GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2024

10781

GEOGRAPHY

(PAPER 1)

GEOGRAPHY: Paper 1

10781E

TIME: 3 hours

MARKS: 150

19 pages

X05

P.T.O

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 3026 DA ALIWAL NORTH and a 1 : 10 000 orthophoto map 3026 19 DA DUKATHOLE 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 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 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 1.1.7) in the ANSWER BOOK, e.g. 1.1.8 A.

1.1.1 An urban heat island can be described as …

A urban areas being colder than rural areas.
B urban areas receiving more insolation than rural areas.
C urban areas being warmer than rural areas.
D an increase in temperature as you move from rural to urban areas.

1.1.2 Urban heat islands can develop because of …

A the reduced number of vehicles.
B reduced industrial activity.
C larger open water sources.
D larger artificial surfaces.

1.1.3 The following photograph shows … due to a large glass surface in an urban area.



[Source: *https://www.mornglass.com/light-pollution-of-glass-curtain-wall.html*]

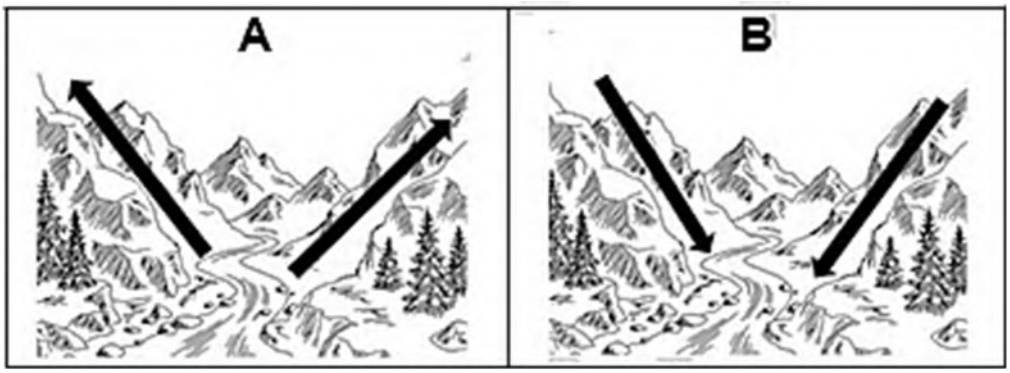
A Albedo
B evapotranspiration
C insolation
D absorption

1.1.4 A pollution dome located over an urban area would be … and …

(i) higher during the day
(ii) lower during the day
(iii) lower during the night
(iv) higher during the night

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

Refer to sketches **A** and **B** below, showing wind direction in valleys, to answer QUESTIONS 1.1.5 to 1.1.7.



[Adapted from *https://www.alamy.com/mountain-valley-river-graphic-black-white-landscape-sketch-illustration-vector-image416759737.html*]

1.1.5 The wind illustrated in sketch **A** is a/an … wind.

A katabatic
B Föhn
C anabatic
D Berg

1.1.6 The wind illustrated in diagram **B** is most prevalent …

A in the afternoon.
B at night.
C before midday.
D at any time of the day.

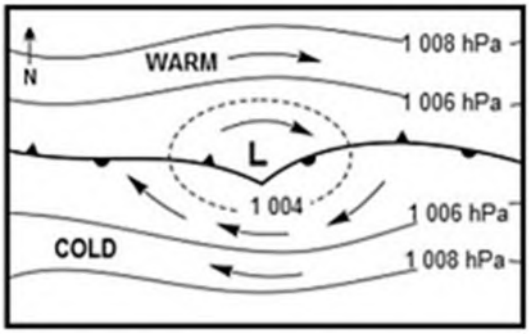
1.1.7 Frost pockets will likely form in diagram **B** because of the …

A accumulation of cold air.
B dispersion of warm air.
C mountain slopes.
D location of the river. (7 x 1) (7)

1.2 Read the statements below and choose the appropriate word(s) in brackets that will make the statement TRUE. Write down only the question numbers (1.2.1 to 1.2.8) and the answer in the ANSWER BOOK, e.g. 1.2.9 Decreased.

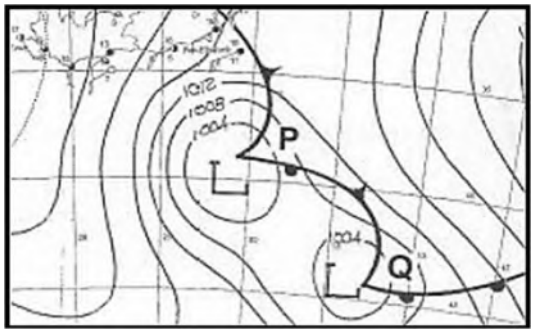
1.2.1 The global wind belt responsible for the general movement of mid-latitude cyclones is the (polar easterlies/tropical easterlies).

