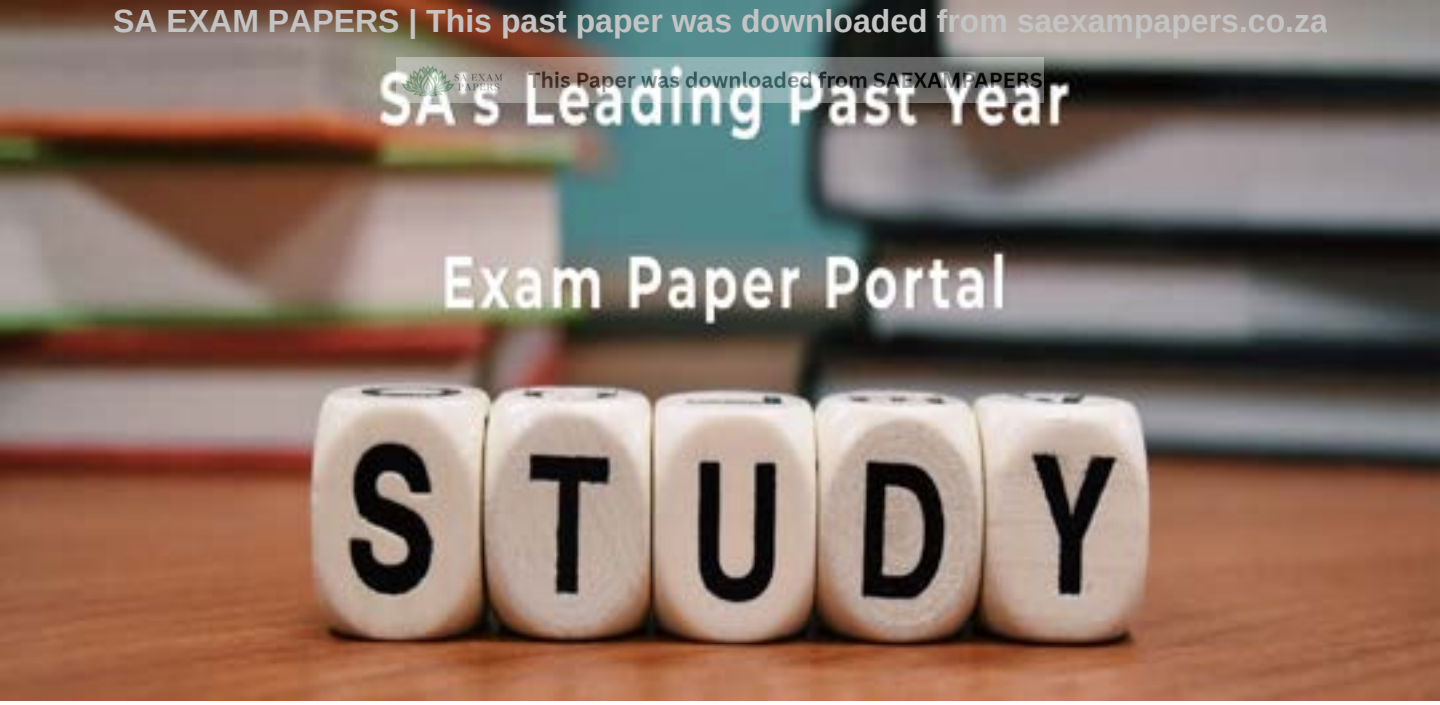


# METRO CENTRAL EDUCATION DISTRICT

## COMMON TRIAL EXAM

**GRADE 12**

**GEOGRAPHY PAPER 1**

**29 AUGUST 2025**

**MARKS: 150**

**TIME: 3 hours**

**This paper consists of 15 pages**

## 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 make use of a magnifying glass.

13. Write neatly and legibly.

## SPECIFIC INSTRUCTIONS AND INFORMATION FOR SECTION B

14. A 1 : 50 000 topographical map 2829DB LADYSMITH and a 1 : 10 000 orthophoto map 2829 DB 6 LADYSMITH are provided.

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

16. Show ALL calculations. Marks will be allocated for this.

## SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY

## QUESTION 1: CLIMATE AND WEATHER

1.1 Give ONE term for each of the following descriptions by choosing the term from the list below. Write only the term next to the question numbers (1.1.1 to 1.1.8) in the ANSWER BOOK, for example 1.1.9 cloud.

