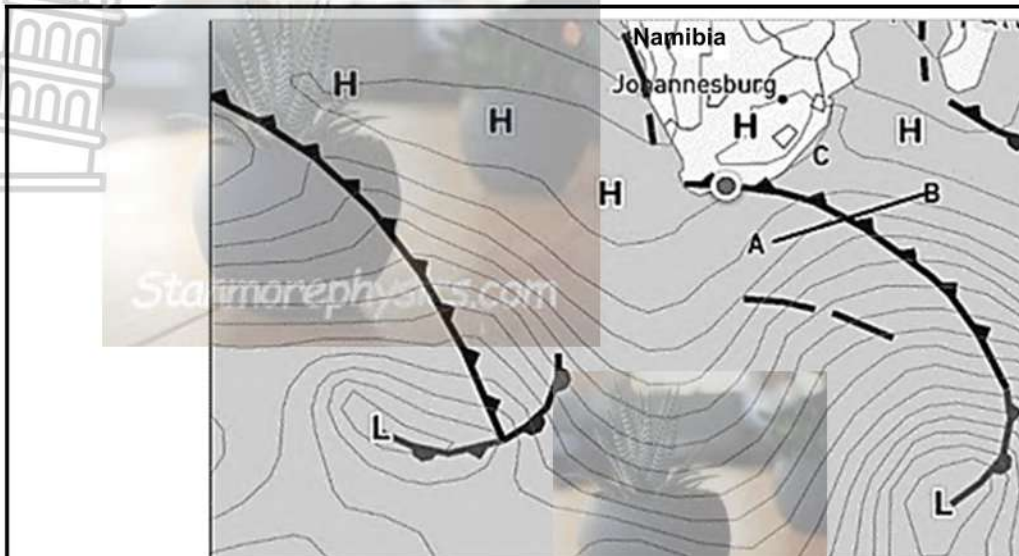
- 1.2 Refer to the sketches below on valley climates. Read the following statements and choose the appropriate word(s) in brackets which will make each statement TRUE. Write down only the question numbers (1.2.1 to 1.2.7) and the answer in the ANSWER BOOK, e.g. 1.2.8 decreased.



[Source: <https://www.gettyimages.com/search/2/image?phrase=katabatic%20winds&sort=rf%2Crm>]

- 1.2.1 The wind shown in sketch **A** is a/an (katabatic/anabatic) wind.
- 1.2.2 The main cause of the winds in sketch **A** is the (cooling/warming) of the valley slopes.
- 1.2.3 Air flowing down the valley slope in sketch **B** will likely cause a (temperature inversion/positive lapse rate).
- 1.2.4 The winds in sketch **B** will be most intense during the (day/night).
- 1.2.5 The winds in (sketch **A**/sketch **B**) can lead to the formation of frost on the valley floor.
- 1.2.6 The winds in sketch **A** generally cause temperatures on the valley slopes to (increase slightly/decrease suddenly).
- 1.2.7 In sketch **B**, (cloud reflection/terrestrial radiation) results in valley slopes losing heat. (7 x 1) (7)

- 1.3 Refer to the sketch and weather prediction below of a mid-latitude cyclone and answer the questions that follow.



Weather prediction for South Africa

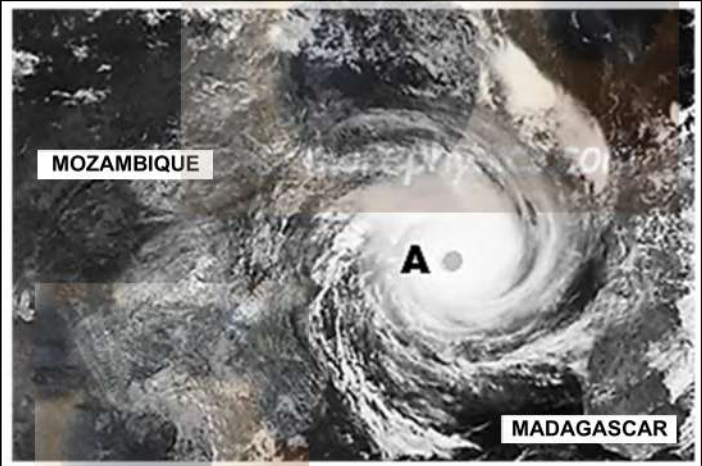
A new cold front is expected to make landfall over the SW Cape late Tuesday or early Wednesday. This may bring the following:

- Showers and possible thundershowers developing over the western interior on Wednesday, tracking to the eastern parts of South Africa from Thursday through early Saturday.
- Very cold conditions with snow are possible over Lesotho and the adjacent regions of the Eastern Cape and KZN on Friday.
- Another cold front may make landfall over the southwestern Cape on Saturday, with the possibility of moderate to heavy rain in the region.

[Source: SWAICSA updated]

- 1.3.1 The season depicted in the sketch above is (summer/winter). (1 x 1) (1)
- 1.3.2 Provide evidence from the sketch to support your answer to QUESTION 1.3.1. (1 x 1) (1)
- 1.3.3 Predict the change in wind direction as the cold front passes over **C**. (1 x 1) (1)
- 1.3.4 In your ANSWER BOOK, draw a labelled cross-section from **A** to **B** as illustrated on the sketch. Clearly indicate the following:
- (a) Cold sector
 - (b) Warm sector
- (2 x 1) (2)
- 1.3.5 According to the passage, possible thunderstorms are expected to develop. Explain why the thunderstorms would likely form at the cold front. (2 x 2) (4)
- 1.3.6 Discuss THREE negative environmental impacts that could occur because of the weather conditions mentioned in the extract. (3 x 2) (6)

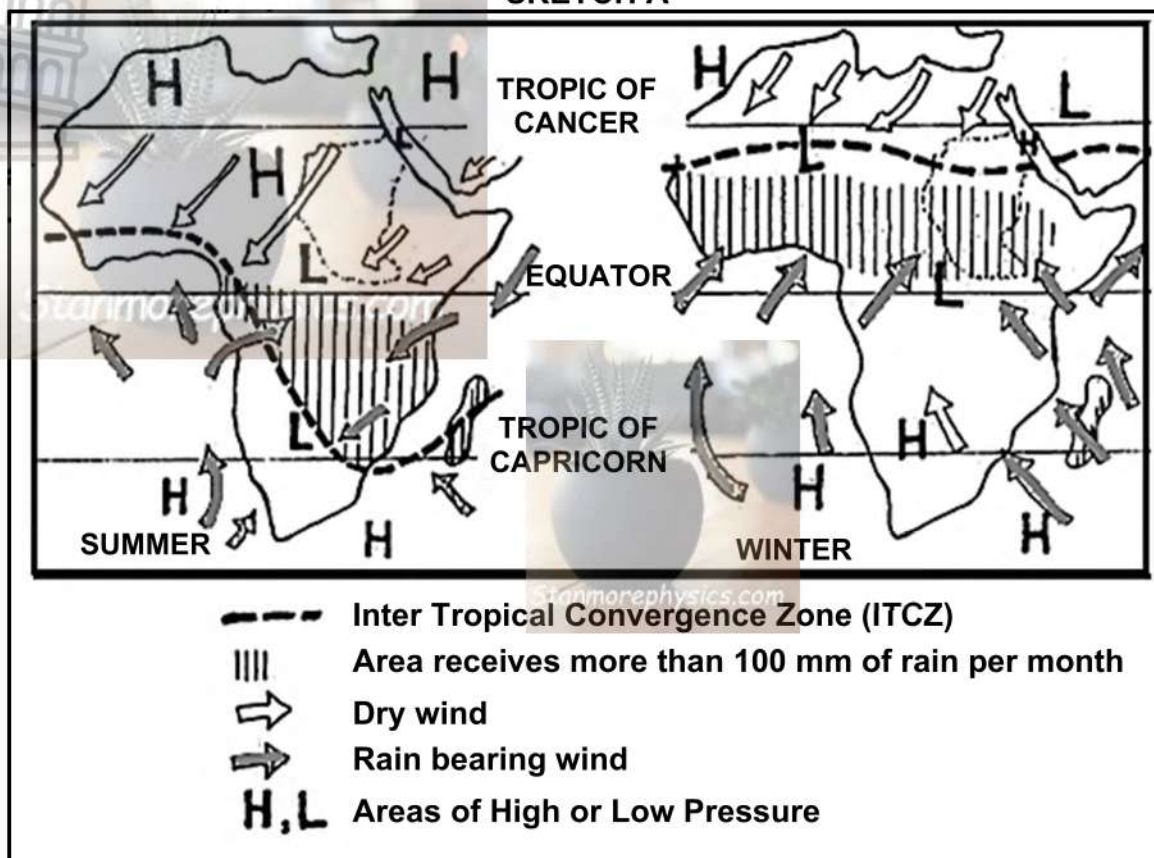
1.4 Refer to the infographic below on Tropical Cyclone Filipo.

TROPICAL CYCLONE FILIPO STRENGTHENS	SATELLITE IMAGE OF TROPICAL CYCLONE FILIPO										
In March 2024, low wind shear (a sudden change in wind direction) in the Mozambique Channel allowed Tropical Cyclone Filipo to strengthen off the coast of southeast Africa. Filipo weakened by March 12, but it continued to deliver strong winds and heavy rain in the Inhambane and Gaza provinces. According to <i>ReliefWeb</i>, more than half a million people live in areas considered to be at risk of flooding from storm surge. Risks include the potential damage to crops and infrastructure. [Adapted from https://www.enn.com/articles/74258-tropical-cyclone-filipo]	 [Source: https://www.thesouthafrican.com/news/sa-weather-service-warning]										
	STATISTICS FOR TROPICAL CYCLONE FILIPO <table border="1" data-bbox="740 1115 1461 1317"> <thead> <tr> <th colspan="2">Filipo: March 10 – 12, 2024</th> </tr> </thead> <tbody> <tr> <td>Wind speed:</td> <td>Maximum: 121 km/h</td> </tr> <tr> <td>Wind speed on land:</td> <td>Maximum: 63 km/h</td> </tr> <tr> <td>Diameter:</td> <td>667 km</td> </tr> <tr> <td>Air pressure:</td> <td>Below 980 mb</td> </tr> </tbody> </table> [Source: https://www.worlddata.info/africa/south-africa/cyclones.php]	Filipo: March 10 – 12, 2024		Wind speed:	Maximum: 121 km/h	Wind speed on land:	Maximum: 63 km/h	Diameter:	667 km	Air pressure:	Below 980 mb
Filipo: March 10 – 12, 2024											
Wind speed:	Maximum: 121 km/h										
Wind speed on land:	Maximum: 63 km/h										
Diameter:	667 km										
Air pressure:	Below 980 mb										