1.2.2 The diagram below shows a mid-latitude cyclone in the (initial/development) stage.



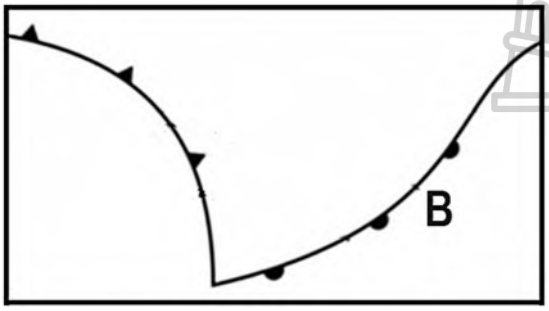
[Source: *https://online.htseden.co.za/wp-content/uploads/2021/03/Geography-Grade-12-Term-1-Week-1_2021-1.pdf*]

1.2.3 The diagram below depicts a (succession/family) of cyclones.



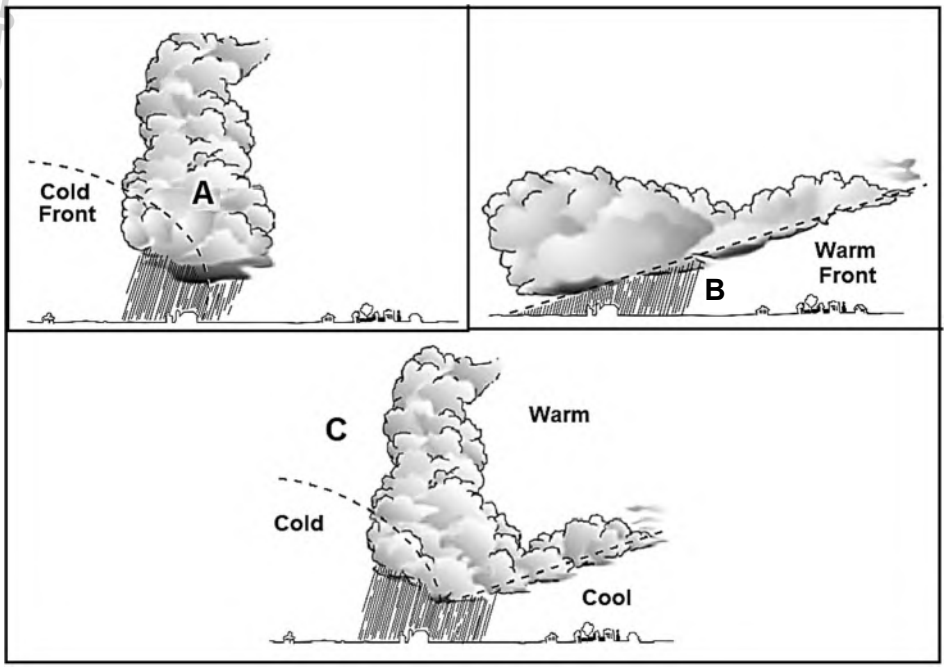
[Source: *https://learn.mindset.africa/sites/default/files/resourcelib/emshare-show-note-asset/858_fdoc.pdf*]

1.2.4 The front at **B** below is the (warm/cold) front.



[Source: *https://learn.mindset.africa/sites/default/files/resourcelib/emshare-show-note-asset/858_fdoc.pdf*]

Refer to the diagrams below to answer QUESTIONS 1.2.5 to 1.2.8.



[Adapted from *https://learntoflyblog.com/weather-fronts-2/*]

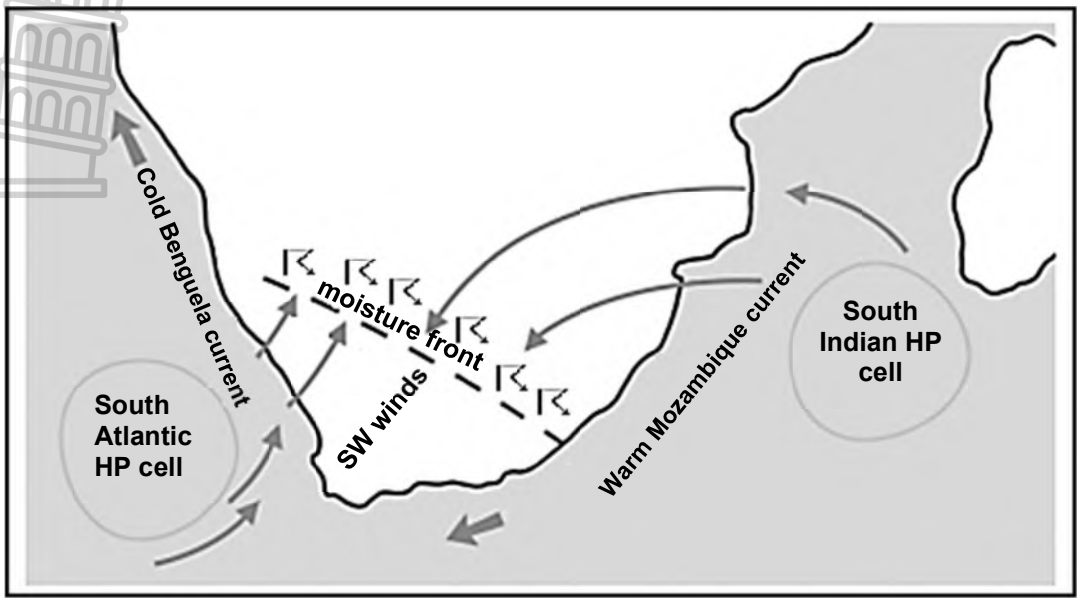
1.2.5 (Nimbostratus/Cumulonimbus) clouds are most likely to develop at **A.**