| |
|---|
| temperature inversion, frost pocket, anabatic wind, hygroscopic nuclei, isotherm, katabatic wind, radiation fog, advection fog, thermal belt |

1.1.1 A type of wind that results from air moving up the valley slope during the day

1.1.2 Forms at night under clear, calm conditions

1.1.3 Lines on a map connecting points having the same temperature

1.1.4 An area where a warm air mass is trapped between two colder air masses

1.1.5 The term used to describe an increase in temperature as height increases

1.1.6 A type of wind that result from air moving down the valley slope at night

1.1.7 Particles of dust, smoke or salt that water vapour sticks to and condenses

1.1.8 Occurs when the temperature of cold air on the valley floor drops to below freezing point (8 x 1) (8)

1.2 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 (1.2.1 to 1.2.7) in the ANSWER BOOK, for example 1.2.8 A.

1.2.1 This system results in stable, fine weather with clear skies

A anticyclones.
B cyclones.
C depressions.
D heat low.

1.2.2 In a thermal low, the air in contact with the earth surface ... and ... towards a low-pressure centre.

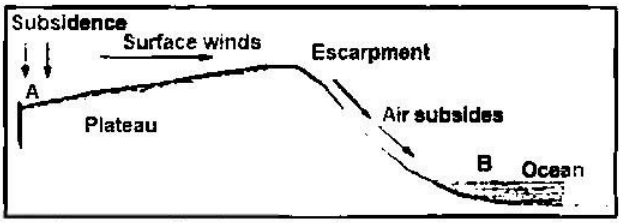
(i) cools
(ii) heats
(iii) diverges
(iv) converges

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

1.2.3 The … deflects mid-latitude cyclones away from the coast in summer.

A Coastal low
B South Indian High-Pressure Cell
C South Atlantic High-Pressure Cell
D Kalahari High-Pressure Cell

1.2.4 The pressure cells … and … at A and B are responsible for the development of a berg wind as indicated in the diagram below,




[Adapted by examiner from fotised.com]

(i) Kalahari High-Pressure Cell
(ii) South Indian High-Pressure Cell
(iii) Thermal low
(iv) Coastal low

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

1.2.5 South African berg winds are warm offshore winds due to the ...

A temperatures are warmer above the plateau.
B low-pressure cell that feeds warm moist air from the interior.
C temperature of air that decreases by 1 °C per 100 m as it ascends.
D temperature of air that increases by 1 °C per 100 m as it descends.