- 1.4.1 Identify the area **A** at the centre of the cyclone on the satellite image. (1 x 1) (1)
- 1.4.2 Give ONE reason why the area identified in QUESTION 1.4.1 has clear skies. (1 x 2) (2)
- 1.4.3 Explain the decrease in wind speed (over land) as indicated in the statistics data for Tropical Cyclone Filipo. (1 x 2) (2)
- 1.4.4 Quote from the extract to indicate the impact of a storm surge, as one of the hazards of Tropical Cyclone Filipo. (1 x 2) (2)
- 1.4.5 In a paragraph of approximately EIGHT lines, discuss strategies on how the impact of the storm surge on the natural environment of Mozambique can be reduced. (4 x 2) (8)

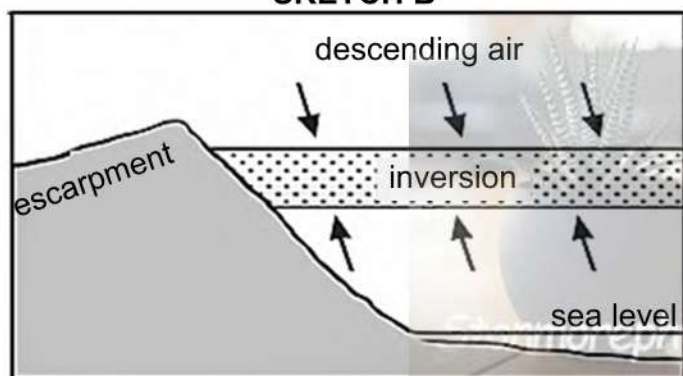
- 1.5 Refer to the summer and winter diagrams below, showing the seasonal position of the ITCZ over Africa and answer the questions that follow.

SKETCH A

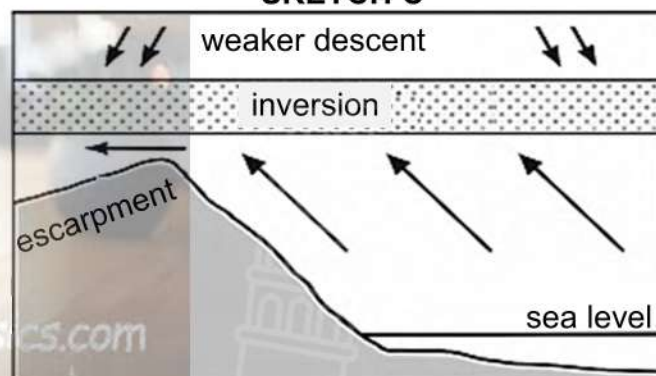


[Source: https://www.researchgate.net/figure/Extreme-positions-of-ITCZ-over-Africa-in-January-and-July-respectively-after-various_fig9_216333102]

SKETCH B



SKETCH C



[Source: online.etseden.co.za]

Refer to sketch A.

- 1.5.1 Describe the air rotation in the high-pressure systems in the Southern Hemisphere. (1 x 1) (1)
- 1.5.2 Describe the change of position of the ITCZ during winter and summer. (2 x 1) (2)

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

1.5.3 Which sketch (**B** or **C**) illustrates the summer conditions shown in sketch **A**? (1 x 2) (2)

1.5.4 Explain why the Kalahari high-pressure system weakens during summer. (1 x 2) (2)

1.5.5 Using information from sketch **B**, explain why rain is unlikely to occur in the interior of South Africa. (2 x 2) (4)

1.5.6 Describe TWO negative impacts on agriculture caused by the position of the inversion layer, as depicted in sketch **B**. (2 x 2) (4)

[60]

QUESTION 2: GEOMORPHOLOGY

2.1 Complete the statements in COLUMN A with the options in COLUMN B. Write down ONLY **Y** or **Z** next to the question numbers (2.1.1 to 2.1.8) in the ANSWER BOOK, e.g. 2.1.9 Y.

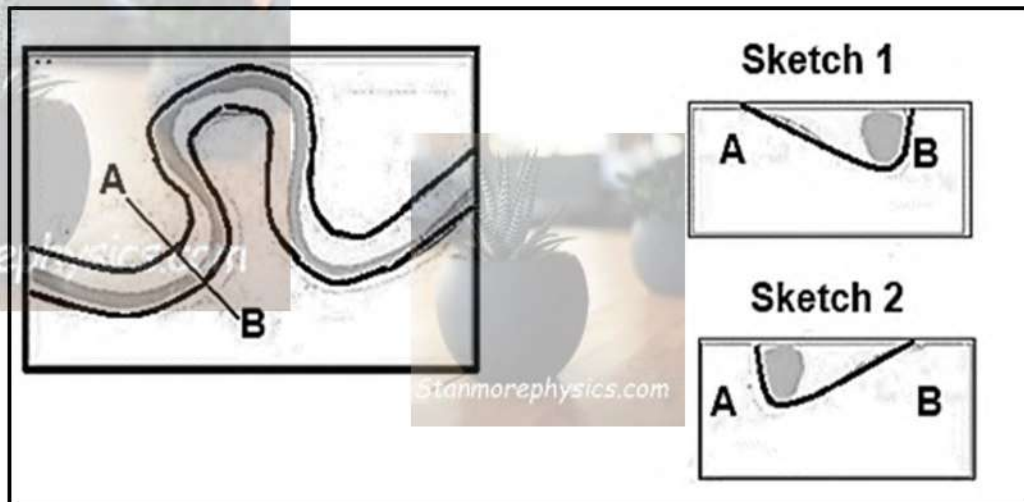
COLUMN A		COLUMN B	
2.1.1	A ... is the area drained by a river system.	Y	catchment area
		Z	drainage basin
2.1.2	Water from different river systems does not flow into the same main stream, as they are separated by a/an ...	Y	watershed
		Z	interfluve
2.1.3	The discharge of a river ... downstream of the confluence of two streams in a river system.	Y	increases
		Z	decreases
2.1.4	An ... river develops in an area with high rainfall and flows through dry, arid regions.	Y	episodic
		Z	exotic
2.1.5	A permanent river maintains its flow during dry periods because it receives ... throughout the year.	Y	groundwater
		Z	rainfall
2.1.6	Streams flowing into a central low-lying area develops a ... drainage pattern.	Y	centripetal
		Z	radial
2.1.7	A ... drainage pattern develops in areas with similarly resistant rocks, often where faulting has occurred.	Y	trellis
		Z	rectangular
2.1.8	A/An ... drainage pattern is found in areas where a river maintains its pattern after folding or faulting has taken place.	Y	superimposed
		Z	antecedent

(8 x 1) (8)

- 2.2 Read the following statements and choose the correct word(s) in brackets which will make each statement TRUE. Write down only the word(s) next to the question numbers (2.2.1 to 2.2.7) in the ANSWER BOOK, e.g. 2.2.8 gentle.

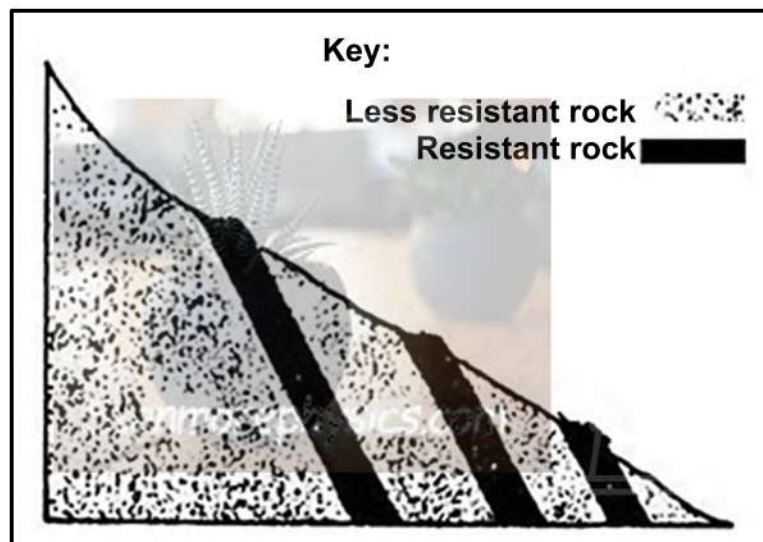
2.2.1 A levee forms on the floodplain of a river due to ongoing (rejuvenation/deposition).

2.2.2 (Sketch 1/Sketch 2) represents a cross-section through the meander along line A – B below.



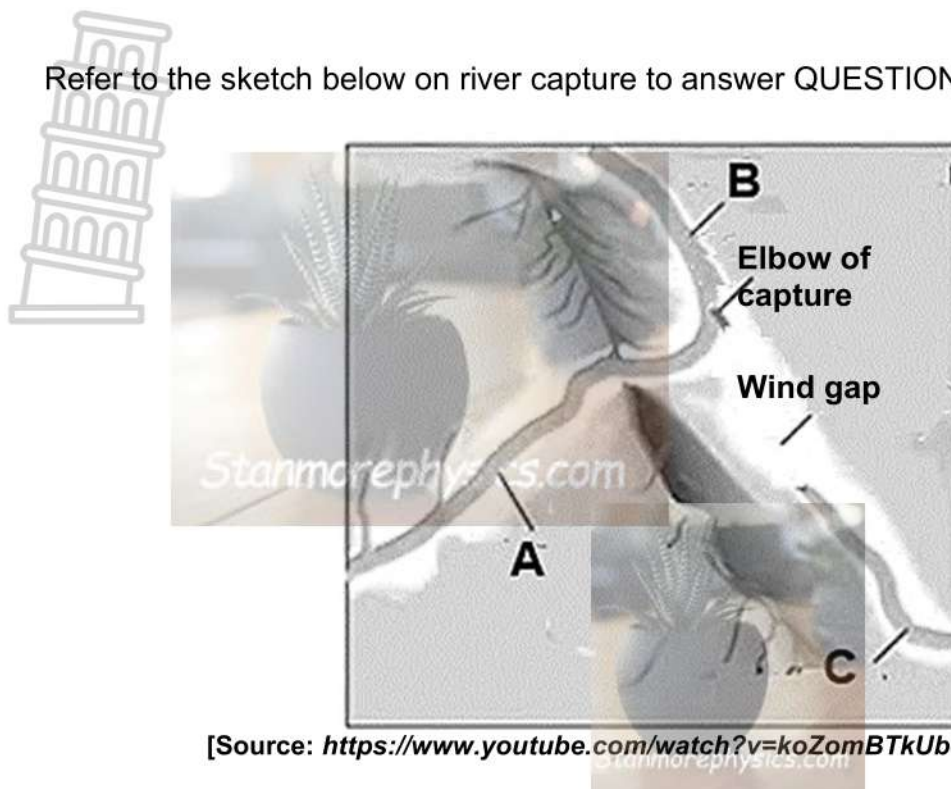
[Source: <https://shorturl.at/snMmg>]

2.2.3 The sketch below represents the underlying rock structure of (waterfalls/rapids).



[Source: <https://shorturl.at/JIUyx>]

Refer to the sketch below on river capture to answer QUESTIONS 2.2.4 to 2.2.7.

