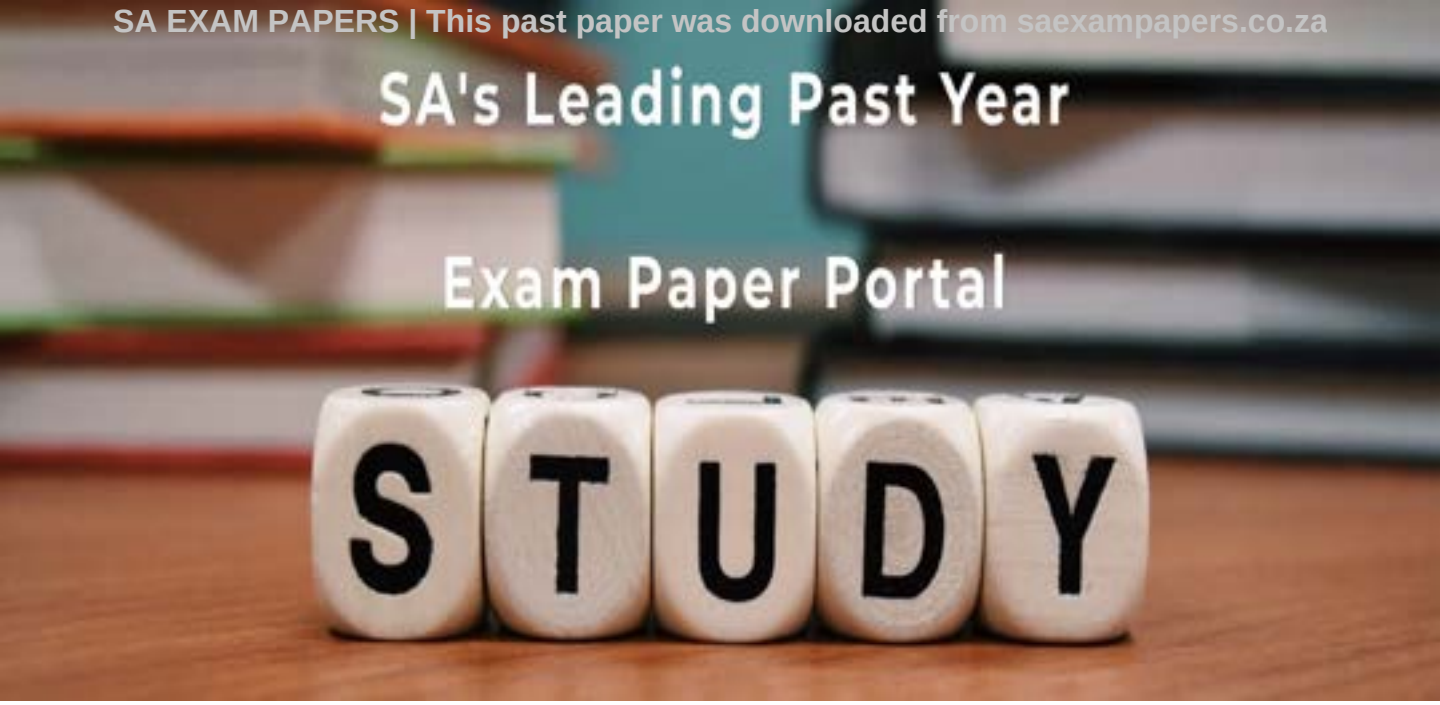


basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

GEOGRAPHY P1

MAY-JUNE 2024

MARKS: 150

This question paper consists of 19 pages.

Please turn over

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. 1020 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 2828CB CLARENS and a 1 : 10 000 orthophoto map 2828 CB 7 MAGDALENAS RUST are provided.

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

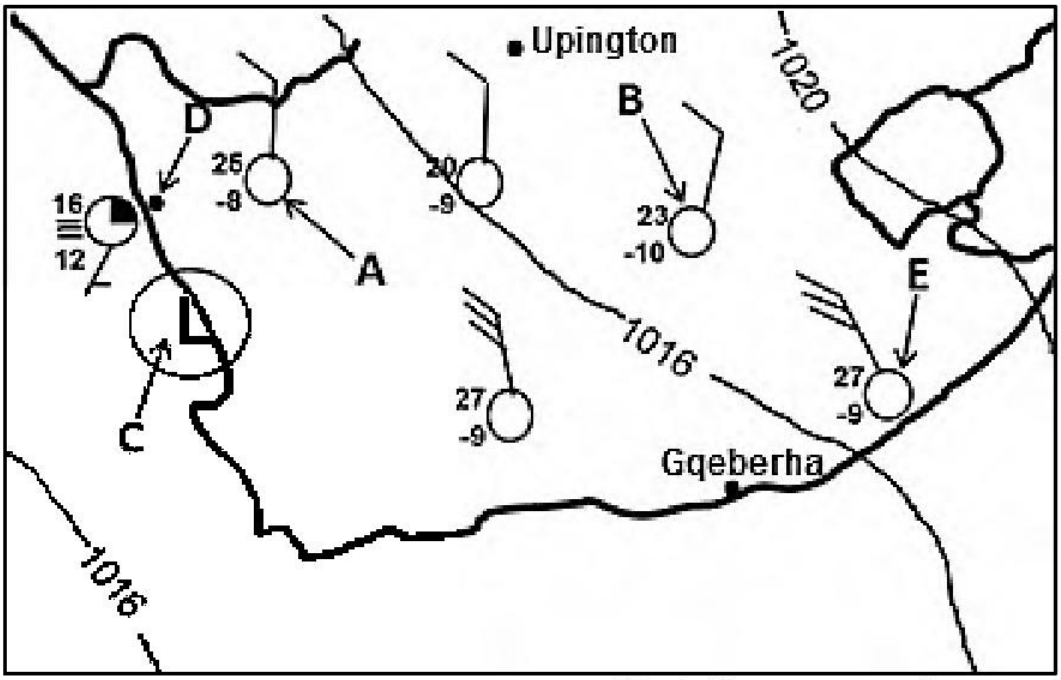
16. Show ALL calculations. Marks will be allocated for steps in calculations.

