GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2025

10781

GEOGRAPHY

(PAPER 1)

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GEOGRAPHY: Paper 1

TIME: 3 hours

MARKS: 150

10781E

MAP AT THE END

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 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.

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SPECIFIC INSTRUCTIONS AND INFORMATION FOR SECTION B

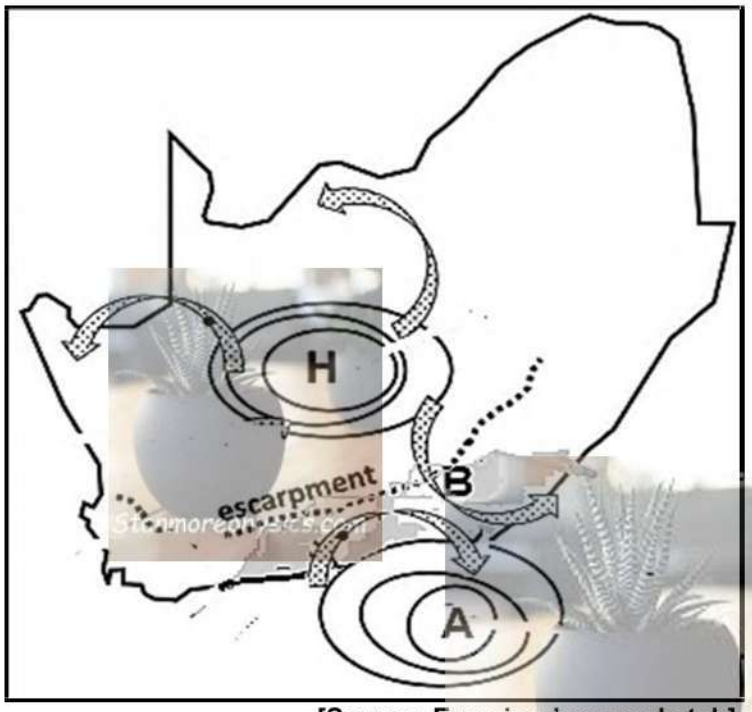
14. A 1 : 50 000 topographical map of 2531BC MALELANE and a 1 : 10 000 orthophoto map 2531 BC 8 MALELANE are provided.
15. The area demarcated in RED on the topographical map represents the area covered by the orthophoto map.
16. Marks will be allocated for steps in calculations.
17. You must hand in the topographical and the orthophoto maps to the invigilator at the end of this examination session.

SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY

QUESTION 1: CLIMATE AND WEATHER

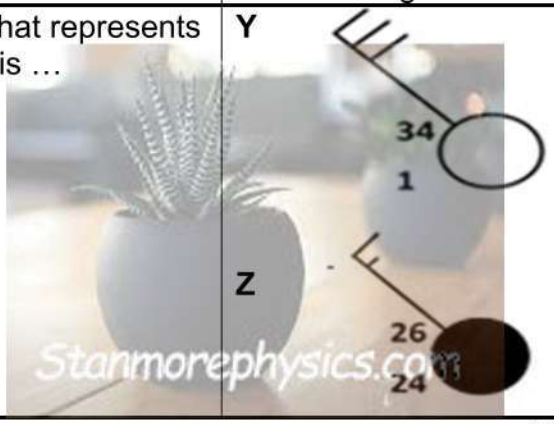
1.1 Complete the statements in COLUMN A with the options in COLUMN B. Write down only **Y** or **Z** next to the question numbers (1.1.1 to 1.1.8) in the ANSWER BOOK, e.g. 1.1.9 Y.

Refer to the extract of a synoptic weather map of South Africa below and answer the following questions.



[Source: Examiner's own sketch]

	COLUMN A		COLUMN B
1.1.1	The sketch shows … conditions.	**Y** **Z**	summer winter
1.1.2	The pressure cell at **A** is a … low pressure.	**Y** **Z**	coastal thermal
1.1.3	The arrow at **B** on the sketch represents … winds.	**Y** **Z**	berg south-easterly
1.1.4	The winds in QUESTION 1.1.3 result in the shaded area at **B** being … than normal.	**Y** **Z**	colder warmer
1.1.5	Berg wind conditions are usually associated with a … pressure gradient.	**Y** **Z**	gentle steep
1.1.6	The weather conditions at QUESTION 1.1.5 may result in the rapid … of veld fires.	**Y** **Z**	spread development

1.1.7	Berg wind conditions are enhanced by adiabatic … of air.	**Y** cooling **Z** heating
1.1.8	The weather station model that represents the weather conditions at **B** is …	**Y**  **Z**

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(8 x 1) (8)

1.2 Choose the correct word from those given in brackets. Write only the correct word next to the question numbers (1.2.1 to 1.2.7) in the ANSWER BOOK, e.g. 1.2.8 cold.