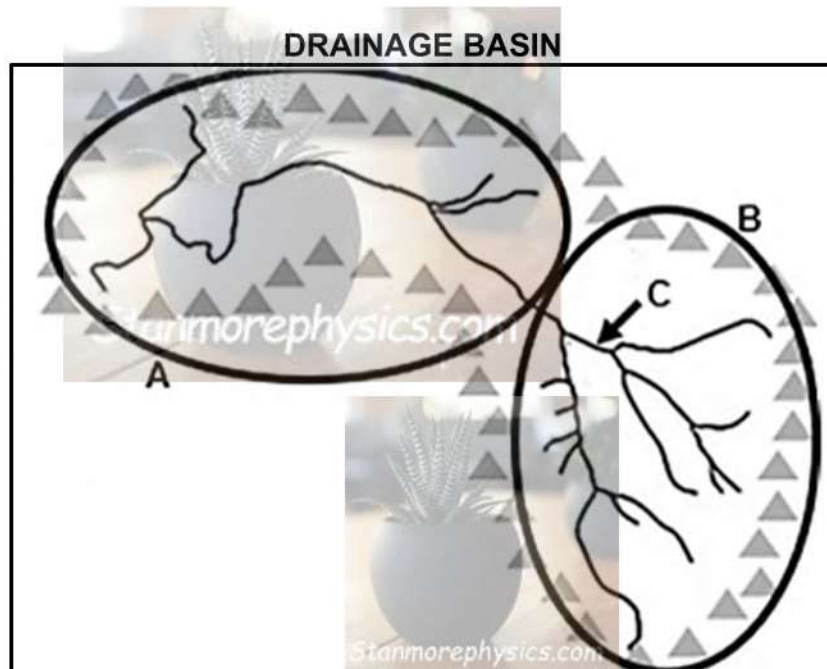


[Source: <https://www.youtube.com/watch?v=koZomBTkUbc>]

- 2.2.4 The sketch represents a landscape (before/after) river capture took place.
- 2.2.5 River **A** is the (captor/captured) stream.
- 2.2.6 Due to its steep gradient, river **A** has (less/more) erosive power than river **B**.
- 2.2.7 Vegetation on the banks of river **C** may die over time due to a (lack of water/flooding).

(7 x 1) (7)

2.3 Refer to the sketch below and answer the questions that follow.



[Adapted from <https://opentextbc.ca/geology/chapter/13-2-drainage-basins/>]

2.3.1 Choose the correct word in brackets.

The drainage density in sub-basin **A** is (lower/higher) than that in sub-basin **B**. (1 x 1) (1)

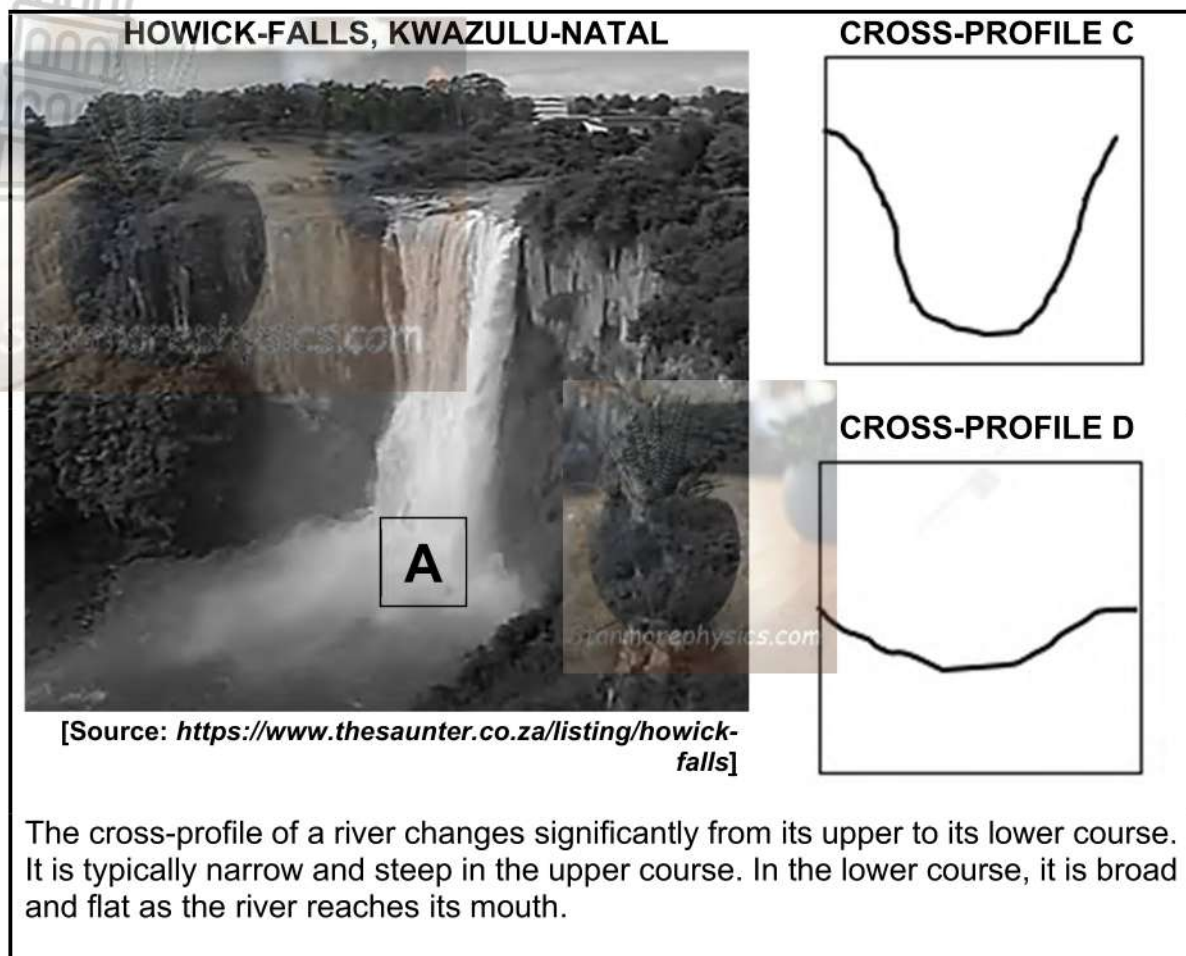
2.3.2 Provide ONE piece of evidence from the sketch to support your answer to QUESTION 2.3.1. (1 x 2) (2)

2.3.3 Explain TWO physical factors that influence the drainage density in sub-basin **B**. (2 x 2) (4)

2.3.4 Determine the stream order of the river at point **C**. (1 x 2) (2)

2.3.5 Explain why the stream order at point **C** will decrease during an extended drought in the area. (3 x 2) (6)

2.4 Refer to the infographic below and answer the questions that follow.



[Adapted from <https://tinyurl.com/2dmbrhvy>]

- 2.4.1 What is a *cross profile*? (1 x 2) (2)
- 2.4.2 Which profile (**C** or **D**) represents the cross-profile of the river course where a waterfall develops? (1 x 1) (1)
- 2.4.3 Identify the fluvial feature that develops at **A**. (1 x 1) (1)
- 2.4.4 What is the main fluvial process that results in the development of the fluvial feature identified in QUESTION 2.4.3? (1 x 1) (1)
- 2.4.5 Draw a labelled, side-view diagram of the waterfall as a fluvial landform. Indicate the rock layers and fluvial features on the profile. (4 x 1) (4)
- 2.4.6 Explain how the fluvial feature identified in QUESTION 2.4.3 develops. (3 x 2) (6)

- 2.5 Refer to the extract below, taken from a newspaper article, and answer the questions that follow.

TSHWANE'S HENNOPS RIVER TURNS GREEN: ALGAE BLOOMS SIGNAL A GROWING ENVIRONMENTAL CRISIS

The Hennops River's recent green hue has raised alarms, with the Department of Water and Sanitation strongly advising against 'water contact sports' in any of Gauteng's rivers.

A section of the Hennops River running through the City of Tshwane Metropolitan Municipality has turned green due to algae blooms in the wake of recent floods in the area.

Speaking to *Daily Maverick*, Tarryn Johnston, CEO of the Hennops Revival and Deep-Water Movement said: "There is a lot of agricultural activity upstream, causing pesticides and fertilisers to leach into the groundwater and to be washed into the river."

According to Dr Ferrial Adam, executive manager at WaterCAN, it is most likely the sewage in the water that has created high levels of nutrients, and those nutrients then give rise to eutrophication."

[Adapted from <https://www.dailymaverick.co.za/article/2025-01-03-hennops-river-algal-bloom-threat-sparks-warnings/>]

- 2.5.1 State ONE reason, according to the article, for the algae blooms in the Hennops River. (1 x 1) (1)
- 2.5.2 Explain how flooding increased the algae blooms in the river. (1 x 2) (2)
- 2.5.3 Quote evidence from the article that the environmental crisis mentioned in the article may restrict the recreational activities of residents across Gauteng. (1 x 2) (2)
- 2.5.4 State TWO possible negative impacts of the crisis mentioned in the article, on the natural environment. (2 x 1) (2)
- 2.5.5 In a paragraph of approximately EIGHT lines, suggest sustainable measures that the City of Tshwane Metropolitan Municipality can implement to reduce algae in the Hennops River. (4 x 2) (8)
- [60]**

TOTAL SECTION A: 120

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

GENERAL INFORMATION ON ROBERTSON



Coordinates: 33°48'S; 19°53'E

Robertson, only a two-hour drive from Cape Town, is the ideal wine-tasting getaway! Drive through the N1 tunnel and you enter a different world.

Robertson receives about 150 mm to 255 mm of rain per year and because it receives most of its rainfall during winter, it has a Mediterranean climate. June in Cape Town receives, on average, 108 mm of rain across 13 days. The average midday temperatures for Robertson range from a warm winter 16,7 °C in July to a hot summer 29 °C in February. In contrast to the warm winter days that allow you to thaw out, the region is the coldest in July when the mercury drops to an average of 4,2 °C at night.

The following English terms and their Afrikaans translations are shown on the topographical map.