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

SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY

QUESTION 1: CLIMATE AND WEATHER

1.1 The questions below refer to the synoptic weather map. Various options are provided as possible answers to the 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 D.



[Adapted from www.sa.weathersa.co.za]

1.1.1 The stable weather conditions over the interior of South Africa are due to the well-developed … high-pressure cell.

A Mauritius
B South Atlantic
C South Indian
D Kalahari

1.1.2 The dew point temperature at weather station **A** is … °C.

A 8
B -8
C -17
D 25

1.1.3 The atmospheric air pressure at weather station **B** is … hPa.

A 1014
B 1016
C 1018
D 1020

1.1.4 The low-pressure cell at **C** is known as a … low.

A cut-off
B thermal
C continental
D coastal

1.1.5 The type of precipitation found at town **D** is …

A fog.
B dew.
C hail.
D rain.

1.1.6 The type of precipitation (answer to QUESTION 1.1.5) is caused by … winds, which consist of … air.

(i) offshore
(ii) onshore
(iii) cold, dry
(iv) warm, moist

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

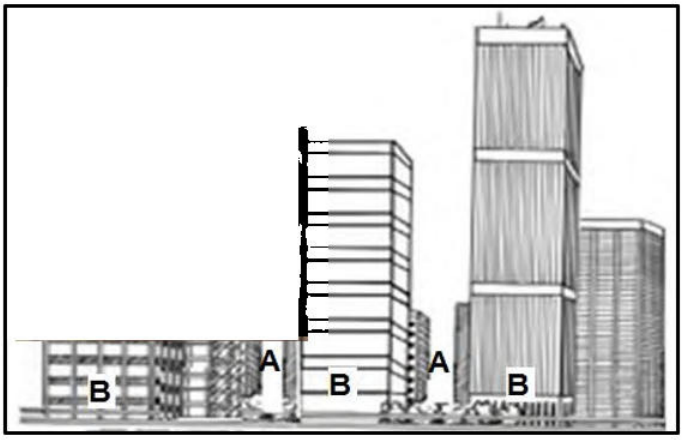
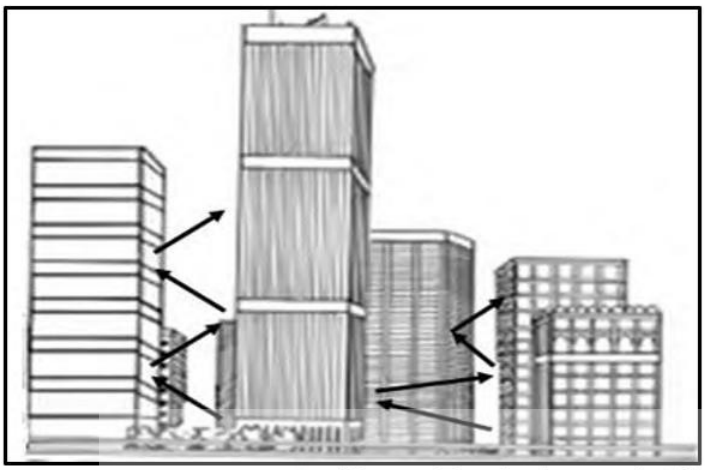
1.1.7 The evidence of berg wind conditions at weather station **E** is … and …

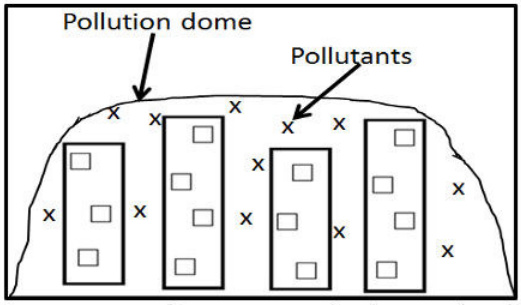
(i) clear skies
(ii) gentle winds
(iii) large temperature range
(iv) south-easterly winds

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

(7 x 1) (7)