1.2.1 The central part of a city is (colder/warmer) than the surrounding rural areas.

1.2.2 The (transpiration/condensation) process in vegetation lowers the temperature in rural areas.

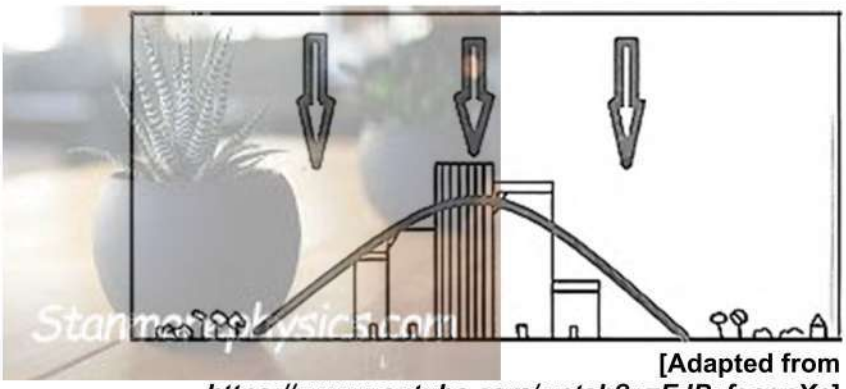
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1.2.3 The wind speed is (lower/higher) in urban areas than in rural areas.

1.2.4 Precipitation occurs (more/less) frequently in rural areas than in urban areas.

1.2.5 The temperature in a city can be lowered by painting concrete surfaces in (dark/light) colours.

Refer to the sketch below to answer QUESTIONS 1.2.6 and 1.2.7.



[Adapted from *https://www.youtube.com/watch?v=EJPxfqaopXo*]

1.2.6 The sketch represents a pollution dome during the (day/night).

1.2.7 The height of the pollution dome indicates the presence of (more/less) convectional currents over the urban area.

(7 x 1) (7)



1.3 Refer to the infographic on mid-latitude cyclones below and answer the following questions.

CAPE TOWN IS HIT BY MORE MID-LATITUDE CYCLONES

By GERALD IMRAY

Updated: 5:48 PM GMT+2, July 11, 2024

CAPE TOWN, South Africa (AP) — The South African city of Cape Town and surrounding areas were hit by more storms on Thursday that ripped roofs off houses and caused widespread flooding, forcing at least 4 500 people out of their homes and damaging at least 15 000 structures, authorities said. The devastating weather began a week ago. Multiple cold fronts have battered the region on the south-western tip of Africa since late last week, bringing record rainfall and gale-force winds in some parts. City authorities said the bad weather was expected to continue until the weekend and possibly into next week.

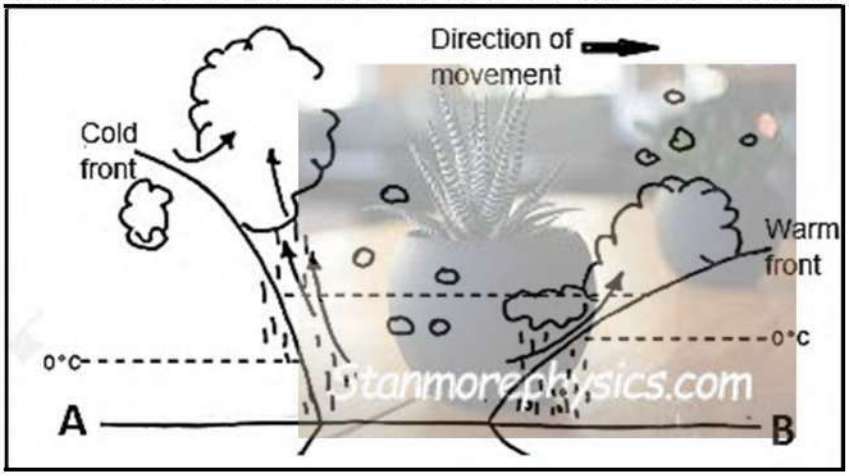
[Source: *https://apnews.com/article/south-africa-storms-floods-cape-town-3be223aee333da1fe441730f76cedfb9*]