1.2.6 Gentle rain can be expected at **B** because (warm/cold) air rises steadily above the cooler air masses.

1.2.7 The occluded front depicted in diagram **C** is a (warm/cold) occlusion.

1.2.8 The occlusion in diagram **C**, is the result of cold air that moves (faster/slower) than warm air. (8 x 1) (8)

1.3 Refer to the sketch below showing line thunderstorms.



[Source: *https://www.theanswer.co.za/wp-content/uploads/2021/11/Gr-12-Geography-3-in-1-Extracts.pdf*]

1.3.1 What is a *moisture front*? (1 x 2) (2)

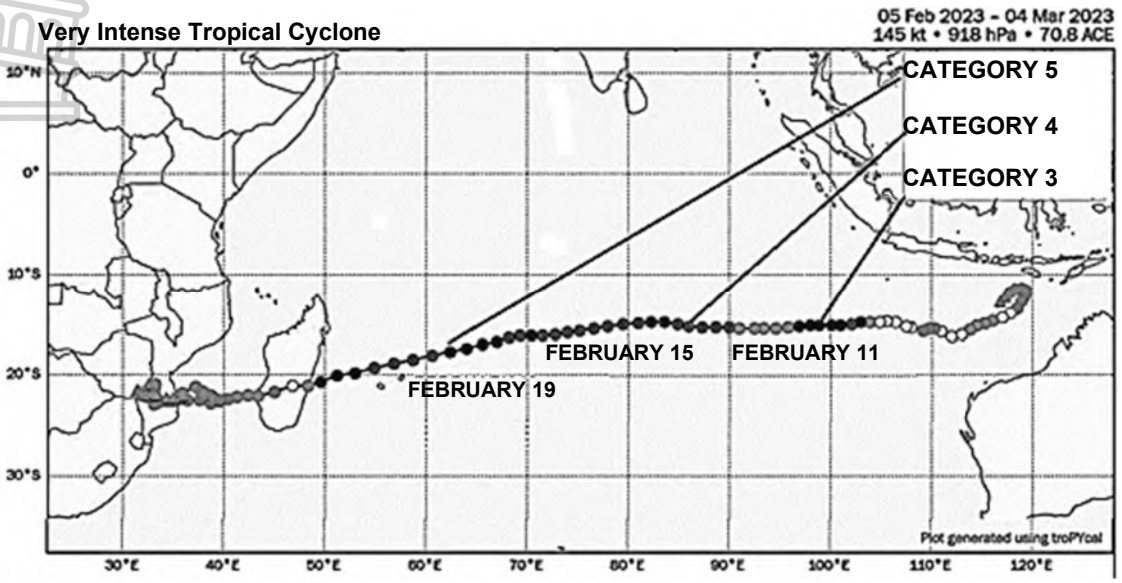
1.3.2 State ONE piece of evidence from the diagram indicating that line thunderstorms are occurring. (1 x 1) (1)

1.3.3 Use information from the sketch and explain why there will be more clouds located in the eastern part instead of the western part of South Africa. (2 x 2) (4)

1.3.4 In a paragraph of approximately EIGHT lines, explain how the summer location (position) of the high-pressure cells (anticyclones) promotes the development of line thunderstorms. (4 x 2) (8)

1.4 Refer to the infographic on Tropical Cyclone Freddy.

MOVEMENT OF TROPICAL CYCLONE FREDDY



[Adapted from *https://watchers.news/2023/03/06/tropical-cyclone-freddy-the-longest-lived-and-one-of-a-kind-tropical-cyclone-in-history/*]

CYCLONE FREDDY

Tropical Cyclone Freddy was an exceptionally long-lived, powerful, and deadly storm that traversed the southern Indian Ocean for more than five weeks in February and March of 2023.

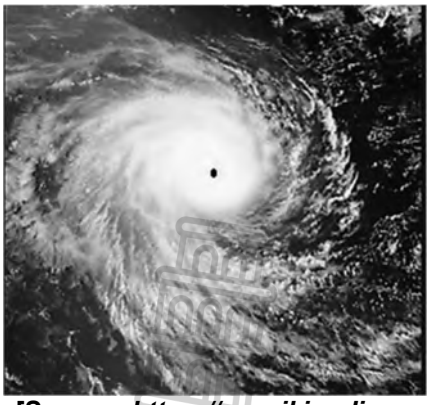
Freddy made its first landfall near Mananjary, Madagascar. The storm rapidly weakened overland but restrengthened in the Mozambique Channel.