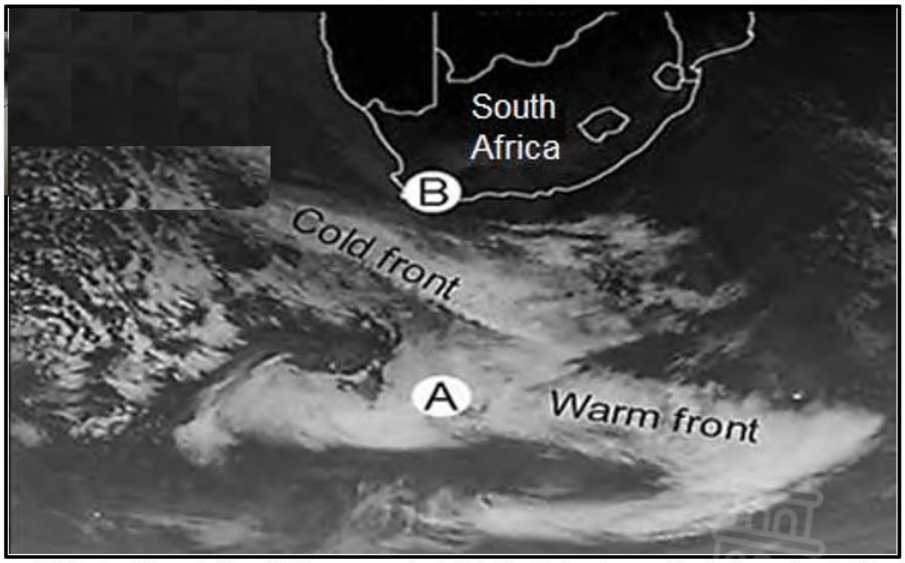
1.2 The questions below refer to valley and urban climates. Complete the statements in COLUMN A with the options in COLUMN B. Write only **Y** or **Z** next to the question numbers (1.2.1 to 1.2.8) in the ANSWER BOOK, e.g. 1.2.9 **Y**.

	COLUMN A	COLUMN B
1.2.1	Slopes in a valley facing the equator are warmer because the area covered by insolation is …	**Y** smaller **Z** greater
1.2.2	Anabatic winds are … winds.	**Y** downslope **Z** upslope
1.2.3	Anabatic winds … pollutants found in the valley.	**Y** disperse **Z** trap
1.2.4	Type of precipitation found in a valley, when dew point temperature is above 0 °C	**Y** fog **Z** frost
1.2.5	Winds at **A** will be … than winds at **B** in the sketch below.  [Source: Examiner's own sketch]	**Y** weaker **Z** stronger
1.2.6	Main factor contributing to the heat island effect in the sketch below  [Source: Examiner's own sketch]	**Y** multiple reflections **Z** height of buildings

1.2.7	The sketch below illustrates a pollution dome during the …  [Source: Examiner's own sketch]	**Y** **Z**	day night
1.2.8	The shape of the pollution dome (in QUESTION 1.2.7) is because of … convection.	**Y** **Z**	high low

(8 x 1) (8)

1.3 Refer to the satellite image below on mid-latitude cyclones.



[Adapted from https://afriwx.co.za/satellite/cold-front-monitor-infrared-satellite-]

1.3.1 **A** is a (low/high) pressure cell. (1 x 1) (1)

1.3.2 Give evidence from the satellite image for your answer to QUESTION 1.3.1. (1 x 2) (2)

1.3.3 Describe the rainfall usually associated with the cloud type at the warm front. (1 x 2) (2)

1.3.4 Give a reason why the interior of South Africa experiences clear skies. (1 x 2) (2)

1.3.5 In a paragraph of approximately EIGHT lines, explain how the approaching cold front changes the cloud cover and winds experienced at area **B**. (4 x 2) (8)

1.4 Refer to the extract and map below on Tropical Cyclone Freddy.

IMPACT OF TROPICAL CYCLONE FREDDY

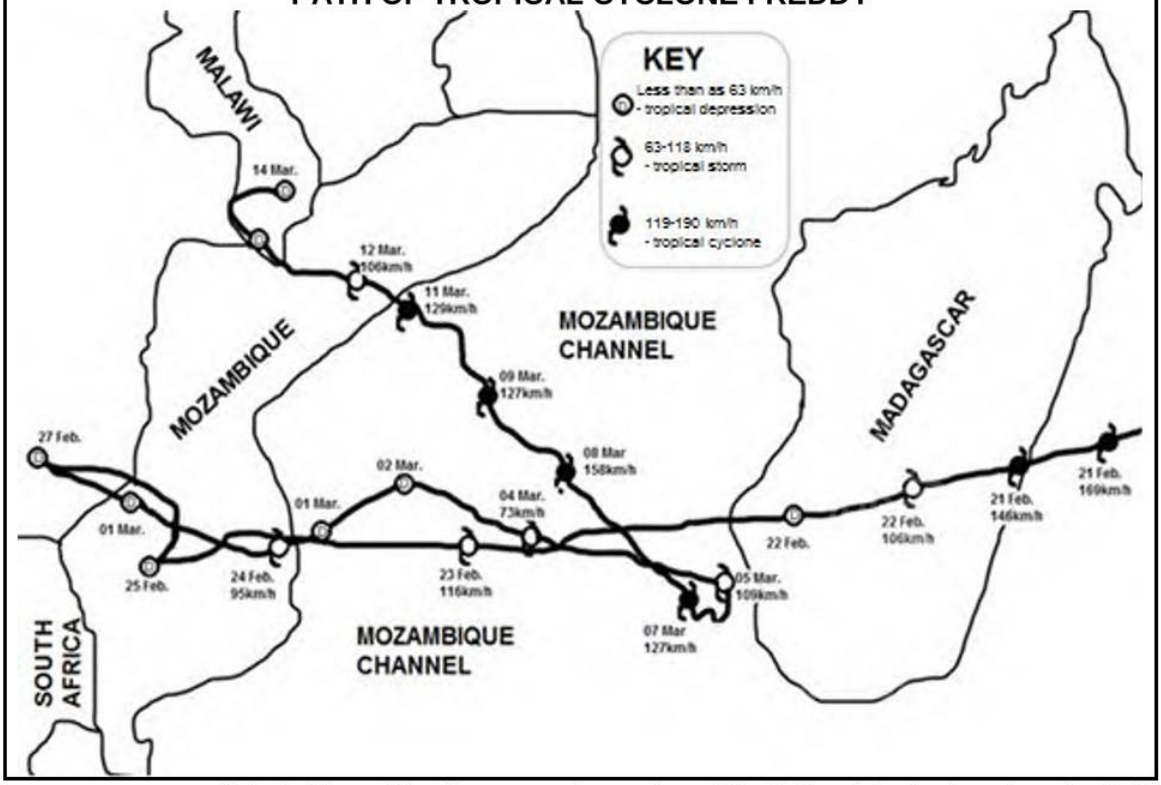
According to the Australian Bureau of Meteorology and the US Joint Typhoon Warning Centre, Tropical Cyclone Freddy formed on 6 February 2023, in the Indian Ocean northwest of the Australian coast. From its birthplace near Australia, it went from east to west across the entire South Indian Ocean towards Africa and travelled approximately 8 000 kilometres.