SATELLITE IMAGE



[Source: *https://weatherblog.co.za/cold-front/majestic-cold-front-about-to-make-landfall/*]

CROSS-SECTION THROUGH THE MATURE STAGE OF A MID-LATITUDE CYCLONE



[Source: *http://www.physicalgeography.net/fundamentals/7s.html*]

1.3.1 Provide the reason, from the article, for the record rainfall experienced around Cape Town. (1 x 1) (1)

1.3.2 Identify the cloud type indicated at **Y** on the satellite image. (1 x 1) (1)

1.3.3 Account for the development of the cloud type at **Y** (answer to QUESTION 1.3.2). (1 x 2) (2)

1.3.4 State the general direction of movement of a mid-latitude cyclone. (1 x 1) (1)

1.3.5 Give a reason for the answer to QUESTION 1.3.4. (1 x 2) (2)

1.3.6 Explain how the general direction of movement of the mid-latitude cyclone (answer to QUESTION 1.3.4) resulted in the flooding referred to in the article. (2 x 2) (4)

1.3.7 Draw a labelled plan view of the cross-section from **A** to **B**. The following must be shown in the drawing:

- The position of the cold front
- The position of warm air
- The position of cold air (4 x 1) (4)



1.4 Refer to the information on Tropical Cyclone Dikeledi below and answer the following questions.

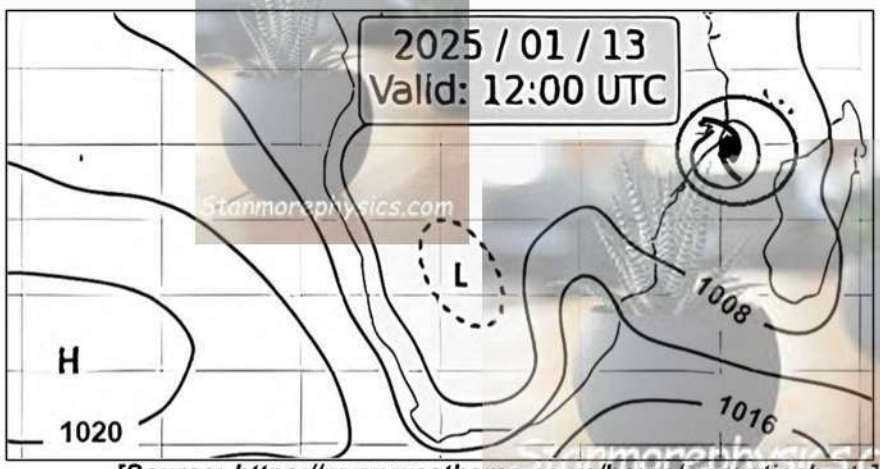
MOZAMBIQUE – TROPICAL CYCLONE DIKELEDI

13 JANUARY 2025

Mozambique is facing a new devastating weather system as Tropical Storm Dikeledi has reintensified into a tropical cyclone. It is currently moving across Nampula in Madagascar and will weaken over land. It is expected to re-enter the Mozambique Channel near Angoche by 14 January, potentially regaining strength to a cyclone or intense cyclone. The National Meteorology Institute (INAM) indicates that strong winds and heavy rainfall (up to 200 mm/24h) are expected to impact coastal districts, including Mossuril, Mogincual, Liupo and Angoche in the Nampula province

[Adapted from *https://reliefweb.int/report/mozambique/mozambique-cyclone-tropical-dikeledi-flash-update-1-13-january-2025-enpt*]

EXTRACT FROM A SYNOPTIC WEATHER MAP



[Source: *https://www.weathersa.co.za/home/synopticcharts*]

1.4.1 How many tropical cyclones have occurred before cyclone Dikeledi? (1 x 1) (1)

1.4.2 Provide a reason for the answer to QUESTION 1.4.1. (1 x 2) (2)

1.4.3 Refer to the map extract and determine the air pressure at the centre of the tropical cyclone. (1 x 2) (2)

1.4.4 Explain why Tropical Cyclone Dikeledi will weaken when moving over land. (1 x 2) (2)

1.4.5 In a paragraph of approximately EIGHT lines, discuss how strong winds and heavy rain will impact negatively on the natural environment, when Tropical Cyclone Dikeledi makes landfall. (4 x 2) (8)