The cyclone struck south-eastern Madagascar, damaging many homes. The impact in Mozambique was more severe than in Madagascar and included heavy rainfall in the southern half of the country.

Hardest-hit was Malawi where incessant rains caused catastrophic flash floods, with Blantyre suffering the brunt of it. The nation's power grid was crippled, with its hydroelectric dam rendered inoperable. Food security was of particular concern, with millions of people left at risk.

[Source: *https://en.wikipedia.org/wiki/Cyclone_Freddy*]

SATELLITE IMAGE OF TROPICAL CYCLONE FREDDY



[Source: *https://en.wikipedia.org/wiki/Cyclone_Freddy*]

1.4.1 According to the infographic, what was the lifespan of Tropical Cyclone Freddy? (1 x 1) (1)

1.4.2 Quote an example of infrastructural damage caused by Tropical Cyclone Freddy, as mentioned in the article. (1 x 1) (1)

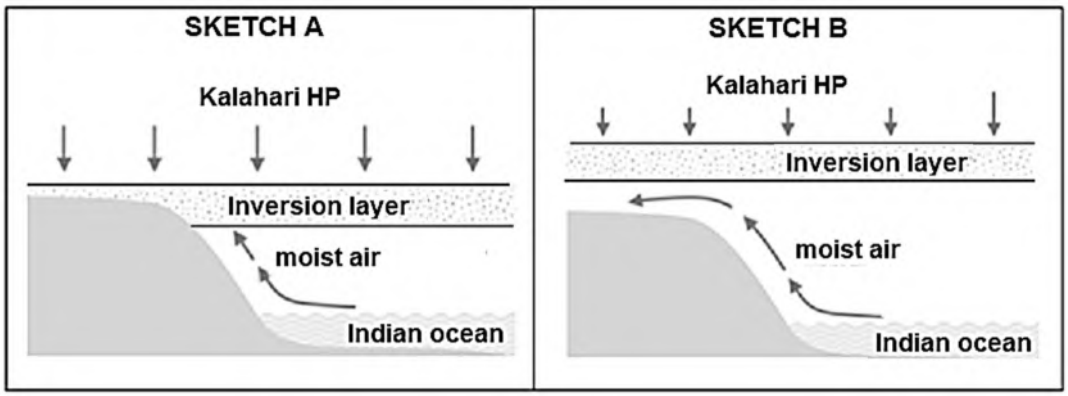
1.4.3 Describe the rotation of winds as depicted (shown) in the satellite image. (1 x 1) (1)

1.4.4 Suggest TWO possible reasons why Tropical Cyclone Freddy intensified from a category 3 to a category 5 cyclone between 11 February 2023 and 19 February 2023. (2 x 2) (4)

1.4.5 What could have caused the rapid weakening of Tropical Cyclone Freddy when it made landfall near Mananjary? (1 x 2) (2)

1.4.6 Suggest THREE strategies that the local authorities in Mozambique could have implemented to prepare for the destruction caused by Tropical Cyclone Freddy. (3 x 2) (6)

1.5 Refer to sketches **A** and **B** below, showing the inversion layer.



[Adapted from *https://www.theanswer.co.za/wp-content/uploads/2021/11/Gr-12-Geography-3-in-1-Extracts.pdf*]

1.5.1 Define the term *temperature inversion*. (1 x 2) (2)

1.5.2 Which of the sketches, **A** or **B**, represents the winter season? (1 x 1) (1)

1.5.3 Provide evidence from the sketch to support your answer to QUESTION 1.5.2. (1 x 2) (2)

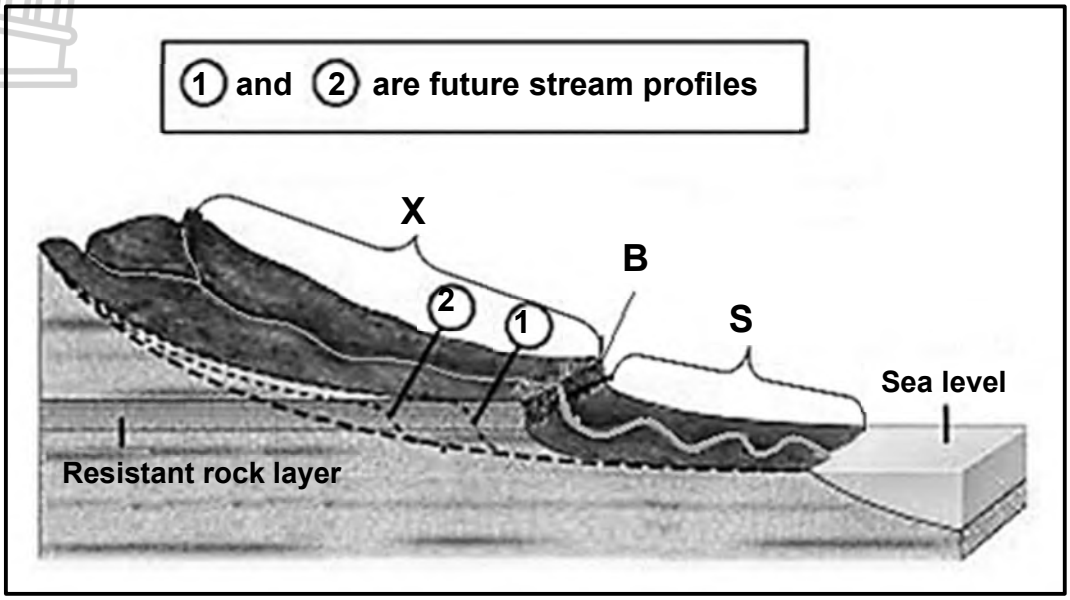
1.5.4 Explain the likely stable conditions experienced in the interior of South Africa in sketch **A**. (2 x 2) (4)