Tropical Cyclone Freddy hit Madagascar on 21 February and Mozambique on 24 February. The impact of heavy rainfall and strong winds in Mozambique were more severe than in Madagascar. This included the damage to infrastructure.

On 5 March Tropical Cyclone Freddy turned in a north-westerly direction, hitting Mozambique for a second time on 11 March. This path is rare (unusual). As it moved in a north-westerly direction, the system was moving very slowly and this gave it plenty of time to draw in large masses of water from the sea. This resulted in continuous heavy rain to affected regions, often causing widespread flooding.

Tropical Cyclone Freddy reached Malawi as a tropical depression, but still generated heavy rains and high wind speeds.

PATH OF TROPICAL CYCLONE FREDDY



[Adapted from https://www.google.com/search?q=Path+of+tropical+cyclone+freddy]

Refer to the extract.

1.4.1 On which date did Tropical Cyclone Freddy hit Madagascar? (1 x 1) (1)

1.4.2 Why was the impact of Tropical Cyclone Freddy more severe (destructive) in Mozambique than in Madagascar? (1 x 2) (2)

Refer to the path of Tropical Cyclone Freddy.

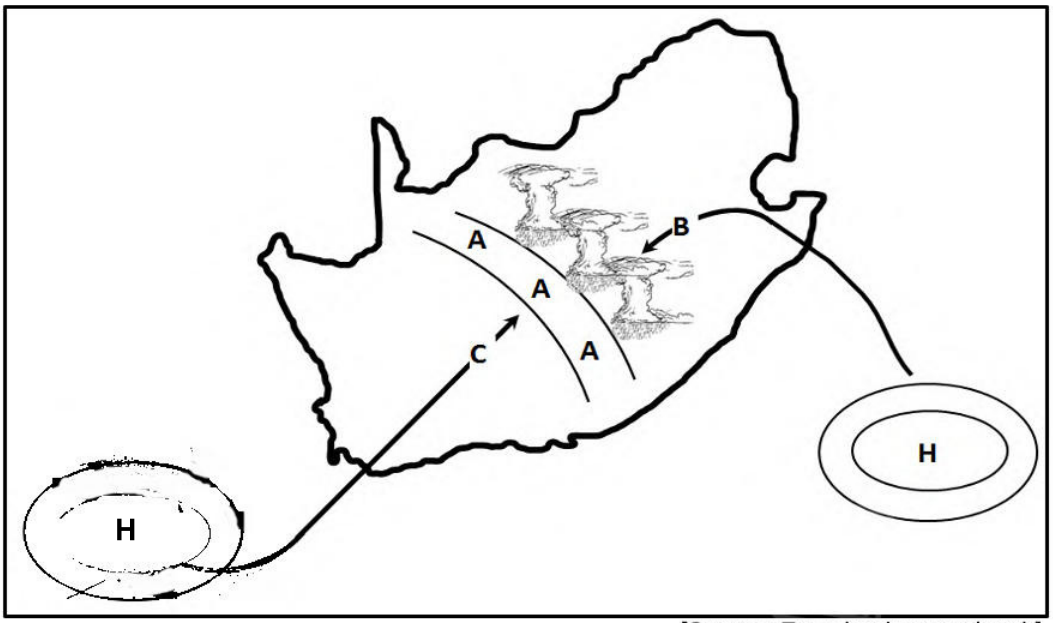
1.4.3 Give TWO reasons why Tropical Cyclone Freddy changed from a tropical cyclone to a tropical depression from 21 February to 22 February. (2 x 2) (4)

1.4.4 Why is the north-westerly path taken by Tropical Cyclone Freddy considered rare (unusual)? (1 x 2) (2)

1.4.5 How did the Mozambique channel influence the increase in intensity (strength) of Tropical Cyclone Freddy? (1 x 2) (2)

1.4.6 Explain how damage to infrastructure caused by Tropical Cyclone Freddy could have a negative impact on people in the affected area. (2 x 2) (4)

1.5 Refer to the sketch below, which illustrates the development of line thunderstorms during summer.



[Source: Examiner's own sketch]

1.5.1 Identify the front at **A**. (1 x 1) (1)

1.5.2 Give the wind direction at **B** and **C**. (2 x 1) (2)

1.5.3 State the moisture content of air masses **B** and **C**. (2 x 1) (2)

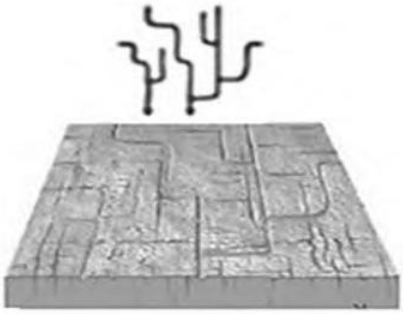
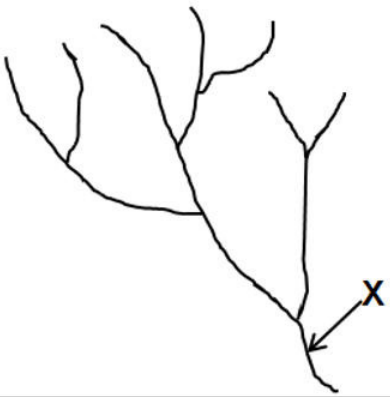
1.5.4 Explain the formation of line thunderstorms over the interior of South Africa. (3 x 2) (6)