1.2.6 Onshore winds on the west coast are ... and ...

(i) warm
(ii) cold
(iii) dry
(iv) moist

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

1.2.7 In winter ... air compresses and ... adiabatically which causes the inversion layer to be below the escarpment.

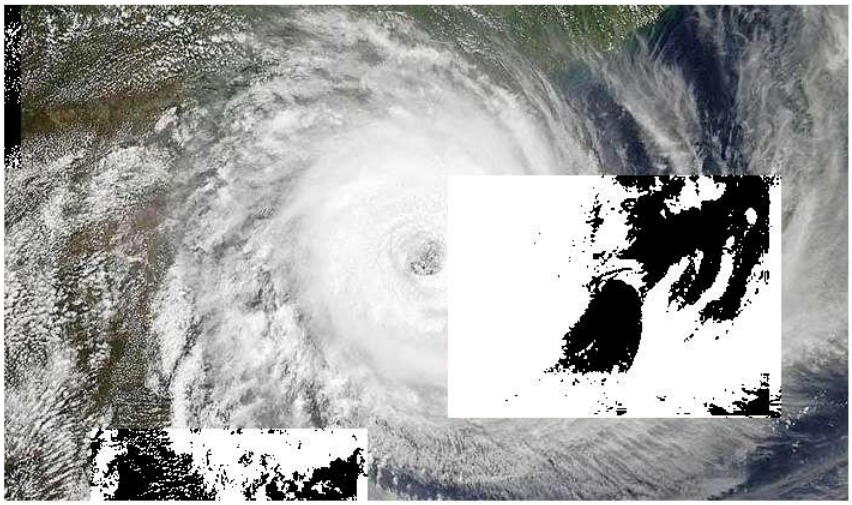
(i) sinking
(ii) rising
(iii) heats
(iv) cools

A (i) and (iii)
B (i) and (iv)
C (ii) and (iii)
D (ii) and (iv) (7 x 1) (7)

1.3 Refer to the extract below on Tropical Cyclone Idai.

Death Toll From Idai Rises Above 800: 3rd Deadliest Southern Hemisphere Cyclone on Record

Dr. Jeff Masters · April 1, 2019, 12:03 PM EDT



Above: Cyclone Idai as seen at 12Z March 14, 2019, approaching landfall in Mozambique. Image credit: NASA.

The death toll from horrific Cyclone Idai in southeast Africa has risen above 800, making the storm the third deadliest tropical cyclone on record in the Southern Hemisphere. Only Tropical Cyclone Flora of 1973 (1650 killed in Indonesia) and the 1892 Mauritius Cyclone (1200 deaths in Mauritius) were deadlier.

The official death for Idai on Monday morning stood at 826, with 501 dead in Mozambique, 259 in Zimbabwe, 56 in Malawi, 7 in South Africa, and 3 in Madagascar. According to EM-DAT, Idai is the deadliest flood on record for Zimbabwe, exceeding the toll of 251 in January 2017 from Tropical Cyclone Dineo.

The final death toll from Idai will never be known. Media reports detail that many bodies have been buried without being registered with authorities. The bodies of many other victims have been eaten by crocodiles or washed out to sea, and many will never be found.

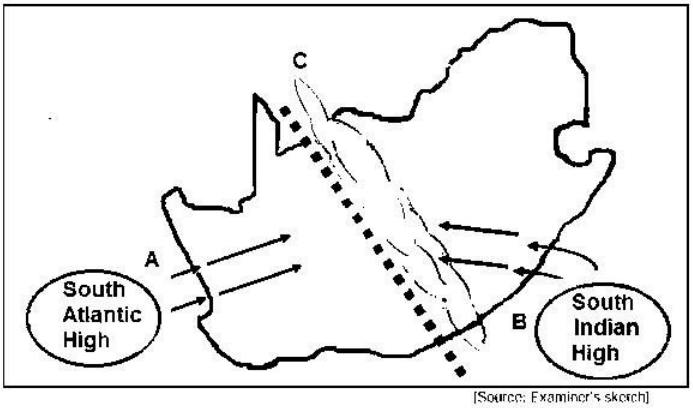
https://www.wunderground.com/cat6/Death-Toll-Idai-Rises-Above-800-3rd-Deadliest-Southern-Hemisphere-Cyclone-Record

| | | | |
|---|---|---|---|
| 1.3.1 | During which season do Tropical Cyclones typically occur? | (1 x 1) | (1) |
| 1.3.2 | How many Tropical Cyclones had occurred in this ocean before Idai in 2019? | (1 x 1) | (1) |
| 1.3.3 | Give ONE reason why the final death toll of Tropical Cyclone Idai will never be known? | (1 x 1) | (1) |
| 1.3.4 | Explain TWO conditions necessary for the formation of a Tropical Cyclone. | (2 x 2) | (4) |