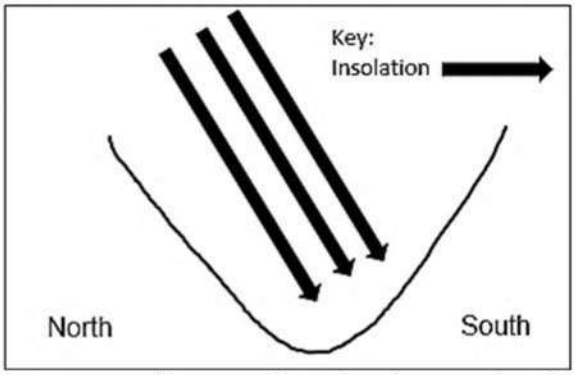
1.5 Refer to the infographic on valley climate in the Southern Hemisphere below when answering the following questions.

KATABATIC WIND

As air cools it becomes denser and therefore heavier. The cold air then flows down the side of the valley, resulting in a katabatic flow (or wind).

[Adapted from *https://skybrary.aero/articles/katabatic-wind*]

INSOLATION IN THE VALLEY



[Source: Examiner's own sketch]

PHOTOGRAPH OF A VALLEY



[Source: *https://www.flickr.com/photos/zakopaneinthesierras/31006055087*]

1.5.1 Define the term *slope aspect*. (1 x 2) (2)

1.5.2 Provide evidence from the "insolation in the valley" sketch that the valley is located in the Southern Hemisphere. (1 x 2) (2)

1.5.3 At which slope, **C** or **D**, will the shadow zone on the photograph develop? (1 x 1) (1)

1.5.4 Account for the difference in vegetation between slopes **C** and **D,** which is evident in the photograph. (2 x 2) (4)

1.5.5 Refer to the extract on katabatic winds in a valley. Explain how katabatic winds can lead to the development of a valley inversion. (3 x 2) (6)

[60]

QUESTION 2: GEOMORPHOLOGY

2.1 Refer to diagrams **A** and **B** below which show the flow patterns of rivers. Match the descriptions in QUESTIONS 2.1.1 to 2.1.7 with **A** or **B**. Write down only **A** or **B** next to the question numbers (2.1.1 to 2.1.7) in the ANSWER BOOK, e.g. 2.1.8 A.

DIAGRAM A - LAMINAR FLOW	DIAGRAM B - TURBULENT FLOW
	
[Source: *www.vecteezy.com/free-photos/winding-river*]	[Source: *www.vecteezy.com/free-photos/river-rapids*]

2.1.1 The flow pattern in which water flows in parallel layers occurs in diagram (**A**/**B**).

2.1.2 Diagram (**A**/**B**) represents a flow pattern that occurs in the upper course of a river.

2.1.3 Obstacles in the river channel have resulted in the flow pattern in diagram (**A**/**B**).

2.1.4 Diagram (**A**/**B**) shows the flow pattern that occurs over an even and gently sloping river channel.

2.1.5 In diagram (**A**/**B**), the flow pattern results in a higher rate of erosion.

2.1.6 The flow pattern that mostly occurs on an ungraded river profile is shown in diagram (**A**/**B**).

2.1.7 The formation of ox-bow lakes is most likely to occur in diagram (**A**/**B**).

(7 x 1) (7)

2.2 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 (2.2.1 to 2.2.8) in the ANSWER BOOK, e.g. 2.2.9 A.

2.2.1 River rejuvenation can be defined as the …

A widening of a river valley due to deposition.
B river having renewed energy and downward erosion.
C formation of a delta at the river mouth.
D complete drying up of a river.

2.2.2 River rejuvenation is likely caused by the …

A deposition of sediments.
B rising of sea levels.
C rising of land along the course of a river.
D creation of meanders.

2.2.3 A/An … is a feature commonly associated with river rejuvenation.

A floodplain
B incised meander
C delta
D levee



2.2.4 Rejuvenated rivers will have a … energy level resulting in increased …

(i) lower
(ii) higher
(iii) deposition.
(iv) erosion.

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

2.2.5 River capture is when a river on a … altitude intercepts the waters of another river through constant … erosion.

(i) higher
(ii) lower
(iii) headward
(iv) lateral

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

2.2.6 The feature formed at the location where the captured stream is diverted into the captor stream is known as the …

A wind gap.
B confluence of two tributaries.
C source of the river.
D elbow of capture.