1.5.5 What is the positive impact of the heavy rainfall associated with line thunderstorms on the physical (natural) environment? (2 x 2) (4)

[60]

QUESTION 2: GEOMORPHOLOGY

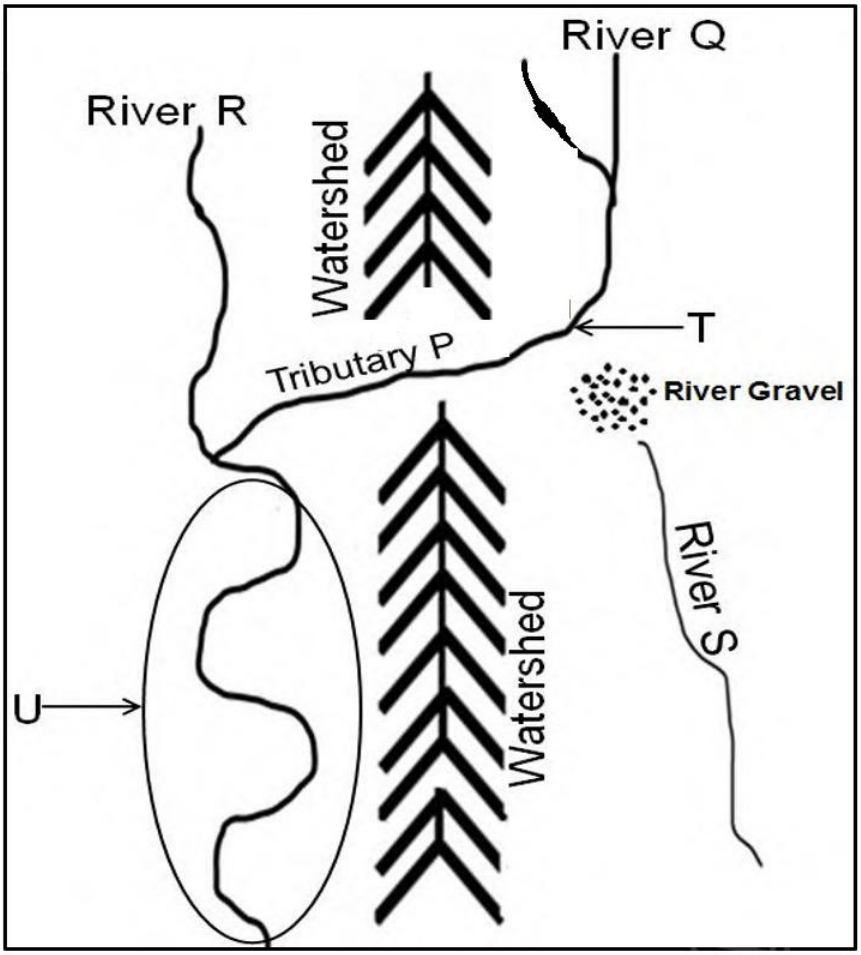
2.1 Complete the statements in COLUMN A with the options in COLUMN B. Write only **Y** or **Z** next to the question numbers (2.1.1 to 2.1.7) in the ANSWER BOOK, e.g. 2.1.8 **Y**.

	COLUMN A	COLUMN B
2.1.1	Dendritic stream pattern	**Y**  **Z** 
2.1.2	Stream pattern develops on a dome	**Y** trellis **Z** radial
2.1.3	Stream pattern is characterised by short tributaries joining the main stream at right angles	**Y** rectangular **Z** trellis
2.1.4	The underlying rock structure of the stream pattern below has … 	**Y** cracked and jointed rock **Z** hard and soft rock
2.1.5	Drainage density of a river system flowing in areas of high permeability will be …	**Y** high **Z** low
2.1.6	The stream order at **X** 	**Y** 2 **Z** 3
2.1.7	Characteristics of a first-order stream in a drainage basin	**Y** straight and short **Z** straight and long

(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. D.

Refer to the sketch below on river capture (stream piracy) to answer QUESTIONS 2.2.1 to 2.2.6.



[Source: Examiner's own sketch]

2.2.1 The sketch illustrates a/an …

A longitudinal profile.
B plan view.
C oblique view.
D cross profile.

2.2.2 River capture has taken place because tributary **P** flows on … rock and over a … gradient than river **Q**.

(i) softer
(ii) harder
(iii) gentler
(iv) steeper

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

2.2.3 Tributary **P**, as illustrated in the sketch, is a … stream.

A captured
B captor
C misfit
D beheaded

2.2.4 The process in which tributary **P** lengthened its channel by cutting through the watershed is known as …

A river rejuvenation.
B lateral erosion.
C river capture.
D headward erosion.

2.2.5 Feature **T** is known as a/an …

A wind gap.
B elbow of capture.
C knickpoint waterfall.
D gorge.