1.3.5 What is the importance of Madagascar for the eastern coastline of Southern Africa? (1 x 2) (2)

1.3.6 Discuss precautionary measures that can be taken to minimise the impact of Tropical Cyclones. (3 x 2) (6)

1.4 The diagram below shows the presence of a line thunderstorm across South Africa.




[Source: Examiner's sketch]

1.4.1 Does the line thunderstorm obtain its source of moisture from ocean A or B? (1 x 1) (1)

1.4.2 Do line thunderstorms typically occur in summer or in winter? (1 x 1) (1)

1.4.3 Name the feature represented by the dotted line C? (1 x 1) (1)

1.4.4 Explain why line thunderstorms typically occur along the dotted line C. (2 x 2) (4)

1.4.5 State TWO weather conditions associated with the passage of a line thunderstorm (2 x 2) (4)

1.4.6 Explain any TWO precautionary measures that farming communities can take to minimise the impact of line thunderstorms. (2 x 2) (4)

1.5 Refer to the extract below based on urban heat islands.

**CITY DWELLERS ARE BEARING THE BRUNT OF EXTREME TEMPERATURES**

Thanks to a phenomenon that makes urban areas hotter than their surroundings, cities such as Pretoria are as much as 6 °C hotter than they could be. The heat comes from decades of poor planning. Since the 1950s, the global focus of city infrastructure planning has been on cars and on getting as many people as possible into tall buildings (skyscrapers). In South Africa's six big cities, this means tarred roads crisscrossing what used to be fields, big cement slabs providing parking for the cars, high-rise apartments and office blocks overcrowding their occupants. This both creates and traps heat, which leads to an urban heat island. This effect is worse at night, with cities storing heat. The World Health Organisation (WHO) says urban heat islands, which both raise temperatures and trap pollutants, will have to disappear in this century if future generations are to live healthy lives in cities. A possible way of addressing the issue of heat islands is introducing 'green' strategies. Green strategies are sustainable and do not harm the environment.

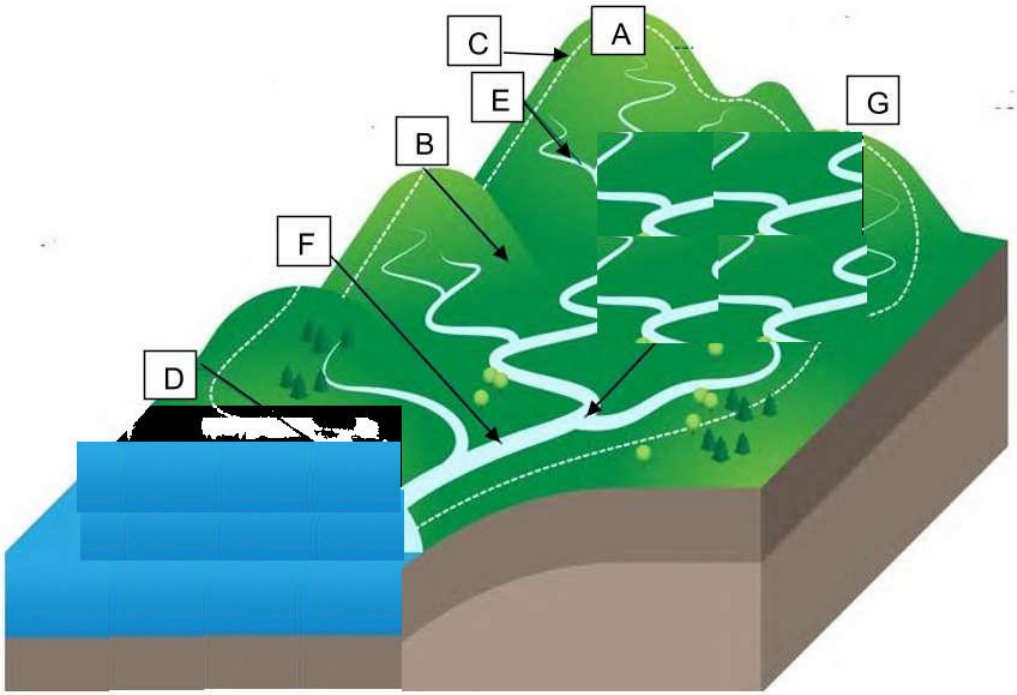
**[Adapted from https://mg.co.za/article/2016-01-16-beyond-the-inferno-how-sa-cities-must-green]**