ENGLISH

Diggings
Caravan park
Sewage works
Golf course
Wetland

AFRIKAANS

Uitgrawings
Karavaanpark
Rioolwerke
Golfbaan
Vlei

3.1 MAP SKILLS AND CALCULATIONS

Refer to both the topographical and orthophoto map.

3.1.1 The ocean located west of Robertson is the ... Ocean.

- A Indian
- B Atlantic
- C Pacific
- D Antarctic

(1 x 1) (1)

3.1.2 The grid reference number of the map to the north west of the 3319 DD Robertson is ...

- A 3319 DA.
- B 3319 DB.
- C 3319 DC.
- D 1933 DA.

(1 x 1) (1)



Refer to the orthophoto map.

3.1.3 Calculate the area (in metres) of the vineyard (8) in block B2 on the orthophoto. Use the following information: Length = 1,5 cm.

Formula: **Area = Length x Breadth**

(4 x 1) (4)

Refer to the topographical map.

3.1.4 Calculate the gradient from trigonometrical station 167 (block A5) to spot height 422 (block A3). Use the following information:

The distance between trigonometrical station 167 (block A5) to spot height 422 (block A3) is 3 350 m.

Formula: **Average Gradient = $\frac{\text{Vertical Interval (VI)}}{\text{Horizontal Equivalent (HE)}}$** (3 x 1) (3)

3.1.5 Explain your answer to QUESTION 3.1.4.

(1 x 1) (1)

3.2 MAP INTERPRETATION

Refer to the information sheet to answer the following questions.

3.2.1 Name the type of climate experienced in Robertson.

(1 x 1) (1)

3.2.2 Give TWO characteristics of this climatic region.

(2 x 1) (2)

Refer to the orthophoto map.

3.2.3 (a) Identify the feature shown as **7** on the orthophoto in block **D3**.

- A Lake
- B Dam
- C Marsh
- D Floodplain

(1 x 1) (1)

(b) Describe ONE characteristic of the feature identified in QUESTION 3.2.3(a).

(1 x 1) (1)

(c) Explain how the feature identified in QUESTION 3.2.3(a) negatively affects farming in the area.

(1 x 2) (2)

Refer to the Breë River in block **C2** on the topographical map.

3.2.4 (a) Identify the fluvial feature of the Breë River at **F** in block **C2**.

(1 x 1) (1)

(b) The fluvial feature identified in QUESTION 3.2.4(a) is commonly found in the ... course of a river where the river has a ... gradient.

- (i) lower
- (ii) upper
- (iii) gentle
- (iv) steep

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

(1 x 1) (1)

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

3.2.5 (a) Identify the main drainage pattern of the rivers in block **A1**.

(1 x 1) (1)

(b) Provide evidence from the topographical map to support your answer to QUESTION 3.2.5(a).

(1 x 2) (2)

3.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

3.3.1 Refer to the Sand River **H** in block **A1** on the topographical map.

- (a) The Sand River is an example of (raster/vector) data. (1 x 1) (1)
- (b) Give evidence from the topographical map to motivate your answer to QUESTION 3.3.1(a). (1 x 1) (1)

- 3.3.2 (a) Define *attribute data*. (1 x 2) (2)
- (b) Identity TWO attributes of the Sand River visible in block **A1**. (2 x 1) (2)

Refer to block **B1** on the topographical map.

- 3.3.3 In which way does the indication of spot height **386** in block **B1** represent both spatial and attribute data? (2 x 1) (2)

[30]

TOTAL SECTION B: 30

TOTAL: 150



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2026

MARKING GUIDELINES

GEOGRAPHY (PAPER 1) (10781)

22 pages

MARKING PRINCIPLES FOR GEOGRAPHY – SEPT 2026

The following marking principles have been developed to standardise the marking process.

MARKING

- ALL questions MUST be marked, irrespective of whether they are 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 that 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: X
 - Use MORE than one cross across 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.

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 the word/term, is 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.

TOTALLING AND TRANSFERRING OF MARKS

- Each sub-question must be totalled.
 - Questions in Section A have five Sub-sections, therefore five sub-totals per question is 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 space to write in the moderated marks on the different levels.
- Total sub-totals and transfer totals to the top left-hand margin next to question number.
- Transfer the final total to the cover of the answer book.

MODERATION

Moderation is done in the same way as the initial marking. All guidelines for marking must be adhered to.

If a mark for a sub-question is changed after moderation, the moderator must strike through the marker's mark and write down the new mark.

The total for the question must be recalculated, and similarly struck off and the new total written down.

EXAMPLE FOR MARKING**QUESTION 1****22**

1.1 1.1.1 A (South Atlantic High) ✓

1.1.2 B (Kalahari High) ✓

1.1.3 B (South Indian) X

1.2 1.2.1 Melting snow ✓

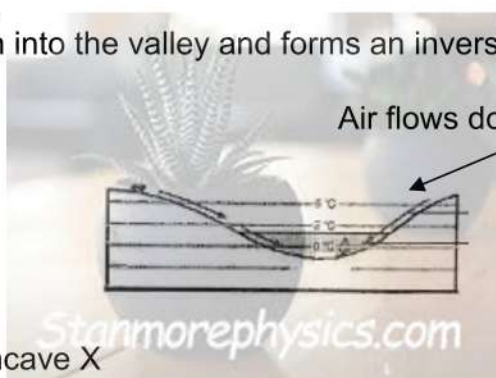
1.2.2 Mouth X

1.2.3 Third order ✓

1.3 1.3.1 Katabatic X

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. ✓✓

1.4 1.4.1 Shape of front concave X
Steep gradient of front ✓

1.4.2 Warm air undercuts the cold air X

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. ✓✓

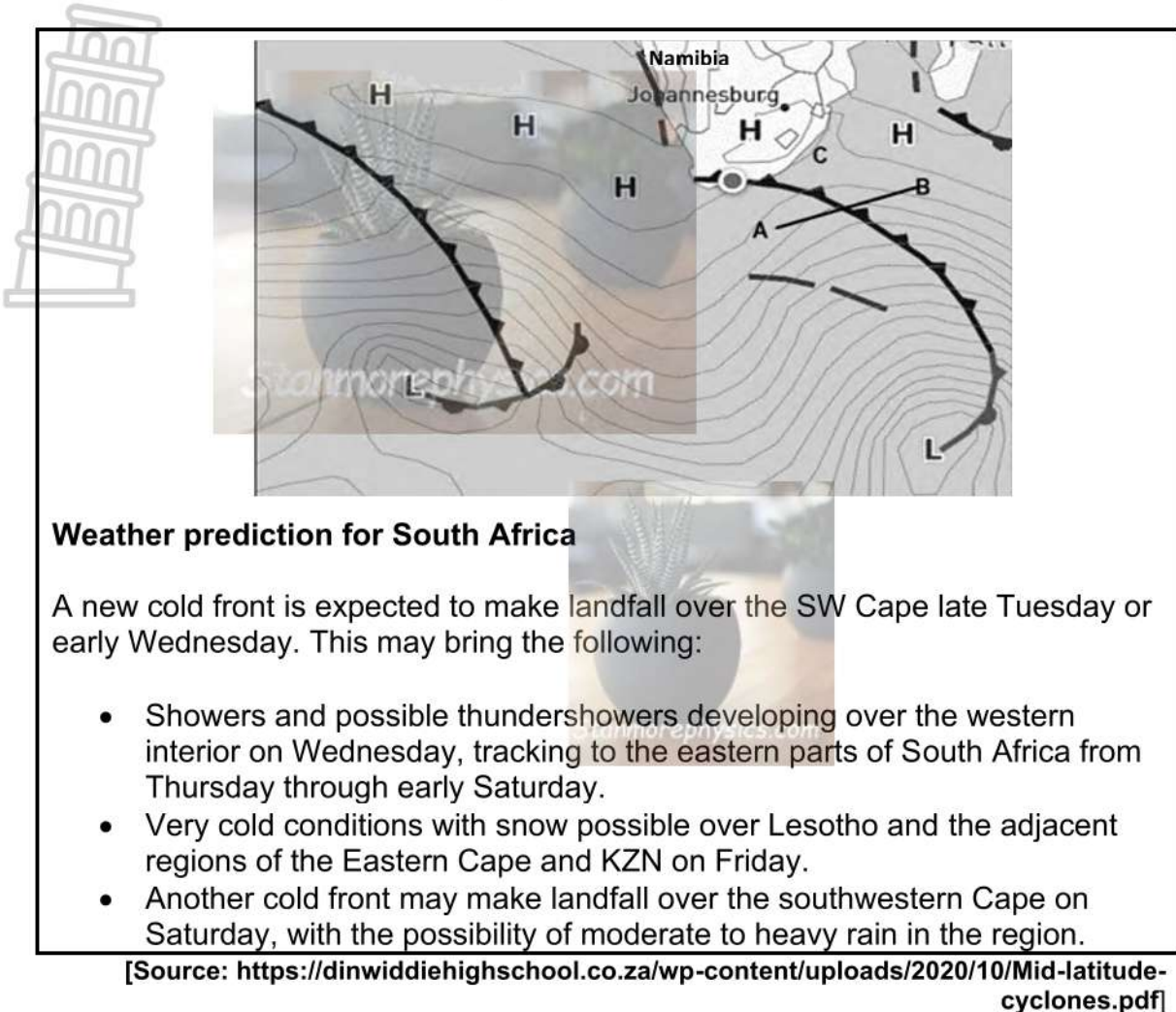
- 1.5 1.5.1 (a) A river that only flows all year-round X
 (b) The river channel is wide X
 (c) Regularity of rainfall and the soil type over which the streams flow. ✓✓ ✓✓
- 1.5.2 ✓ X Gauteng and the Eastern Cape
- 1.5.3 The cost of food production will increase as it is costly to buy purified water. Farmers will have to buy more chemicals to purify the 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 hydroelectricity.