2.2.6 River **R** will have a … drainage basin and a/an … velocity after river capture.

(i) smaller
(ii) larger
(iii) increase in
(iv) decrease in

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

Refer to area **U** on the sketch, where river rejuvenation occurred, to answer QUESTIONS 2.2.7 and 2.2.8.

2.2.7 River rejuvenation occurred due to a/an… and … erosion that took place.

(i) increased volume of water
(ii) isostatic uplift of the land
(iii) vertical
(iv) lateral

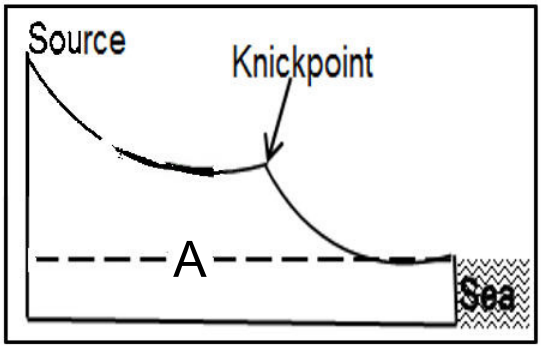
A (i) and (iii)
B (i) and (iv)
C (ii) and (iii)
D (ii) and (iv)

2.2.8 The resultant landform most likely to form after river rejuvenation in area **U** is a/an …

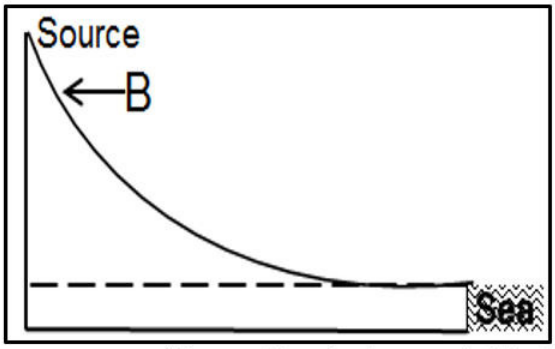
A gorge.
B interlocking spur.
C incised meander.
D rapid. (8 x 1) (8)

2.3 Refer to longitudinal profiles **X** and **Y** below.

PROFILE X



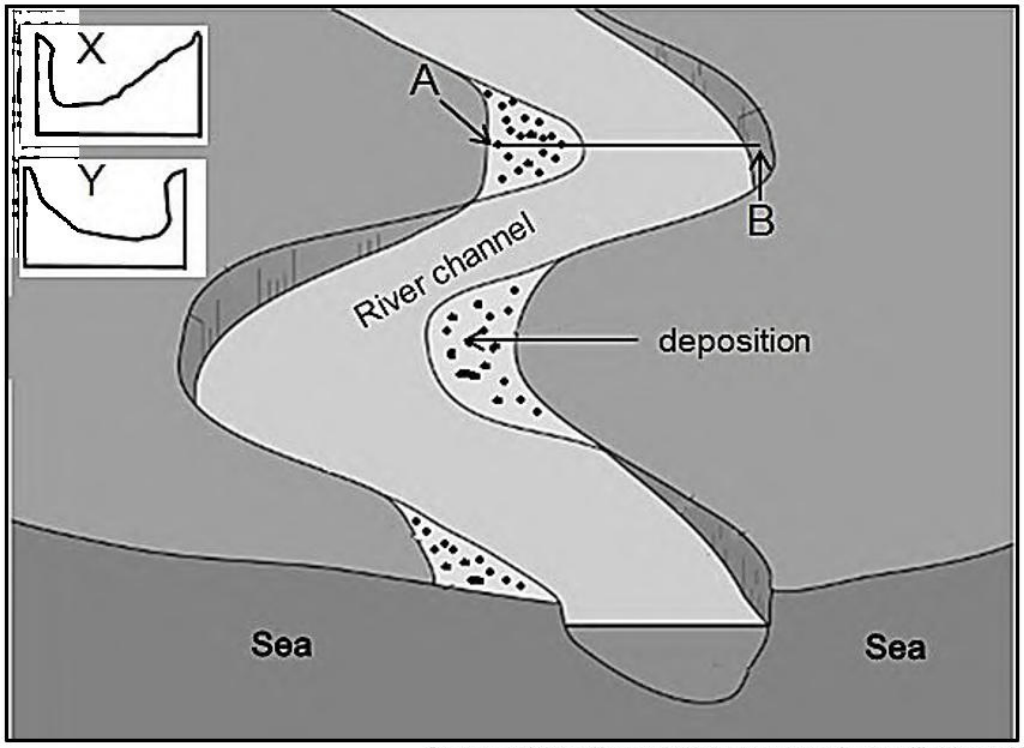
PROFILE Y



[Source: Examiner's own sketches]

2.3.1	What is a *longitudinal profile*?	(1 x 2)	(2)
2.3.2	**A** is known as the (temporary/permanent) base level of erosion.	(1 x 1)	(1)
2.3.3	Give an example of a natural temporary base level of erosion that could develop at the knickpoint.	(1 x 1)	(1)
2.3.4	Which profile, **X** or **Y**, is graded?	(1 x 1)	(1)
2.3.5	Give a reason for your answer to QUESTION 2.3.4.	(1 x 2)	(2)
2.3.6	Explain how the profile (answer to QUESTION 2.3.4) developed.	(2 x 2)	(4)
2.3.7	Draw a rough cross-profile of the river valley at **B**.	(2 x 1)	(2)
2.3.8	Give a reason for the shape of the cross-profile drawn in QUESTION 2.3.7.	(1 x 2)	(2)

2.4 Refer to the sketch below of a fluvial landform/feature.



[Source: https://www.internetgeography.net/flashcard/]

2.4.1 The fluvial landform/feature illustrated in the sketch is a (braided stream/meander). (1 x 1) (1)

2.4.2 Give a characteristic of the river in the lower course in which this fluvial landform/feature (answer to QUESTION 2.4.1) developed. (1 x 1) (1)

2.4.3 Explain how gradient influenced the development of the fluvial landform/feature illustrated in the sketch. (2 x 2) (4)

Refer to cross-sections **X** and **Y** and the fluvial landform/feature above.