| | | | |
|---|---|---|---|
| 1.5.1 | Define the concept urban heat island. | (1 x 2) | (2) |
| 1.5.2 | Give ONE quotation from the extract that suggests that poor planning is responsible for increasing temperatures in cities. | (1 x 1) | (1) |
| 1.5.3 | Why is the urban heat island effect more concentrated at night? | (2 x 2) | (2) |
| 1.5.4 | Discuss ONE negative effect of urban heat islands | (1 x 2) | (2) |
| 1.5.5 | In a paragraph of approximately EIGHT lines, provide sustainable green strategies, as referred to in the extract, that can reduce the heat island effect. | (4 x 2) | (8) |

**[60]**

**QUESTION 2: GEOMORPHOLOGY**

2.1 The diagram below depicts the features found in a drainage basin. Give ONE answer for each of the following descriptions by choosing the letter from the diagram below. Write only the letter next to the question numbers (2.1.1 to 2.1.7) in the ANSWER BOOK, for example 2.1.8 H.




2.1.1 The mouth of the river.

2.1.2 A watershed

2.1.3 A main stream

2.1.4 An interfluve

2.1.5 The origin of the river

2.1.6 A tributary

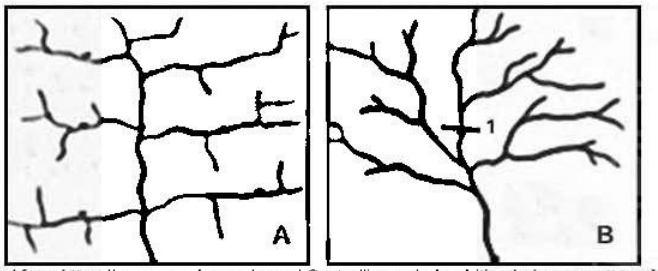
2.1.7 A confluence (7 x 1) (7)

2.2 Choose a term from COLUMN B that matches the characteristic/description in COLUMN A. Write only the letter (A–I) next to the question numbers (2.2.1 to 2.2.8) in the ANSWER BOOK, e.g. 2.2.9 J.

| | COLUMN A | COLUMN B |
|---|---|---|
| 2.2.1 | Flat, natural feature next to a river | A. rapid |
| 2.2.2 | An embankment along the river where coarse material is deposited first | B. delta |
| 2.2.3 | Curves or bends found along the course of a river | C. meanders |
| 2.2.4 | When a meander loop becomes separated from the river | D. braided stream |
| | | E. flood plain |
| 2.2.5 | Streams with multiple channels and islands of sediment between the channels | F. oxbow lake |
| 2.2.6 | A vertical drop in the course of a river as a result of softer rock eroding faster than hard rock | G levee |
| 2.2.7 | A depositional landform that occurs when a river flows into the ocean | H. waterfall |
| 2.2.8 | A section of a river where the water flows very fast and turbulently over rocks, creating frothy white water | I. main stream |

(8 x 1) (8)

2.3 Refer to the diagrams showing drainage patterns.




[Adapted from https://www.google.com/search?q=trellis+and+dendritic+drainage+patterns]