1.5.5 A farmer in the Free State wants to plant crops that require large amounts of water. Explain why the climatological conditions depicted in sketch **B** would suit this type of farming. (3 x 2) (6)

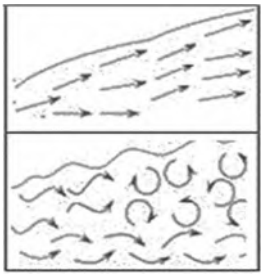
[60]

QUESTION 2: GEOMORPHOLOGY

2.1 Refer to the diagram below. 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 2.1.7) in the ANSWER BOOK, e.g. 2.1.8 Y.



[Source: *http:www.google.comsearchq=temporary+base+level+diagram&tbm*]

	COLUMN A	COLUMN B
2.1.1	The longitudinal profile in the diagram represents a/an … river profile.	**Y** graded **Z** ungraded
2.1.2	The river course indicated by **X** on the longitudinal profile is the … course.	**Y** upper **Z** middle
2.1.3	… erosion is the dominant erosion process at **X**.	**Y** Vertical **Z** Lateral
2.1.4	The sharp drop in gradient indicated at **B** on the diagram is known as a …	**Y** waterfall. **Z** rapid.
2.1.5	… erosion may result in the removal of the temporary base level at **B**.	**Y** Headward **Z** Vertical
2.1.6	After the removal of the temporary base level at **B**, the river profile will have a … shape.	**Y** convex **Z** concave
2.1.7	… flow is predominant on the slope of the river profile indicated as **S**.	**Y**  **Z**

(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, for example 2.2.9 A.

2.2.1 A drainage pattern that formed as a result of melting ice is known as …

A dendritic.
B trellis.
C rectangular.
D deranged.

2.2.2 A/An … drainage pattern does not match the geology and topography of the surrounding landscape.

A trellis
B deranged
C antecedent
D superimposed

2.2.3 The following characteristics describe the dendritic drainage pattern where … and …

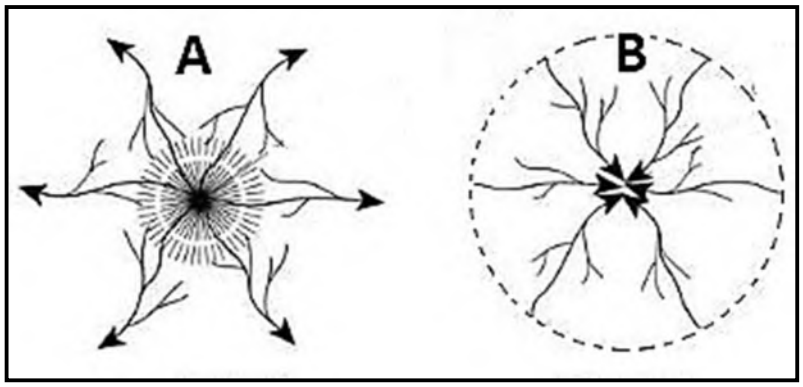
(i) tributaries join at acute angles
(ii) alternating hard and soft rock layers occur
(iii) tributaries are short and join at right angles
(iv) the branching patterns resemble the branches of a tree

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

2.2.4 The ... pattern occurs where a river maintains its course even after the land has been uplifted due to tectonic movement.

A antecedent
B superimposed
C trellis
D deranged

Refer to the drainage patterns illustrated in sketches **A** and **B** below to answer QUESTIONS 2.2.5 and 2.2.6.



[Source: Examiner's own sketch]