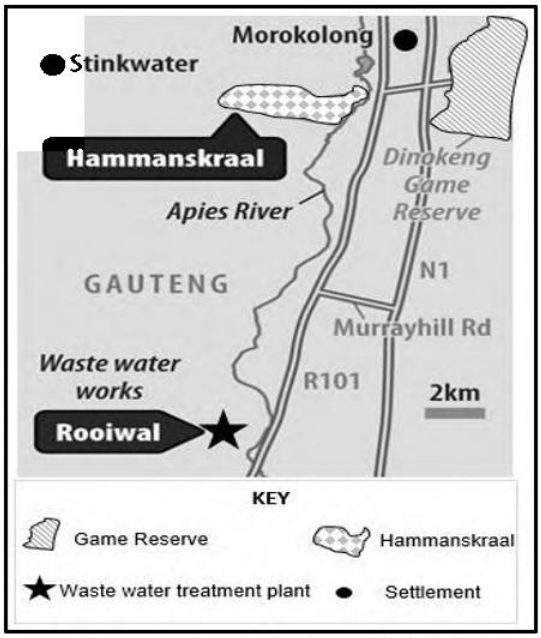
2.4.4 Identify slopes **A** and **B**. (2 x 1) (2)

2.4.5 Which cross-section (**X** or **Y**) represents the line between **A** and **B**? (1 x 1) (1)

2.4.6 Explain the processes involved in the formation of slopes **A** and **B**. (3 x 2) (6)

2.5 Refer to the extract below on catchment and river management.

HAMMANSKRAAL WATER CRISIS EXPOSES YEARS OF NEGLECT



The situation in Hammanskraal may be shocking, but it is not surprising. People have had a decade-long struggle with water and sanitation issues, serving as a clear example of what happens when unplanned development occurs.

The water supply network in Hammanskraal needs to be upgraded and equipped to meet the growing demand. A significant portion of the water infrastructure is in a state of disrepair (poor condition), leading to frequent leaks and disruptions in the water supply. Over the years, several concerns have been raised, further highlighting the extent of the crisis. The Rooiwal water-treatment plant has been failing to treat the waste water and instead it is dumping raw or semi-treated waste water into the Apies River, which supplies Hammanskraal. Residents have repeatedly described the water in Hammanskraal as 'brown and slimy'. In 2019, the South African Human Rights Commission declared the water unfit for human consumption. Adding to the residents' plight, the City of Tshwane, in August 2021, shut down the Temba water purification plant, leaving Hammanskraal without access to water for a week.

[Adapted from https://mg.co.za/environment/2023-05-24-hammanskraal-water-crisis]

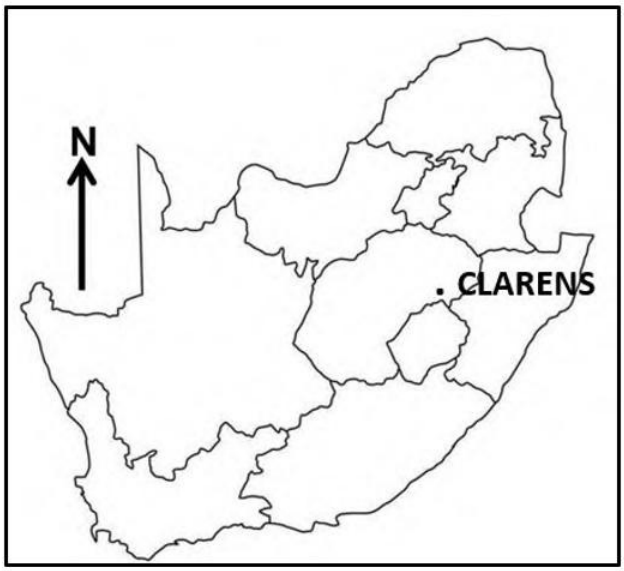
2.5.1	In which province is Hammanskraal located?	(1 x 1)	(1)
2.5.2	What is meant by 'unplanned development' as mentioned in the extract?	(1 x 2)	(2)
2.5.3	Give TWO consequences of 'unplanned development' according to the extract.	(2 x 1)	(2)
2.5.4	How did the Apies River become polluted?	(2 x 1)	(2)
2.5.5	In a paragraph of approximately EIGHT lines, suggest strategies the local municipality can implement (put in place) to reduce pollution of the Apies River.	(4 x 2)	(8)
			[60]

TOTAL SECTION A: 120

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

GENERAL INFORMATION ON CLARENS



Coordinates: 28°31'S; 28°25'E

Clarens is a small town situated in the Thabo Mofutsanyana region of the Free State in South Africa.

The Rooiberg mountain range encompasses the area and further towards the south-east are the Maluti Mountains. The area is surrounded by sandstone cliffs with their multi-coloured layers – the horizontal strata is a characteristic feature of the area.

In Clarens and surrounding areas, the climate is warm and temperate. Days throughout the year are usually sunny and bright and winter night temperatures have been known to drop to -14 °C.