2.3.1 Identify the drainage patterns of rivers **A** and **B**. (2 x 1) (2)

2.3.2 Differentiate between the underlying rock structure of drainage patterns **A** and **B** respectively. (2 x 2) (4)

2.3.3 Why are the tributaries of the main stream parallel to each other in drainage pattern **A**? (1 x 2) (2)

2.3.4 Determine the stream order at point 1 in drainage pattern **B**. (1 x 2) (2)

2.3.5 Choose the CORRECT word between brackets to make the statement TRUE.

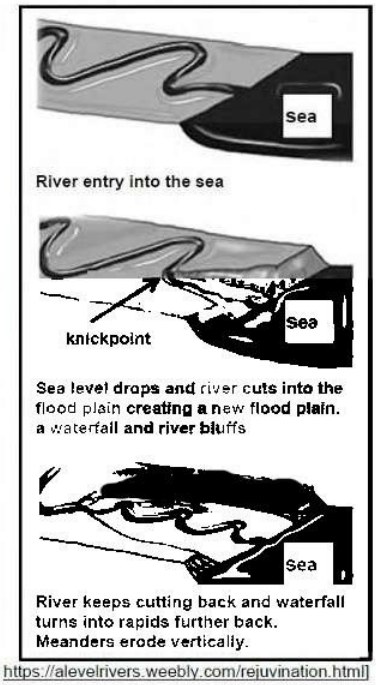
The higher the stream order, the (higher / lower) the drainage density. (1 x 1) (1)

2.3.6 Refer to drainage pattern **B** and describe the relationship between;

(a) Drainage density and low rainfall
(b) Drainage density and steep gradient (2 x 2) (4)

2.4 The diagram below illustrates river rejuvenation

**RIVER REJUVENATION**




[Source: https://alevelrivers.weebly.com/rejuvination.html]

2.4.1 Define the term river rejuvenation. (1 x 2) (2)

2.4.2 Identify the condition that resulted in river rejuvenation. (1 x 1) (1)

2.4.3 Name ONE likely fluvial feature that can form at the knickpoint along the river profile. (1 x 2) (2)

2.4.4 Explain the impact of river rejuvenation on the grading of a river (2 x 2) (4)

2.4.5 Discuss the changes that will occur in the fluvial features found in the illustrated course of the river as a result of river rejuvenation. (3 x 2) (6)

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

**RIVER TURNS BLACK AFTER COAL MINE DAM COLLAPSES NEXT TO RURAL COMMUNITIES AND HLUHLUWE-IMFOLOZI GAME RESERVE**

By Tony Carie, 11 January 2022

Large volumes of potentially toxic coal mine effluent (waste) have spilled into rivers flowing through rural communities and the Hluhluwe-Imfolozi Game Reserve. According to the US-based Union of Concerned Scientists, mining and coal-washing operations produce high water pollution which can also contain toxic heavy metals such as arsenic copper, lead and manganese.
When the slurry dam* wall collapsed on 24 December, the residents of the affected communities were not warned about the potential hazards until two weeks later. Conservation managers in the neighbouring Hluhluwe-Imfolozi Game Reserve were also led to believe that the spill was under control, only to discover pitch-black water flowing through the reserve several days later.
By this stage, the black water had reached the confluence of the Black and White Imfolozi Rivers.

***slurry dam – a dam that is used to store by-products of mining operations after separating the ore***

[Adapted from dailymaverick.co.za]

| | | | |
|---|---|---|---|
| 2.5.1 | What caused the water in the river to change its colour to black? | (1 x 1) | (1) |
| 2.5.2 | Name any TWO toxic heavy metals in the extract that could be found in polluted mine water. | (2 x 1) | (2) |
| 2.5.3 | Quote ONE phrase from the extract that indicates that the mining company did NOT disclose (make known) the pollution of the river. | (1 x 2) | (2) |
| 2.5.4 | What could have been the negative economic impact of non-disclosure (answer to QUESTION 2.5.3) on the community? | (1 x 2) | (2) |
| 2.5.5 | In a paragraph of approximately EIGHT lines, describe the environmental importance of managing the Imfolozi drainage basin AND suggest measures that the local municipality could implement to maintain the future quality of water. | (4 x 2) | (8) |