2.2.7 River capture is caused by …

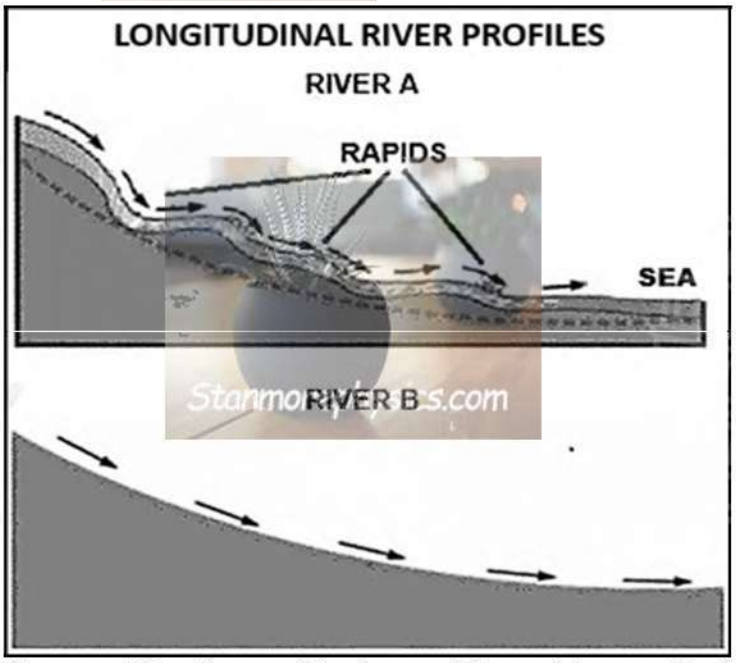
A tectonic uplift in the river valley.
B lateral erosion near the river source.
C headward erosion by a more powerful stream.
D sediment deposition in the lower course of a river.

2.2.8 A misfit stream can be described as a river …

A too small for the valley in which it flows.
B that occurs on a gentle landscape.
C intercepted by a more energetic river.
D where vertical erosion is dominant.

(8 x 1) (8)

2.3 Refer to the diagrams below, indicating the longitudinal profiles of rivers **A** and **B** and answer the questions that follow.



[Source: *https://www.slideshare.net/jlanser/river-profiles*]

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

2.3.2 Does river **A** have a graded or an ungraded profile? (1 x 1) (1)

2.3.3 Provide evidence from the diagram to support the answer to QUESTION 2.3.2. (1 x 2) (2)

2.3.4 In the longitudinal profile of river **A**, identify the:

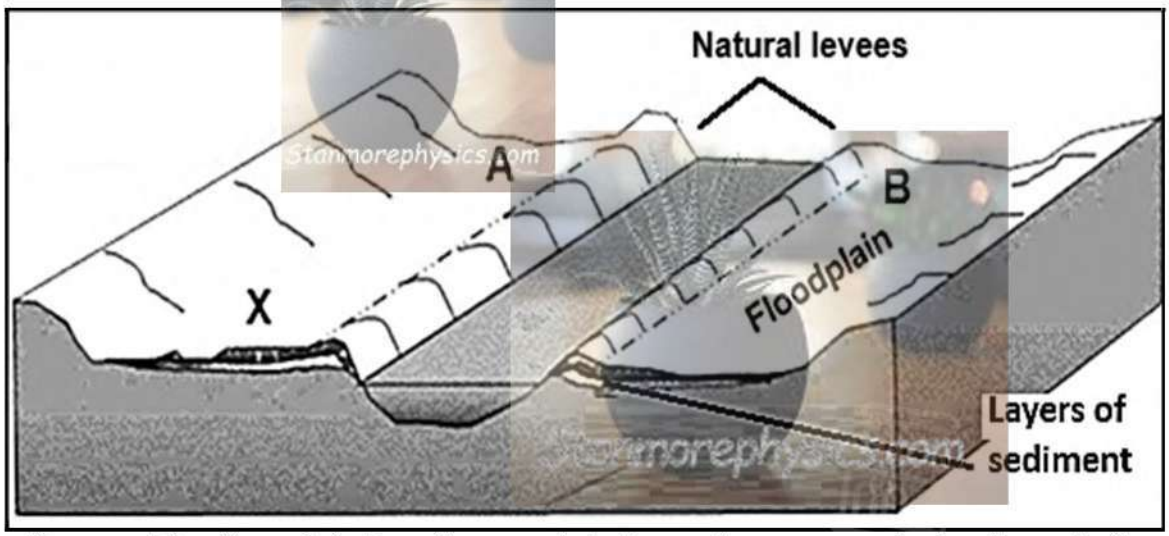
(a) Permanent base level of erosion (1 x 1) (1)