SECTION A: PHYSICAL GEOGRAPHY**QUESTION 1: CLIMATE AND WEATHER**

- 1.1 1.1.1 B (1)/Warmer temperatures in urban areas compared to their rural surroundings
- 1.1.2 C (1)/Heat retention by concrete
- 1.1.3 C (1)/at night
- 1.1.4 C (1)/Glass buildings
- 1.1.5 A (1)/(i) and (iii)/increased and higher
- 1.1.6 C (1)/(ii) and (iii)/increases and warm
- 1.1.7 D (1)/absorbing heat energy.
- 1.1.8 B (1)/Inclusion of large open green spaces. (8 x 1) (8)
- 1.2 1.2.1 anabatic (1)
- 1.2.2 warming (1)
- 1.2.3 temperature inversion (1)
- 1.2.4 night (1)
- 1.2.5 sketch B (1)
- 1.2.6 increase slightly (1)
- 1.2.7 terrestrial radiation (1) (7 x 1) (7)

1.3 Refer to the sketch and weather prediction.



1.3.1 The season depicted in the sketch above is (summer/winter).

winter (1)

(1 x 1) (1)

1.3.2 Provide evidence from the sketch to support your answer to QUESTION 1.3.1.

Kalahari HP dominant over interior (1)

Mid-latitude cyclones move over the Southern Cape region (1)

South Atlantic and South Indian High-pressure systems moved north (1)

South Atlantic and South Indian High-pressure systems move closer to South Africa (1)

(Ridging) Extending of the South Atlantic High-pressure behind the cold front (1)

(1 x 1) (1)

[Any ONE]

1.3.3 Predict the change in wind direction as the cold front passes over C.

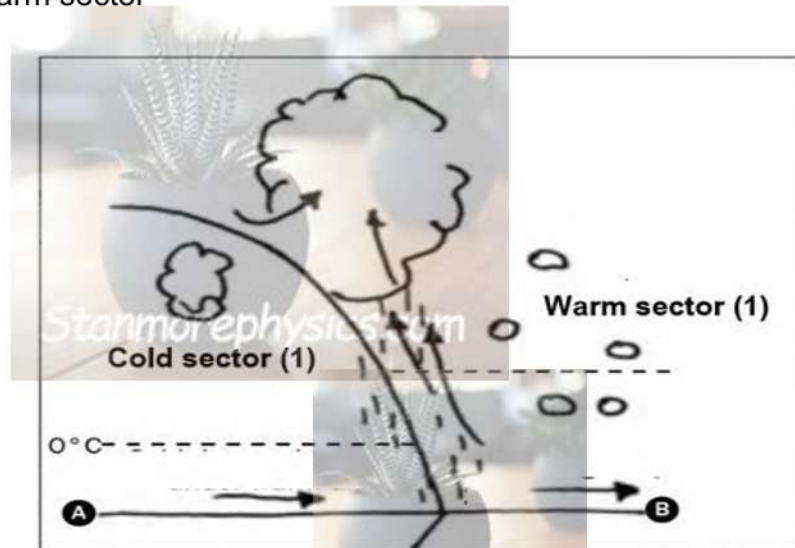
Wind direction will change (from north-west) to south-west. (1)

(1 x 1) (1)

- 1.3.4 In your ANSWER BOOK, draw a labelled cross section from **A** to **B** as illustrated on the sketch. Clearly indicate the following:



- (a) Cold sector
(b) Warm sector



Allocation of marks:

1 mark for correct indication of the cold sector

1 mark for the correct indication of the warm sector

(2 x 1) (2)

- 1.3.5 According to the passage, possible thunderstorms are expected to develop. Explain why the thunderstorms would likely form at the cold front.

Cold air undercuts warm air at the cold front. (2)

Warm air is forced to rise rapidly. (2)

Large-scale condensation occurs due to rapid uplift/steep pressure gradient. (2)

Formation of cumulonimbus clouds because of rapid uplift of warm air. (2)

[ANY TWO]

(2 x 2) (4)

- 1.3.6 Discuss THREE negative environmental impacts that could occur because of the weather conditions mentioned in the extract.

Heavy rainfall/Snow results in flooding/flash floods. (2)

Heavy rainfall causes soil erosion. (2)

Heavy rainfall harms/kills wildlife. (2)

Heavy rainfall can damage vegetation. (2)

Heavy rainfall disrupts ecosystems. (2)

Heavy rainfall destroys habitats. (2)

Heavy rainfall destroys biodiversity. (2)

Heavy rainfall can cause mudslides (2)

Lightning can cause veldfires. (2)

Hail can damage vegetation and wildlife. (2)

Cold conditions/Snow can damage vegetation. (2)

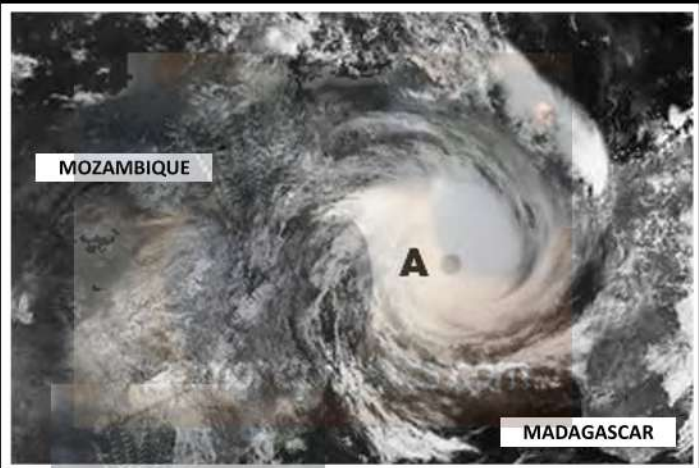
Cold conditions/Snow harms/kills wildlife. (2)

[ANY THREE]

(3 x 2) (6)

[15]

1.4 Refer to the infographic on Tropical Cyclone Filipo.

TROPICAL CYCLONE FILIPO STRENGTHENS In March 2024, low wind shear (sudden change in wind direction) in the Mozambique Channel allowed Tropical Cyclone Filipo to strengthen off the coast of southeast Africa. Filipo weakened by March 12, but it continued to deliver strong winds and heavy rain in the Inhambane and Gaza provinces. According to ReliefWeb, more than half a million people live in areas considered to be at a risk of flooding from storm surge. Risks included the potential damage to crops and infrastructure. [Adapted from https://www.enn.com/articles/74258-tropical-cyclone-filipo]	TROPICAL CYCLONE FILIPO SATELLITE IMAGE  [Source: https://www.thesouthafrican.com/news/sa-weather-service-warning] TROPICAL CYCLONE FILIPO STATISTICS <table border="1"> <thead> <tr> <th colspan="2">Filipo: March 10 – 12, 2024</th> </tr> </thead> <tbody> <tr> <td>Wind speed:</td> <td>Maximum: 121 km/h</td> </tr> <tr> <td>Wind speed on land:</td> <td>Maximum: 63 km/h</td> </tr> <tr> <td>Diameter:</td> <td>667 km</td> </tr> <tr> <td>Air pressure:</td> <td>Below 980 mb</td> </tr> </tbody> </table> [Source: https://www.worlddata.info/africa/south-africa/cyclones.php]	Filipo: March 10 – 12, 2024		Wind speed:	Maximum: 121 km/h	Wind speed on land:	Maximum: 63 km/h	Diameter:	667 km	Air pressure:	Below 980 mb
Filipo: March 10 – 12, 2024											
Wind speed:	Maximum: 121 km/h										
Wind speed on land:	Maximum: 63 km/h										
Diameter:	667 km										
Air pressure:	Below 980 mb										

1.4.1 Identify the area **A** in the centre of the cyclone on the satellite image.

The eye. (1)

(1 x 1) (1)

1.4.2 Give ONE reason why the area identified in QUESTION 1.4.1 has clear skies.

Air descends in the eye and results in an increase in temperature (adiabatic heating) and less condensation. (2)

(1 x 2) (2)

1.4.3 Explain the decrease in wind speed (over land) as indicated in the statistics data for Tropical Cyclone Filipo.

Increased friction as the cyclone moved over land. (2)
Lack of warm, moist air over land weakens the cyclone. (2)
[ANY ONE]

(1 x 2) (2)

- 1.4.4 Quote from the extract to indicate the impact of a storm surge as one of the hazards of Tropical Cyclone Filipo.



“... at risk of flooding...” (2)

“...potential damage to crops and infrastructure.” (2)

(1 x 2) (2)

(ANY ONE)

- 1.4.5 In a paragraph of approximately EIGHT lines, discuss strategies on how the impact of the storm surge on the natural environment of Mozambique can be reduced.

Restore Mangroves: Natural buffers that reduce wave energy and erosion. (2)

Plant natural vegetation as it protects biodiversity and reduces erosion. (2)

Prevent people driving on the coast to protect vegetation on dunes (2)

Protect sand dunes and wetlands in order to help absorb storm surge energy. (2)

Prevent sand mining and encroachment that will make the natural environment more prone to erosion. (2)

Implement coastal Zoning/Enforce no-build zones and buffer areas to prevent habitat destruction. (2)

Early Warning Systems: Improve forecasting and community training to enable proactive protection of natural areas. (2)

Community Education: Training local communities on how to protect ecosystems during cyclones. (2)

Policy and Funding: Use integrated coastal plans and global support to protect the natural environment and fund large-scale conservation efforts. (2)

Building of storm surge barriers to protect the natural environment. (2)

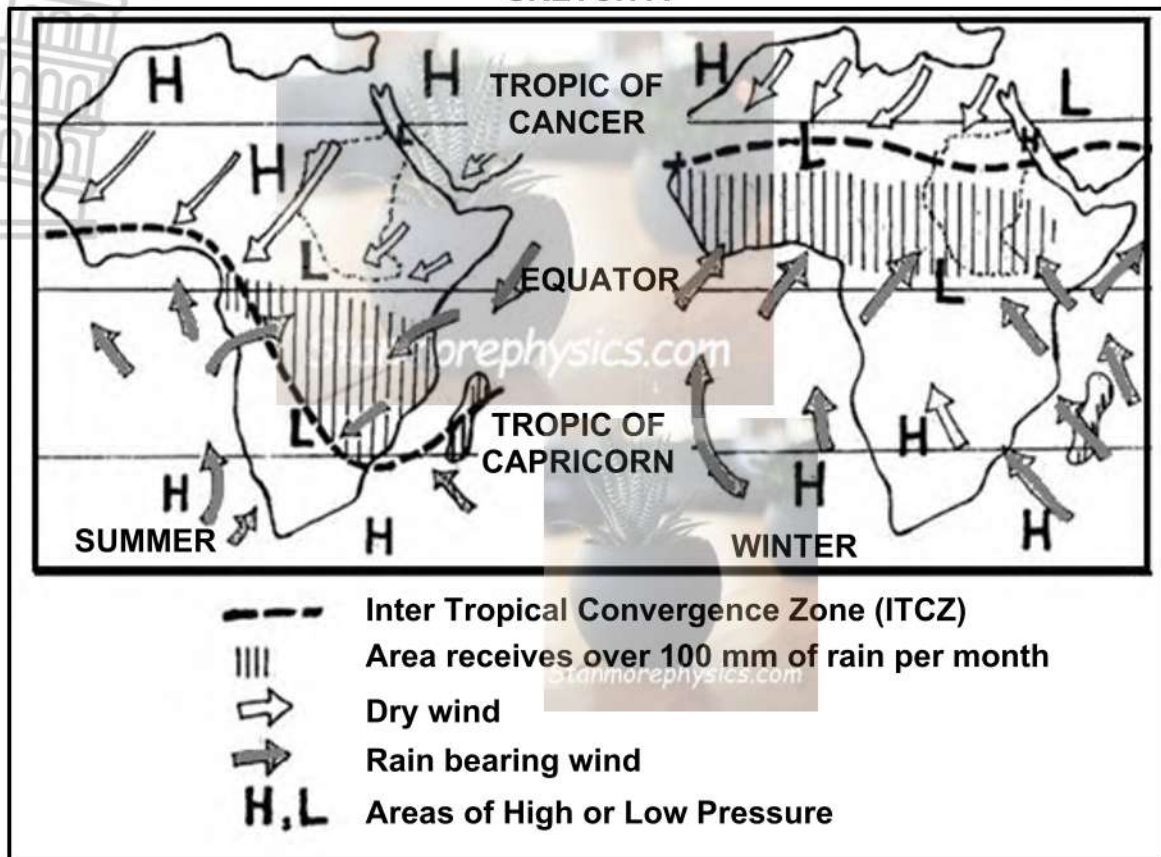
[Any FOUR]