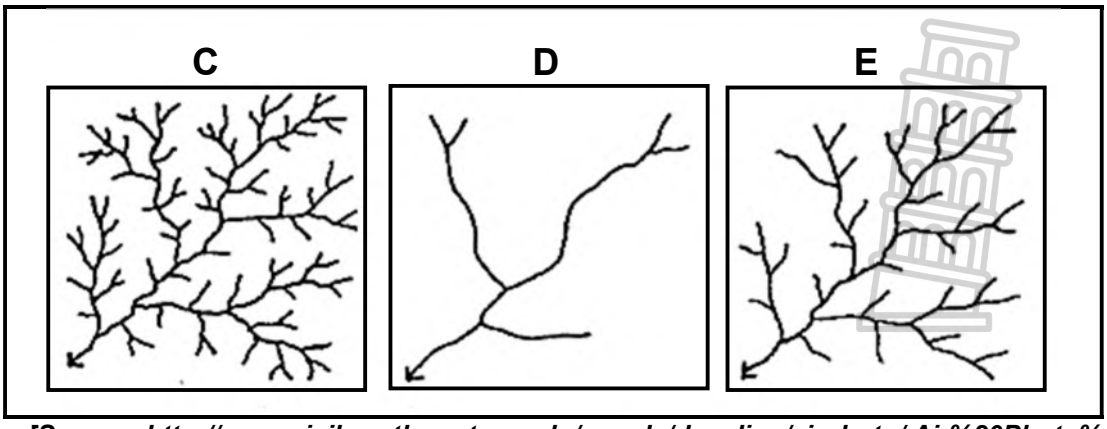
2.2.5 The drainage pattern represented by **A** is …

A radial.
B centripetal.
C rectangular.
D dendritic.

2.2.6 Drainage patterns **A** and **B** develop respectively on …

A homogeneous and rectangular strata.
B a dome and a central basin.
C mountainous and rocky regions.
D inclined and horizontal strata.

Refer to the drainage patterns illustrated in sketches **C, D** and **E** below to answer QUESTIONS 2.2.7 and 2.2.8.



[Source: *http://www.civil.northwestern.edu/people/dowding/airphoto/ Air%20Photo%20Elements.html*]

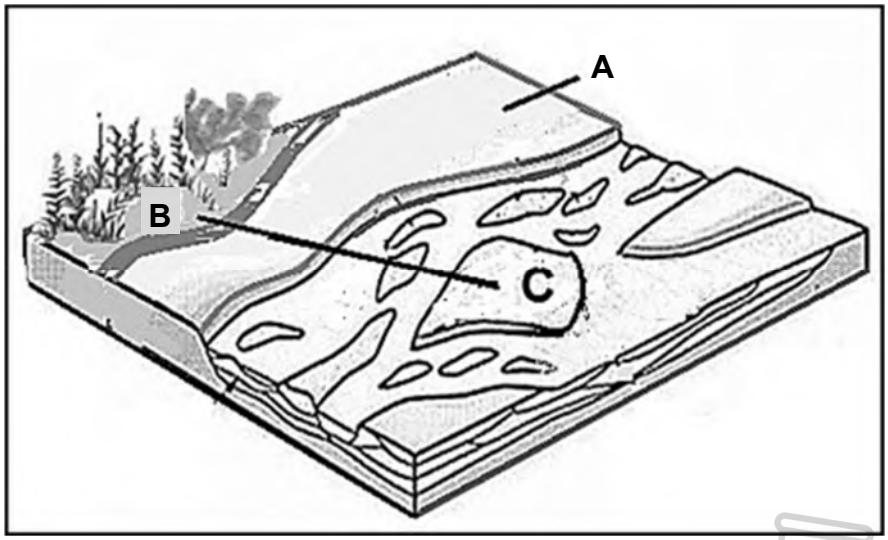
2.2.7 Arrange sketches **C, D** and **E** according to the increase in drainage density.

A C; E; D
B E; D; C
C D; C; E
D D; E; C

2.2.8 The drainage density in sketch **C** represents a drainage basin in a region with … gradients and … permeability of the rock structure.

A steeper; low
B steeper; high
C gentle; low
D gentle; high (8 x 1) (8)

2.3 Study the sketch below of a braided river channel.



[Adapted from *https://people.uwec.edu/jolhm/NZ/Below/Home.html*]

2.3.1 Define the concept *braided river channel.* (1 x 2) (2)

2.3.2 Identify the fluvial (river) features labelled **A** and **C**. (2 x 1) (2)

2.3.3 (a) Choose the correct answer from the options within brackets.
The (upper/middle/lower) fluvial course is depicted in the sketch.
(1 x 1) (1)

(b) Give THREE pieces of evidence from the sketch to support your answer to QUESTION 2.3.3 (a). (3 x 1) (3)

2.3.4 Draw a freehand, labelled cross-section along line **B – C**. (3 x 1) (3)

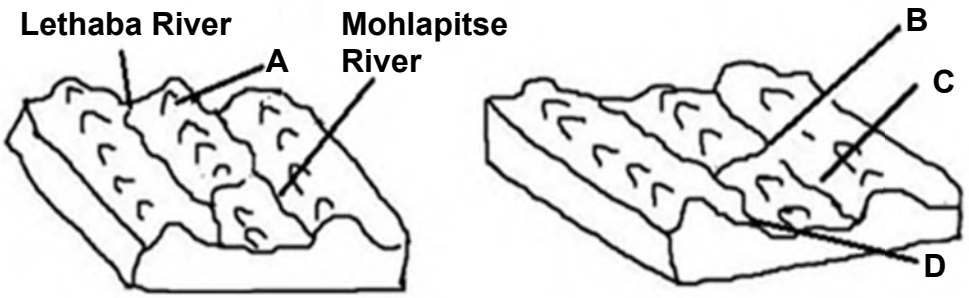
2.3.5 Explain why a tourist should not set up camp at point **C**. (2 x 2) (4)