(b) Temporary base level of erosion (1 x 1) (1)

2.3.5 Describe the shape of the longitudinal profile of river **B**. (1 x 2) (2)

2.3.6 Explain how erosion and deposition contribute to the shape of the longitudinal profile of river **B**, as described in QUESTION 2.3.5. (3 x 2) (6)

2.4 Refer to the diagram on natural levees below to answer the questions that follow.



[Source: *https://www.tutor2u.net/geography/reference/gcse-geography-landforms-in-the-lower-course-river-landscapes-6*]

2.4.1 What is a *natural levee*? (1 x 2) (2)

2.4.2 In which course of the river is the floodplain in the diagram most likely to occur? (1 x 1) (1)

2.4.3 What type of erosion is dominant in the river shown in the diagram? (1 x 2) (2)

2.4.4 Use evidence from the diagram to explain how flooding leads to the formation of a natural levee. (2 x 2) (4)

2.4.5 Draw a labelled cross-section of the river from **A** to **B**. The cross-section must show:

(a) The shape of the river valley (1 x 1) (1)

(b) The position of the natural levee (1 x 1) (1)

2.4.6 Evaluate why site **X** would be a suitable (good) location for the development of a rural settlement. (2 x 2) (4)

2.5 Refer to the extract below on river management.

THE UMBILO RIVER SYSTEM, SOUTH AFRICA

The water in the UmBilo River system in Durban's eThekwini Municipality in KwaZulu-Natal is severely polluted. This is due to years of industrial pollution and inefficient sewage infrastructure which results in raw sewage contaminating the water system.

The water pollution is so severe that the water has changed colour. Not only is the health of the surrounding communities being affected by this water pollution, but sensitive ecosystems along the path of the UmBilo river system are also being destroyed.

Greenpeace Africa is partnering with the UmBilo River Watch community group to raise awareness about the causes and effects of this water pollution on vulnerable communities and ecosystems.

[Adapted from *https://www.greenpeace.org/africa/en/blogs/49015*]

2.5.1 Define the concept *river management.* (1 x 2) (2)

2.5.2 In which province is the eThekwini Municipality located? (1 x 1) (1)

2.5.3 According to the extract, what are the main causes of pollution of the UmBilo River? (2 x 1) (2)

2.5.4 Name ONE environmental impact of pollution, highlighted in the extract. (1 x 2) (2)

2.5.5 In a paragraph of approximately EIGHT lines, suggest strategies that the eThekwini Municipality can implement to protect the UmBilo River from untreated sewage. (4 x 2) (8)

[60]

TOTAL SECTION A: 120

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

BACKGROUND INFORMATION ON MALELANE



Coordinates: 25°29′S ; 31°31′E

Malelane is a gateway to the Kruger National Park, Mozambique and Eswatini (formerly Swaziland). This charming farming town in Mpumalanga is situated on the N4 national highway about halfway between the capital city of Mpumalanga, Nelspruit, and the capital city of Mozambique, Maputo. Malelane sits on the intersection of three roads that lead to many of southern Africa's favourite tourist destinations. Driving into Malelane from Nelspruit, you can see the hilly outcrop directly ahead, with the Mozambique border post nestled at its base. Turn left and the promise of a few glorious days in the Kruger National Park beckons you. Turn right and the lush, tropical landscape of Eswatini lies on the horizon.

[Source: *https://hamiltonslodge.co.za/history-of-malelane/*]

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

ENGLISH	**AFRIKAANS**
Diggings	Uitgrawings
Caravan park	Karavaanpark
Sewage works	Rioolwerke
Golf course	Gholfbaan
Wetland	Vleiland

3.1 MAP SKILLS AND CALCULATIONS

Refer to the topographical map and the orthophoto map.

3.1.1 In which province is Malelane located?

A Gauteng
B Limpopo
C Mpumalanga
D KwaZulu-Natal (1 x 1) (1)

3.1.2 The grid reference number located to the east of the Malelane map 2531BC is:

A 2531BD
B 3125BD
C 2531BB
D 3125BD (1 x 1) (1)

Refer to the orthophoto map.