(4 x 2) (8)

[15]

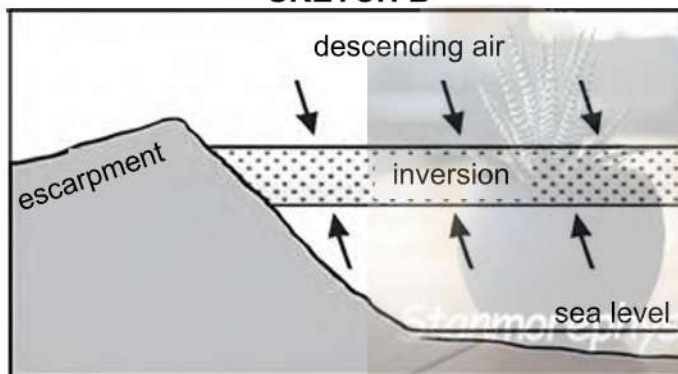
- 1.5 Refer to the summer and winter diagrams showing the seasonal position of the ITCZ over Africa.

SKETCH A

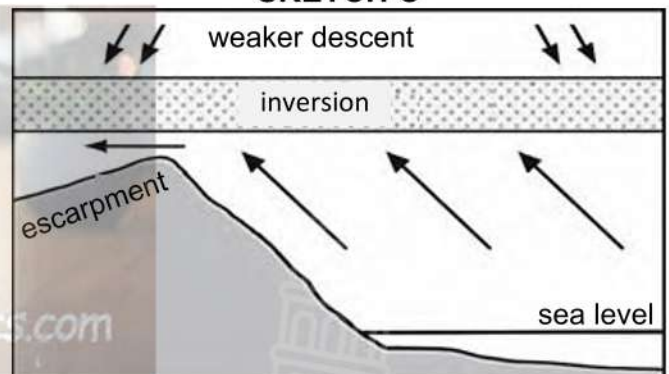


[Source: https://www.researchgate.net/figure/Extreme-positions-of-ITCZ-over-Africa-in-January-and-July-respectively-after-various_fig9_216333102]

SKETCH B



SKETCH C



[Source: online.etseden.co.za]

Refer to sketch A.

- 1.5.1 Describe the air rotation in the high-pressure systems in the Southern Hemisphere.

Anticlockwise. (1)

(1 x 1) (1)

- 1.5.2 Describe the change of position of the ITCZ during winter and summer.

During winter the ITCZ is located further north. (1)

During summer the ITCZ is located further south. (1)2

(2 x 1) (2)

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



- 1.5.3 Does sketch **B** or **C** illustrate the summer conditions shown in sketch **A**?

C (2)

(1 x 2) (2)

- 1.5.4 Explain why the Kalahari High-Pressure system weakens during summer.

Higher surface temperature causes rising air over the interior. (2)

The high pressure is replaced with warm air (thermal low). (2)

Warm moist air from the South Indian High Pressure moves into the interior. (2)

[ANY ONE]

(1 x 2) (2)

- 1.5.5 Using information from sketch **B**, explain why rain is unlikely to occur in the interior of South Africa.

Air is subsiding over the interior. (2)

Temperature inversion is formed over the interior. (2)

Moisture is blocked (by KHP) from entering the interior. (2)

[ANY TWO]

(2 x 2) (4)

- 1.5.6 Describe TWO negative impacts on agriculture caused by the position of the inversion layer, as depicted in sketch **B**

Reduced precipitation. (2)

Decreased vegetation growth. (2)

Reduced pasturage for livestock. (2)

Increased risk of drought. (2)

Increased risk of veld fires. (2)

Increased soil erosion. (2)

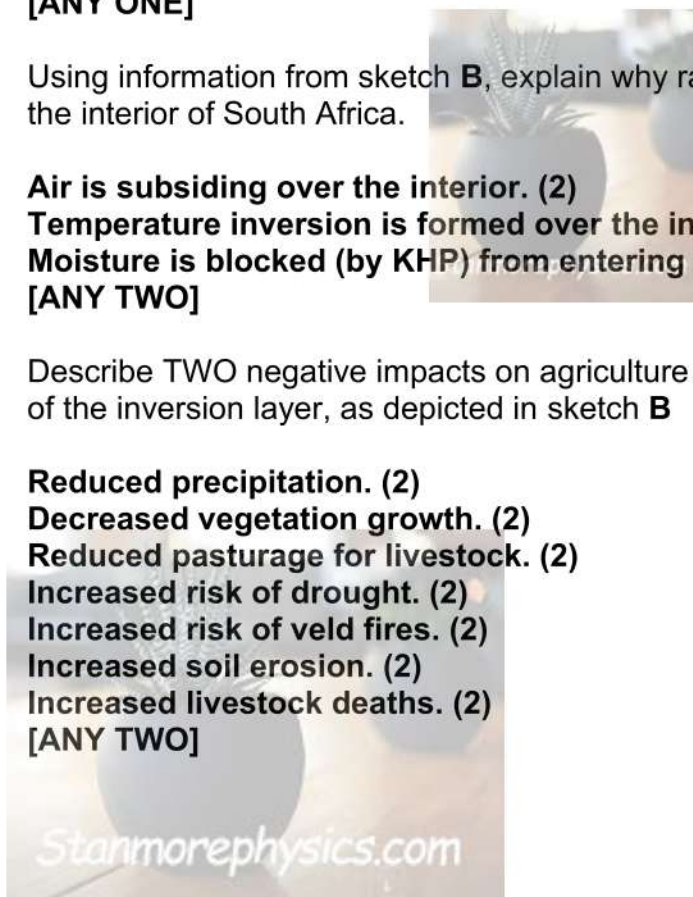
Increased livestock deaths. (2)

[ANY TWO]

(2 x 2) (4)

[15]

[60]



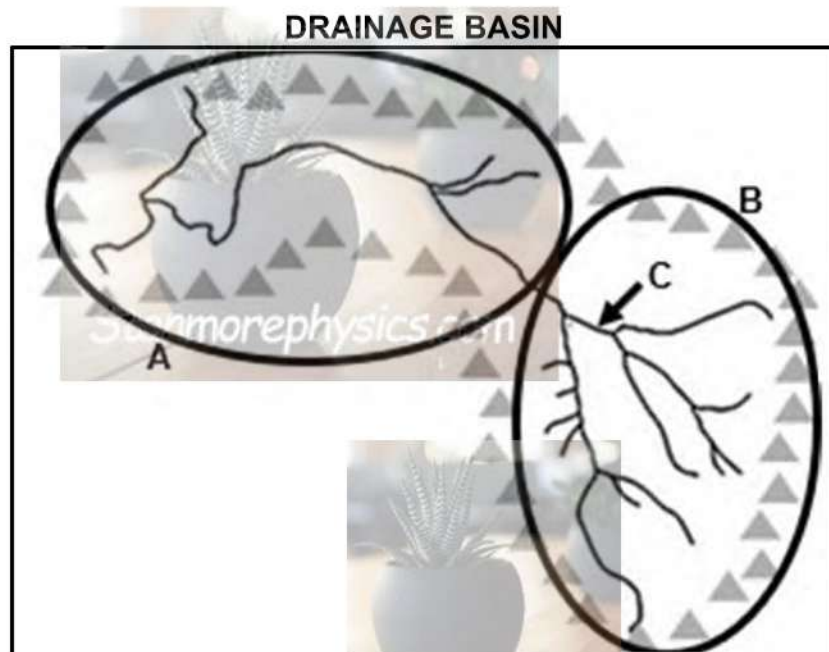
QUESTION 2: GEOMORPHOLOGY2.1 2.1.1 **Z (1)/drainage basin**2.1.2 **Y (1)/watershed**2.1.3 **Y (1)/increases**2.1.4 **Z (1)/exotic**2.1.5 **Y (1)/groundwater**2.1.6 **Y (1)/centripetal**2.1.7 **Z (1)/rectangular**2.1.8 **Z (1)/antecedent**

(8 x 1) (8)

2.2 2.2.1 **deposition (1)**2.2.2 **Sketch 1 (1)**2.2.3 **rapids (1)**2.2.4 **after (1).**2.2.5 **captor (1)**2.2.6 **more (1)**2.2.7 **lack of water (1)**

(7 x 1) (7)

- 2.3 Refer to the sketch below and answer questions that follow.



[Source: <https://www.youtube.com/watch?v=koZomBTkUbc>]

- 2.3.1 The drainage density in sub-basin **A** is (lower/higher) than that in sub-basin **B**.

Lower (1)

(1 x 1) (1)

- 2.3.2 Provide ONE piece of evidence from the sketch to support your answer to QUESTION 2.3.1.

The total length of streams in (sub-basin/area) A is less than in (sub-basin/area) B. (2)

There are less streams/tributaries in (sub-basin/area) A than in (sub-basin/area) B. (2)

OR

The total length of streams in (sub-basin/area) B is more than in (sub-basin area) A. (2)

There are more streams in (sub-basin/area) B than in (sub-basin/area) A. (2)

(Any ONE)

(1 x 2) (2)

- 2.3.3 Explain TWO physical factors that influence the drainage density in sub-basin **B**.