2.4 Study the following information on river capture.

RIVER CAPTURE IN WILDERNESS

A river capture site can be found nine kilometres down the George's Valley Road, at the turn off to the Wolkberg Wilderness Area, a point on the Lethaba River where a prehistoric act of "piracy" occurred during the process of headward erosion. It was here, many long years ago that the Great Lethaba River eroded back into the hills and captured the headwaters of the Mohlapitse River. Today the Lethaba River flows fast and clear at this spot, whereas the Mohlapitse, deprived of the previously strong flows is now a soggy and confused wetland, uncertain of how it will gather strength and flow down into the distant Olifants River.

[Source: *https://www.iinfo.co.za/content/river-capture-site-georges-valley*]



Before River Capture **After River Capture**

[Source: Examiner's own sketch]

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

2.4.2 Provide the geomorphological terms for the features indicated as:

(a) The high-lying area labelled **A** (1 x 1) (1)

(b) A resultant feature of river capture labelled **B** (1 x 1) (1)

2.4.3 Quote evidence from the case study, that the misfit stream occurs in area **C**. (1 x 1) (1)

2.4.4 Discuss how the flow characteristics in the Great Lethaba River will change after river capture. (2 x 2) (4)

2.4.5 Describe the impact on farming activities along the Mohlapitse River after river capture. (3 x 2) (6)

2.5 Study the article below on river management in KwaZulu-Natal.

KZ-N SEWAGE LEAKS A BREEDING GROUND FOR DISEASE, WARNS EXPERT

As of 7 October, the Westbrook, Bronze, Umhlanga, Umdloti, Isipingo, Reunion, Pipeline, Toti Main, Warner, Baggies, Winklespruit, Garvies and Ansteys beaches remain closed. Not only are beaches closed, frightening E-coli sample collection results, a damning Blue Drop Report and sewage leaks have compounded the province's lack of adequate infrastructure. Roads and critical infrastructure including a number of water treatment plants and pipes were damaged in the last season of flooding and have not yet been repaired. Footage of raw sewage flowing from Port Shepstone Hospital into the nearby uMzimkhulu River, has once again put the spotlight on KwaZulu-Natal's dire water treatment crisis.

According to the eThekwini mayor Mxolisi Kaunda, Johanna Road and Ohlange Sewage pump stations and the Northern Wastewater Treatment Works were largely responsible for high E-coli readings and water quality concerns.

Speaking to The Citizen, Professor Anthony Turton from the University of Free State Centre for Environmental Management, painted a bleak picture of KZ-N's water woes. Turton said sewage risks in KZN are associated with hepatitis A, which is a waterborne pathogen. "This means that we are exposing pathogens in wetlands and aquatic ecosystems to a wide range of drugs," Turton warned.

[Adapted from *https://www.citizen.co.za/news/south-africa/kzn-sewage-leaks-disease-warning-10-october-2022/*]

2.5 2.5.1 Define the concept *river management.* (1 x 2) (2)

2.5.2 What was the main source of pollution which resulted in the closure of beaches in KwaZulu-Natal? (1 x 1) (1)

2.5.3 Quote evidence from the article that suggests that the lack of infrastructure maintenance resulted in the pollution of the rivers. (1 x 2) (2)

2.5.4 What impact might the pollution mentioned in the article have on the natural environment? (1 x 2) (2)

2.5.5 In a paragraph of approximately EIGHT lines, discuss sustainable strategies that can be implemented by the eThekwini municipality to reduce the pollution of the rivers in KwaZulu-Natal. (4 x 2) (8)

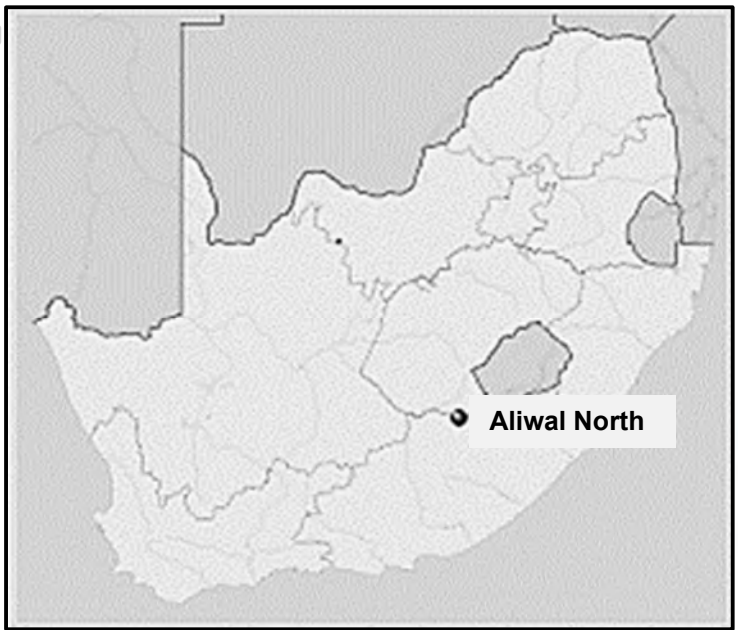
[60]