3.1.3 What is the difference in height between the contour line at **7** and spot height **8** on the orthophoto map? (1 x 1) (1)

3.1.4 Use the answer to QUESTION 3.1.3 to calculate the gradient from the contour line at **7** to spot height **8.**

Use the map distance of 4,5 cm. (3 x 1) (3)

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

3.1.5 Refer to the answer to QUESTION 3.1.4.

At this gradient, will there be more infiltration or more run-off? (1 x 2) (2)

3.1.6 Motivate your answer to QUESTION 3.1.5. (1 x 2) (2)

3.2 MAP INTERPRETATION

Refer to the topographical map.

3.2.1 (a) A wind that blows at night from spot height **405** in block **B3** in a westerly direction to the Umgwenya River, is known as a/an … wind.

A berg
B anabatic
C katabatic
D fohn (1 x 1) (1)

(b) Identify the negative environmental impact that the wind identified in QUESTION 3.2.1 (a), can have on the Leopard Creek Golf Estate in block **B2**. (1 x 2) (2)

Refer to line **F** – **G** in blocks **B1** and **B2** in the topographical map**.**

3.2.2 (a) Draw a cross-section along the line **F** – **G** across the Umgwenya River. Provide the following labels on the cross-section:

(i) Undercut slope
(ii) Slip-off slope (2 x 1) (2)

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(b) Give ONE physical reason why the Leopard Creek Golf Course is located at point **G** rather than at point **F**. (1 x 2) (2)

Refer to block **C2** on the topographical map.

3.2.3 Identify the fluvial feature at **H** in block **C2** on the topographical map. (1 x 1) (1)

3.2.4 The feature identified in QUESTION 3.2.3 is commonly found in the … of a river where the river valley has a/an ... (1 x 1) (1)

(i) upper course
(ii) middle course
(iii) U-shape.
(iv) V-shape.

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

3.2.5 (a) What is the general direction of flow of the Umgwenya River on the topographical map? (1 x 1) (1)

(b) Give evidence from the topographical map to support the answer to QUESTION 3.2.5 (a). (1 x 2) (2)

3.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Refer to the dam in block **A5** on the topographical map.

3.3.1 (a) Is the dam an example of (vector/raster) data? (1 x 1) (1)

(b) Give a reason for the answer to QUESTION 3.3.1(a). (1 x 2) (2)

Refer to block **A4** and the map reference on the topographical map.

3.3.2 (a) Define the term *buffering*. (1 x 2) (2)

(b) Identify the land-use feature at **J** in block **A4**. (1 x 1) (1)

(c) Explain how the land-use feature identified in QUESTION 3.3.2(b) is an example of buffering. (1 x 2) (2)

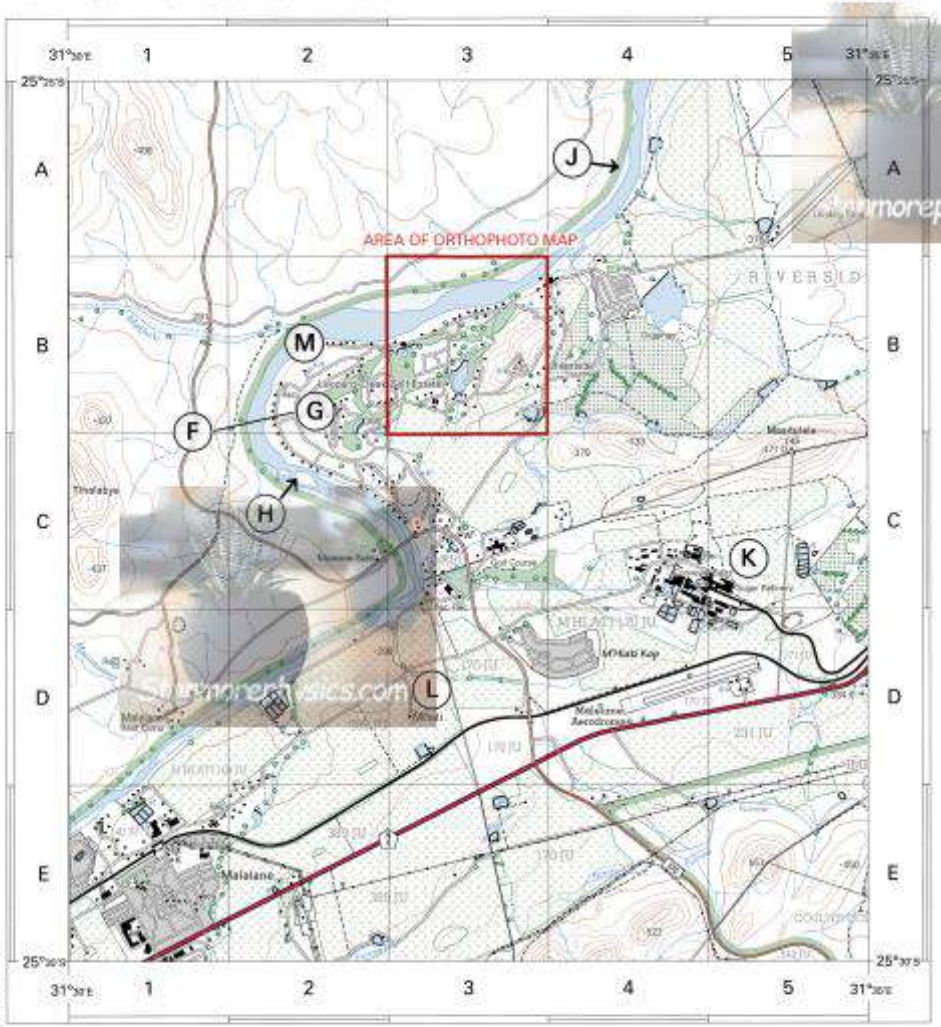
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TOTAL SECTION B: 30