Low evaporation rates (at B) will increase the amount of runoff/water in the streams/low evaporation rates decreases the amount of infiltration (2)

High soil moisture/saturated soil will allow less water to infiltrate/will cause more runoff (2)

Fewer/less vegetation cover will lead to more runoff/less infiltration (accept examples) (2)

The water will flow faster on the steep gradient causing more runoff/less infiltration (2)

Low soil porosity allows for less infiltration/more runoff (2)

Impermeable rocks will allow less infiltration/more runoff (2)

[ANY TWO]

(2 x 2) (4)

[Answers must reflect factors that cause a high drainage density]

- 2.3.4 Determine the stream order of the river at point **C**.

second (2)

(1 x 2) (2)

- 2.3.5 Explain why the stream order at point **C** will decrease during an extended drought in the area.

There is less rainfall during a drought which will decrease runoff (2)

The discharge will decrease, and less water will enter the river (2)

Many smaller tributaries and streams dry up because there is not enough rainfall. (2)

Many smaller tributaries and streams dry up because there is not enough groundwater to sustain their flow. (2)

The loss of these smaller streams reduces the number of contributing channels/tributaries. (2)

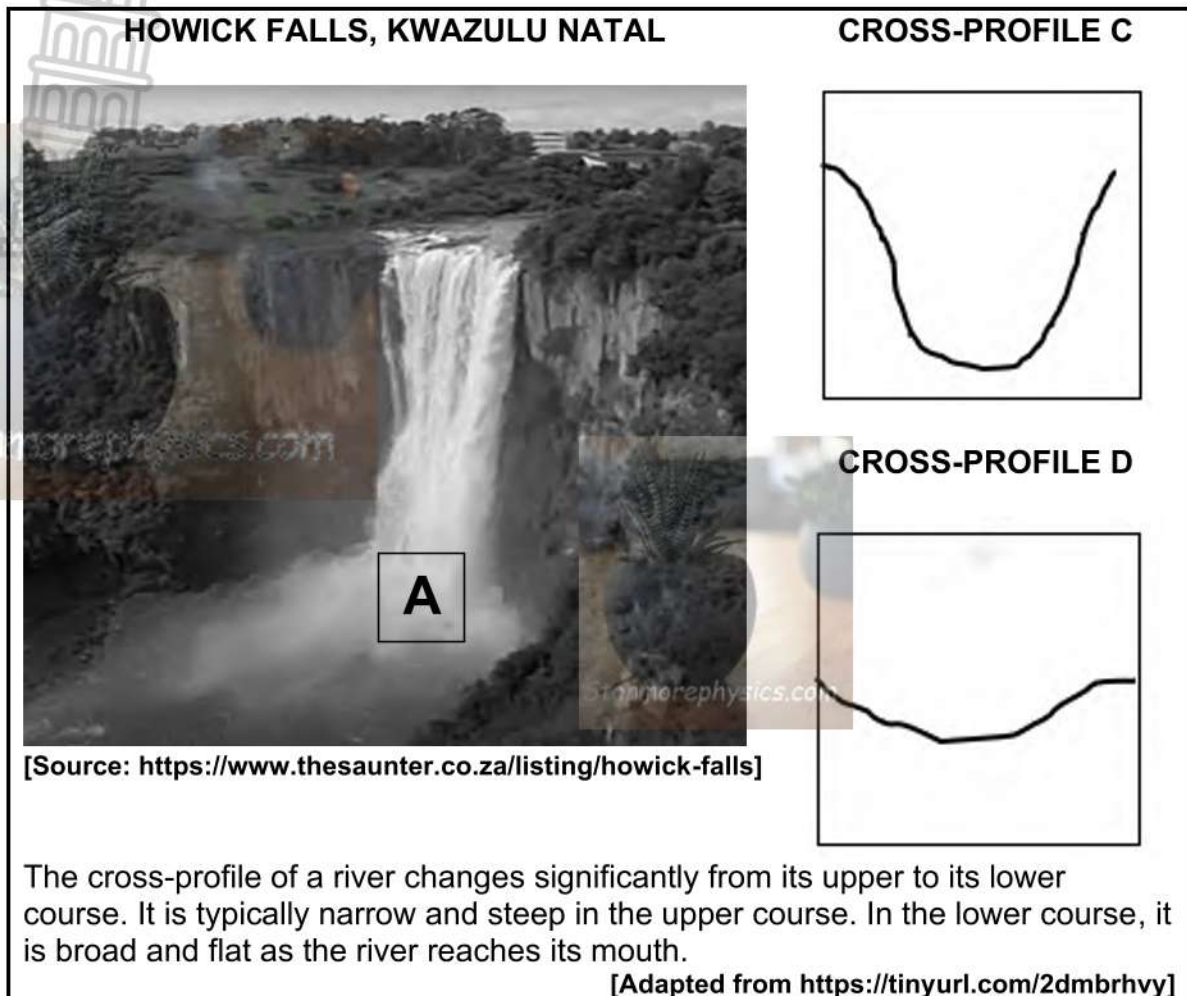
Some of the lower order/first order streams will dry up which will directly impact the stream order. (2)

[ANY THREE]

(3 x 2) (6)

[15]

2.4 Refer to the infographic below when answering the following questions.



2.4.1 What is a *cross-profile*?

The shape of a river valley from one bank to the opposite bank/from side to side across the river valley (2)

(1 x 2) (2)

[CONCEPT]

2.4.2 Will **C** or **D** represent the cross profile of the river course where a waterfall develops?

C (1)

(1 x 1) (1)

2.4.3 Identify the fluvial feature that develops at **A**.

Plunge pool (1)

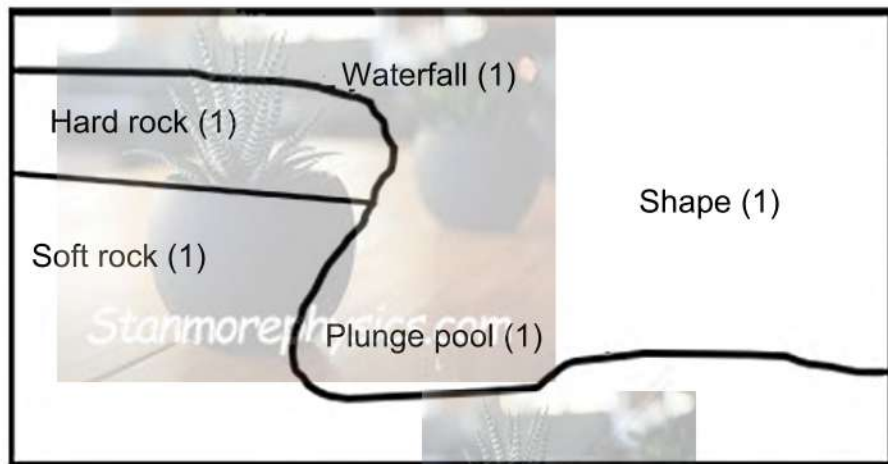
(1 x 1) (1)

2.4.4 What is the main fluvial process that results in the development of the fluvial feature identified in QUESTION 2.4.3?

(Vertical) erosion (1)

(1 x 1) (1)

- 2.4.5 Draw a labelled side-view of the waterfall as a fluvial landform. Indicate the rock layers and fluvial features on the profile.



Marks must be awarded for:

Hard rock 1 mark

Soft rock – 1 mark

Plunge pool – 1 mark

Waterfall – 1 mark

[ANY THREE]

Correct shape with the indication of the plunge pool – 1 mark (4 x 1) (4)

- 2.4.6 Explain how the fluvial feature identified in QUESTION 2.4.3 develops.

Develops when the falling water hits the ground with great force, eroding the rock (through hydraulic action and abrasion). (2)

This repeated pounding action enlarges the hollow at the base. (2)

The swirling water, (carrying stones and sediment), scours and deepens the hollow. (2)

Any soluble rock may also be dissolved. (2)

The continuous downward force of falling water erodes the riverbed vertically. (2)

Over time, these processes create a deep, rounded depression known as a plunge pool. (2)

[ANY THREE]

(3 x 2) (6)

[15]

- 2.5 Refer to the extract below, taken from a newspaper article, and answer the following questions.

TSHWANE'S HENNOPS RIVER TURNS GREEN: ALGAE BLOOMS SIGNAL A GROWING ENVIRONMENTAL CRISIS

The Hennops River's recent green hue has raised alarms, with the Department of Water and Sanitation strongly advising against 'water contact sports' in any of Gauteng's rivers.

A section of the Hennops River running through the City of Tshwane Metropolitan Municipality has turned green due to algae blooms in the wake of recent floods in the area.

Speaking to Daily Maverick, Tarryn Johnston, CEO of the Hennops Revival and Deep-Water Movement said: "There is a lot of agricultural activity upstream causing pesticides and fertilisers to leach into the groundwater and to be washed into the river."

According to Dr Ferrial Adam, executive manager at WaterCAN, it is most likely the sewage in the water that has created high levels of nutrients, and that nutrients then give rise to eutrophication."

[Adapted from <https://www.dailymaverick.co.za/article/2025-01-03-hennops-river-algal-bloom-threat-sparks-warnings/>]

- 2.5.1 State ONE reason, according to the article, for the algae blooms in the Hennops River.

Agricultural activities upstream (1)

Pesticides and fertilisers leaching into groundwater/washing into the river (1)

The sewage in the water has created high levels of nutrients(1)

[ANY ONE]

(1 x 1) (1)

- 2.5.2 Explain how flooding increased the algae blooms in the river.

Flooding causes more fertilisers and pesticides to be washed into the river (2)

Leads to more leaching of pesticides and fertilisers into the ground water (entering the river through base flow) (2)

Flood water fills up/flows into the poorly maintained/compromised sewage systems causing it to overflow into the river (2)

More sewage from informal settlements/untreated sewage washes into the river (2)

[ANY ONE]

(1 x 2) (2)

- 2.5.3 Quote evidence from the article that the environmental crisis mentioned in the article may restrict the recreational activities of the residents across Gauteng.

"(Department of Water and Sanitation strongly) advising against water contact sports" (2)

(1 x 2) (2)

- 2.5.4 State TWO possible negative impacts of this crisis, mentioned in the article, on the natural environment.

Ecosystems are destroyed/altered (1)

Habitats of animals are destroyed (1)

Fish/animals/plants die/are poisoned (1)

Invader species may kill natural plants (accept examples) (1)

Reduced oxygen levels (1)

PH of the water changes (1)

Strong odour from the sewage (1)

Poor visibility in the water (1)

Water quality decreases (1)

Lower aesthetic appeal (1)

The colour of the water changes (1)

Water temperature changes (1)

[ANY TWO]

(2 x 1) (2)

- 2.5.5 In a paragraph of approximately EIGHT lines, suggest sustainable measures that the the City of Tshwane Metropolitan Municipality can implement to reduce algae in the Hennops River.