TOTAL SECTION A: 120

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

GENERAL INFORMATION ON ALIWAL NORTH



Coordinates: 30°42′S ; 26°42′E

Aliwal North (officially Maletswai) is a town in central South Africa on the banks of the Orange River in the Eastern Cape Province. The settlement is situated across from the Orange River, just below its confluence with the Kraai River. To the south-west of the town, the Kramberg rises to 2 000 m above sea level. In Aliwal North, the summers are warm and the winters are short, cold, and dry. The month with the most wet days in Aliwal North is February, with an average of 9,1 days with at least 1 mm of precipitation.

[Adapted from *https://en.wikipedia.org/wiki/aliwal noorde*]

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

ENGLISH	AFRIKAANS
River	Rivier
Orange	Oranje
Furrow	Voor
Recreation	Ontspanning
Church	Kerk
Valley	Vallei

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 In which province is Aliwal North located?

A Western Cape
B Eastern Cape
C Gauteng
D Mpumalanga (1 x 1) (1)

3.1.2 The coordinates for Aliwal North are 30°42′S ; 26°42′E.

The 30° S refers to the (longitude/latitude). (1 x 1) (1)

3.1.3 Refer to the graveyard in block **D1** on the topographical map.

Calculate the area in m² of the graveyard in block **D1** if the length is 1,1 cm and the breadth is 0,7 cm.

Formula: **Length x Breadth** (3 x 1) (3)

3.1.4 Refer to the topographical map.

(a) Calculate the true bearing from trigonometrical station **56** in block **C2** to spot height **1398** in block **E2**. (1 x 1) (1)

(b) Calculate the magnetic bearing from trigonometrical station **56** in block **C2** to spot height **1398** in block **E2** if the current magnetic declination is 24°43´ west of true north. (2 x 1) (2)

Formula: **Magnetic bearing = True bearing + Magnetic declination**

(c) Why is it important to calculate the present magnetic bearing? (1 x 2) (2)

3.2 MAP INTERPRETATION

Refer to the topographical map.

3.2.1 (a) Refer to **R** in block **A3**. The dominant drainage pattern in this block is …

A dendritic.
B trellis.
C parallel.
D radial (1 x 1) (1)

(b) Compare the drainage density of the area at **R** in block **A3**, and **S** in block **B3**. (2 x 1) (2)

(c) Provide evidence from the topographical map to justify your answer to QUESTION 3.2.1 (b). (1 x 2) (2)

3.2.2 (a) Refer to the tributary **T** in block **B4** and **B5**, on the topographical map. In which direction is the tributary flowing? (1 x 1) (1)

(b) Provide evidence from the topographical map to support your answer to QUESTION 3.2.2 (a). (1 x 2) (2)

3.2.3 Refer to lines **6 – 7** in block **A3 – B3** on the orthophoto map.

(a) Draw a labelled, freehand cross-section from point **6** to point **7** as shown on the orthophoto map. (2 x 1) (2)

(b) Refer to point **7** on the orthophoto map. Explain why deposition is the main process taking place at this point. (1 x 2) (2)

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

Read the extract below to answer QUESTION 3.3.1.

The new owner of the farm (Waaiplaas), in block **A5** (on the topographical map) wants to identify the best place to graze his cattle.

3.3.1 Identify ONE of the GIS processes that the farmer could use to identify the best place to graze his cattle. (1 x 1) (1)

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

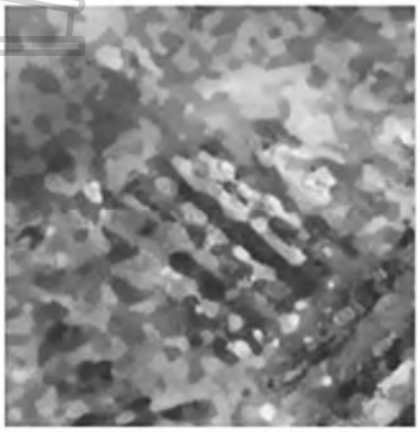
3.3.2 (a) Name ONE human-made point feature in block **A5**, used to extract ground water. (1 x 1) (1)

(b) Name ONE human-made line feature in block **A5**, used to control the flow of water. (1 x 1) (1)

Refer to image **A** and image **B** of block **D3**, on the orthophoto map.

A and **B** are images of the settlement located in block **D3**.

A



B



[Source: Examiner's adapted snippet]

3.3.3	(a)	Which image, **A** or **B**, illustrates a high-resolution image?	(1 x 1)	(1)
	(b)	Motivate your answer to QUESTION 3.3.3 (a).	(1 x 2)	(2)
	(c)	Explain why images **A** and **B** are examples of raster rata.	(1 x 2)	(2)

TOTAL SECTION B: 30

TOTAL: 150

END