TOTAL: 150

END

EXTRACT FROM 2531BC MALELANE 1:50 000



Mean magnetic declination 18°28' West of True North (January 2014).
Mean annual change 9' Westwards (Jan. 2014 - Dec. 2014).

CONTOUR INTERVAL 20 METRES - KONTOERTUSSENRUIMTE 20 METER

REFERENCE

National Freeway; National Route
Arterial Route
Main Road
Secondary Road; Bench Mark
Other Road; Bridge
Track and Hiking Trail
Railway; Station or Siding
Other Railway; Tunnel
Embankment; Cutting
Power Line
Built-up Area (High, Low Density)
Buildings; Ruin
Post Office; Police Station; Store
Place of Worship; School; Hotel
International Boundary and Beacon
Provincial Boundary
Protected Area
Perennial River
Perennial Water
Non-perennial River
Non-Perennial Water
Dry Water Course
Dry Pan
Marsh and Vlei
Pipeline (above ground)
Water Tower; Reservoir; Water Point
Coastal Rocks
Prominent Rock Outcrop
Fence; Wall
Windpump; Monument
Communication Tower
Mine Dump; Excavation
Trigonometrical Station; Marine Beacon
Lighthouse and Marine Light
Cemetery; Grave
Erosion; Sand
Woodland
Cultivated Land
Orchard or Vineyard
Recreation Ground
Row of Trees
Original Farms

EXTRACT FROM 2531 BC 16 RIVERSIDE ortho - rectified image 1:10 000



CONTOUR INTERVAL 5 METRES - KONTOERTUSSENRUIMTE 5 METER

VERKLARING

Nasionale Deurpad; Nasionale Roete
Hoofpad
Sekondêre Pad; Hoogtemerk
Ander Pad; Brug
Dowwe Pad en Voetslanpad
Spoorweg; Stasie of Syding
Ander Spoorweg; Tonnel
Opvulling; Deurgraaf
Kragkyn
Bebouing (Woon Area, Lae Digtheid)
Gebeue; Mynskag
Poskantoor; Polisiestasie; Winkel
Plek van Aanbidding; Skool; Hotel
Internasionale Grens en Baken
Provinsiale Grens
Bewaarings Gebied
Standhoudende Rivier
Standhoudende Water
Nie-standhoudende Rivier
Nie-standhoudende Water
Drie Loop
Drie Pan
Moeras en Vlei
Pyplyn (bo die grond)
Watertoring; Reservoir; Waterpunt
Kontymeter
Prominente Klipbank
Draadheining; Muur
Windpomp; Monument
Kommunikasietoring
Myntoring; Uitgraving
Feilbaken; Seevaarbaken
Vuurtoring en Seevaartlig
Begraafplaas; Graf
Erosie; Sand
Bebosde Gebied
Bewerkte Land
Bosrif of Wingerd
Omheiningsteenoon
Ryi Bome
Doringbos/Ike Plaas