Create a buffer zone to restrict development close to the river banks (2)

Regular monitoring and upkeep of sewage infrastructure will reduce the nutrient levels in the rivers (2)

Replace old sewage infrastructure to prevent sewage leakages into the river (2)

Legislation to prevent factories/businesses/agriculture from dumping waste materials into the sewage systems (2)

Fines to factories/businesses that are caught dumping waste into river systems (2)

Employ more teams to respond to infrastructure challenges that will result in the pollution of the river (2)

More timeous response to leaky sewage pipes/burst pipes (2)

Allocate funds for upkeep/response/new installations of sewage systems (2)

Introduce bio-control measures to reduce algae/algal growth (2)

[ANY FOUR]

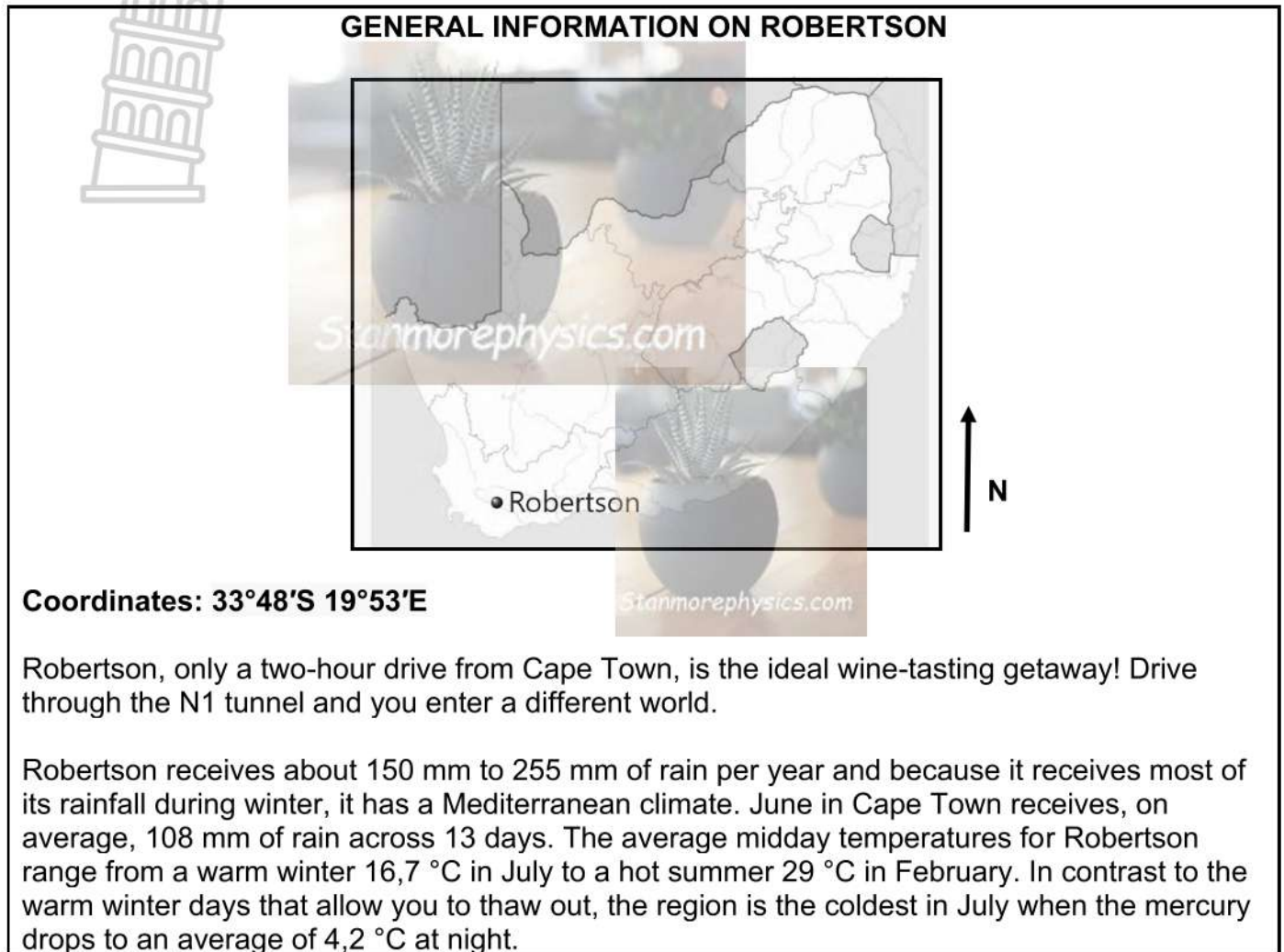
(4 x 2) (8)

[15]

[60]

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES



GENERAL INFORMATION ON ROBERTSON

Coordinates: 33°48'S 19°53'E

Robertson, only a two-hour drive from Cape Town, is the ideal wine-tasting getaway! Drive through the N1 tunnel and you enter a different world.

Robertson receives about 150 mm to 255 mm of rain per year and because it receives most of its rainfall during winter, it has a Mediterranean climate. June in Cape Town receives, on average, 108 mm of rain across 13 days. The average midday temperatures for Robertson range from a warm winter 16,7 °C in July to a hot summer 29 °C in February. In contrast to the warm winter days that allow you to thaw out, the region is the coldest in July when the mercury drops to an average of 4,2 °C at night.

The following English terms and their Afrikaans translations are shown on the topographical map.

ENGLISH

Diggings
Caravan park
Sewage works
Golf course
Wetland

AFRIKAANS

Uitgrawings
Karavaanpark
Rioolwerke
Gholfbaan
Vlei

3.1 MAP SKILLS AND CALCULATIONS

Refer to both the topographical and orthophoto map.

3.1.1 **B (1)/Atlantic** (1 x 1) (1)

3.1.2 **A (1)/3319 DA** (1 x 1) (1)

- 3.1.3 Calculate the area of the vineyard (8) in block **B2** on the orthophoto. Use the following information: Length = 1,5 cm.

Formula: $A = L \times B$

Formula: $A = L \times B$

$$A = (1,5 \text{ cm} \times 100 \text{ m}) \times (1,0 \text{ (1) cm} \times 100 \text{ m}) \text{ [Range: } 0,9 - 1,1\text{)]}$$

$$A = 150 \text{ (1) m} \times 100 \text{ (1) m}$$

$$A = 15\,000 \text{ m}^2 \text{ (1)}$$

$$[90 - 110]$$

$$[13\,500 \text{ m}^2 - 16\,500 \text{ m}^2]$$

$$(4 \times 1) \quad (4)$$

Refer to the topographical map.

- 3.1.4 Calculate the gradient from Trigonometrical Station **167** to Spot Height **422**.

The distance between Trigonometrical Station **167** (block A5) to Spot Height **422** (block A3) is **3 350 m**. (3 x 1)

Formula: Average gradient =

$$\frac{\text{Vertical Interval (VI)}}{\text{Horizontal Equivalent (HE)}}$$

$$\text{Gradient} = \frac{\text{VI}}{\text{HE}}$$

$$\text{VI} = 493,5 - 422 = 71,5 \text{ (1) m}$$

$$\text{HE} = 3\,350 \text{ m}$$

$$\text{Gradient} = \frac{71,5}{3\,350} \text{ (1) for correct substitution}$$

$$= 1 : 46,85 \text{ (1)}$$

$$(3 \times 1) \quad (3)$$

- 3.1.5 Explain your answer to QUESTION 3.1.4.

For every 46,85 metres (unit) you travel horizontally, it will rise (change) by 1 metre (unit) (vertically) (1)

$$(1 \times 1) \quad (1) \quad [10]$$

3.2 MAP INTERPRETATION

Refer to the information sheet to answer the following questions.

- 3.2.1 Name the type of climate experienced in Robertson.

Mediterranean (1)

$$(1 \times 1) \quad (1)$$

- 3.2.2 Give TWO characteristics of this climatic region.

150 mm to 255 mm of rain per year (1)

because it receives most of its rainfall during winter (1)

Hot summer and warm winter (1)

$$(2 \times 1) \quad (2)$$

Refer to the orthophoto map.



- 3.2.3 (a) Identify the feature shown as **7** in block **D3** on the orthophoto.
- C Marsh** (1 x 1) (1)
- (b) Describe ONE characteristic of a feature identified in QUESTION 3.2.3(a).
- Low lying area where water accumulates. (1)**
Water logged area along the edges of the river. (1)
Contains extensive reed growth. (1)
[ANY ONE] (1 x 1) (1)
- (c) Explain how the feature identified in QUESTION 3.2.3 (a) negatively affects farming in the area.
- Too wet for farmers to work, affecting crops (2)**
Water logging results in diseases killing plants (2)
Implements will get stuck in the mud (2)
[ANY ONE] (1 x 2) (2)

Refer to the Breë River in Block **C2** on the topographical map.

- 3.2.4 (a) Identify the fluvial feature of the Breë Rivier at **F** in block **C2**.
- Meander (1)** (1 x 1) (1)
- (b) The fluvial feature identified in QUESTION 3.2.4 (a) is commonly found in the ... course of a river where the river has a ... gradient.
- B (i) and (iii)** (1 x 1) (1)

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

- 3.2.5 (a) Identify the drainage pattern of the rivers in block **A1**.
- Dendritic (1)** (1 x 1) (1)
- (b) Provide evidence from the topographical map for your answer in QUESTION 3.2.5(a).
- Looks like the branches of a tree (2)**
Tributaries join at acute angles to the main river (2) (1 x 2) (2)
(Any ONE)

[12]

3.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

3.3.1 Refer to the Sand River **H** in block **A1** on the topographic map.

- (a) The Sand River is an example of (raster/vector) data.

Vector (1)

(1 x 1) (1)

- (b) Give evidence from the topographical map to motivate your answer to QUESTION 3.3.1(a)

Vector data is given in the form of points, lines and polygons (1)

The Sand river is in the form of a line (1)

(1 x 1) (1)

3.3.2 (a) Define attribute data.

Descriptive information about a geographical feature (2)
[Concept]

(1 x 2) (2)

- (b) Identify TWO attributes of the Sand River visible in block **A1**.

Non-perennial river (shown by dotted blue line) (1)

The name of the river (Sand River) (1)

Flowing south (1)

Second order stream (1)

(2 x 1) (2)

Refer to block **B1** on the topographical map.

3.3.3 In which way does the indication of spot height **386** in block **B1** represent both spatial and attribute data?

Spatial data describes the absolute and relative location of spot height 386 (1)

Attribute data represents the height indicated by the spot height (1)

(2 x 1) (2)

[8]

TOTAL SECTION B: 30

TOTAL: 150