Rainfall occurs mainly in the summer months and thunderstorms are mostly of a very short duration.

[Adapted from https://en.wikipedia.org/wiki/Clarens,_South_Africa]

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

ENGLISH	**AFRIKAANS**
Diggings	Uitgrawings
River	Rivier

3.1 MAP SKILLS AND CALCULATIONS

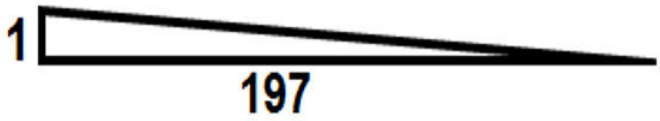
3.1.1 The index contour line in block **A1** on the orthophoto map is … metres.

A 1822
B 1835
C 1840
D 1842 (1 x 1) (1)

3.1.2 The grid reference for spot height 1872 in block **B1** on the topographical map is …

A 28°30'32"S; 28°33'15"E
B 28°33'32"S; 28°17'15"E
C 28°32'32"S; 28°18'15"E
D 28°34'32"S; 28°15'15"E (1 x 1) (1)

The illustration below represents the average gradient between **6** (block **D1**) and **7** (block **E2**) on the orthophoto map.



3.1.3 (a) Determine the vertical interval (VI) of the illustrated gradient. (1 x 1) (1)

(b) Is the illustrated average gradient between **6** and **7** on the orthophoto map gentle or steep? (1 x 1) (1)

(c) State how the illustrated average gradient influenced the human activities between **6** and **7** on the orthophoto map. (2 x 1) (2)

Refer to spot height 1802 in block **E4** and trigonometrical station 182 in block **E5** on the topographical map.

3.1.4 (a) Determine the true bearing (TB) from spot height 1802 to trigonometrical station 182. (1 x 1) (1)

(b) Calculate the magnetic declination (MD) for 2024 if the total change is 44' westwards. (2 x 1) (2)

(c) Determine the magnetic bearing (MB) from spot height 1802 to trigonometrical station 182.

Formula: **MB = TB + MD** (1 x 1) (1)

3.2 MAP INTERPRETATION

Refer to the topographical map.

3.2.1 What is the most likely reason for the difference in average temperature between spot height 2011 in block **A2** and trigonometrical station 181 in block **E3**, as indicated in the table below?

FEATURE	AVERAGE TEMPERATURE (°C)
Spot height	6
Trigonometrical station	14

A Latitude
B Altitude
C Slopes
D Valleys (1 x 1) (1)

3.2.2 The rainfall in the mapped area is seasonal. Give evidence from block **E5** on the topographical map to support this statement. (1 x 1) (1)

Refer to block **E4** on the orthophoto map.

3.2.3 At what time (morning or afternoon) was the photograph taken? (1 x 1) (1)

3.2.4 Give a reason for your answer to QUESTION 3.2.3. (1 x 2) (2)

Refer to the topographical map.

3.2.5 State the purpose of the row of trees in blocks **A5** and **B5**. (1 x 1) (1)

3.2.6 The landform **8** to **9** in block **B4** on the orthophoto map is a … and is known as a/an …

(i) spur
(ii) valley
(iii) watershed
(iv) interfluve

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

Refer to streams **F** in block **A2** and **G** in block **D1** on the topographical map.

3.2.7 In which direction does stream **F** in block **A2** flow? (1 x 1) (1)

3.2.8 Give a reason for your answer to QUESTION 3.2.7. (1 x 2) (2)

3.2.9 How has the stream at **G** in block **D1** made cultivation possible? (1 x 2) (2)

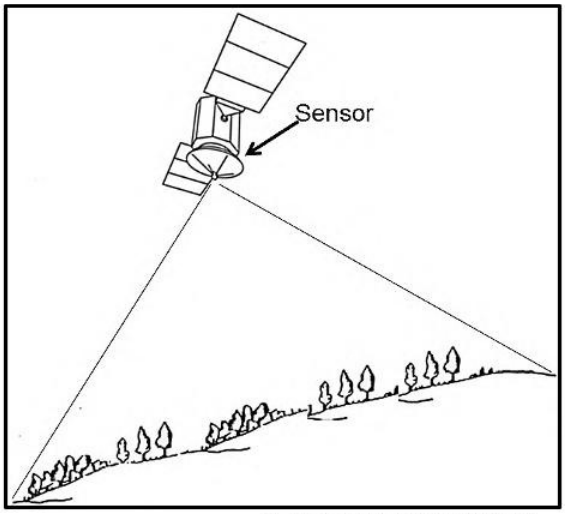
3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

3.3.1 The dam at **H** in block **B3** on the topographical map is a … feature and is considered to be … water.

(i) polygon
(ii) line
(iii) perennial
(iv) non-perennial

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

Refer to blocks **C4 and C5** on the orthophoto map together with the sketch below on remote sensing.



[Examiner's own sketch]

3.3.2 Identify the remote sensing device in the sketch. (1 x 1) (1)

Remote sensing was used to generate the image (photograph) used to create the orthophoto map.

3.3.3 Is the resolution of the orthophoto map high or low? (1 x 1) (1)

3.3.4 Give a reason for your answer to QUESTION 3.3.3. (1 x 2) (2)

3.3.5 The cost of developing infrastructure in blocks **C4 and C5** will be (more/less) expensive. (1 x 1) (1)

3.3.6 Give a reason for your answer to QUESTION 3.3.5. (1 x 2) (2)

TOTAL SECTION B: 30
GRAND TOTAL: 150