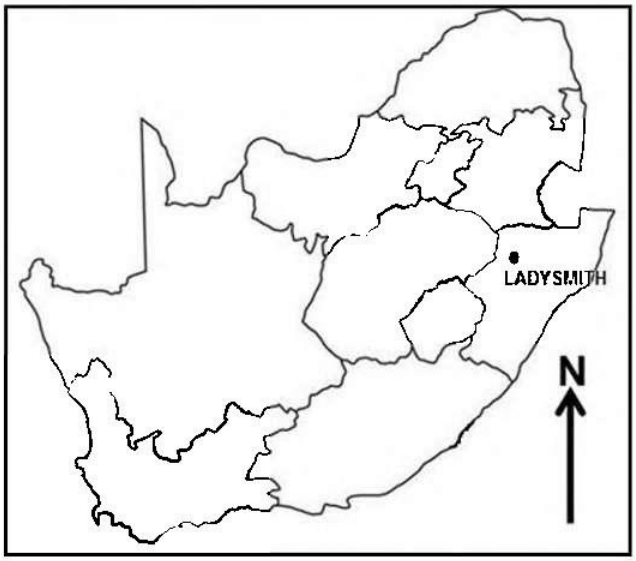
**[60]**

## SECTION B

## QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

### GENERAL INFORMATION ON LADYSMITH

**Coordinates: 28°33'S; 29°46'E**




Ladysmith is a city in the Uthukela District of KwaZulu-Natal. It is situated along the Klip River. The climate is warm and temperate with the highest rainfall recorded in summer. The average annual temperature is 17,3 °C. The average annual precipitation is approximately 1 057 mm. This climate provides ideal conditions for agricultural raw materials.

[Adapted from https://en.wikipedia.org/wiki/LADYSMITH]

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

| ENGLISH | AFRIKAANS |
|---|---|
| Furrow | Voor |
| Aerodrome | Vliegveld |
| Klip River | Kliprivier |
| Sewage works | Rioolwerke |
| Weir | Studam |

## 3.1 MAP SKILLS AND CALCULATIONS

3.1.1 Ladysmith receives its highest rainfall in … (1x1) (1)

A summer
B autumn
C winter
D spring

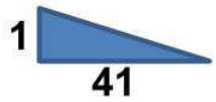
3.1.2 The index contour line in block E2 on the orthophoto map is … metres. (1x1) (1)

A 1085
B 1080
C 1090
D 1070

3.1.3 The town 36 km away from Ladismith is … (1x1) (1)

A Newcastle
B Harrismith
C Glencoe
D Colenso

3.1.4 The illustration below represents the average gradient between spot height 1159 in block **A1** and spot height 1118 in block **A2** on the topographic map.




(a) Determine the difference in height between spot height 1159 and 1118. (1x2) (2)

(b) Does the average gradient shown above represent a gentle or steep slope? (1x1) (1)

(c) Explain why there are no buildings in Thornhill Kop and Bell's Kop. (1x2) (2)

3.1.5 Refer to H in block **B1** and F in block **C2** on the topographical map.

(a) Determine the true bearing (TB) from F to H. (1x2) (2)

**[10]**

## 3.2 MAP INTERPRETATION

Refer to the topographical map.

| | | | |
|---|---|---|---|
| 3.2.1 | The rainfall in the mapped area is seasonal. Give ONE piece of evidence from block B1 to support this statement. | (1x2) | (2) |
| 3.2.2 | The temperature at G is 2°C lower than at F (city centre). Give a reason for this phenomenon. | (1x2) | (2) |
| 3.2.3 | Discuss the role of the row of trees in block B4 in reducing air pollution. | (1x2) | (2) |
| 3.2.4 | The river in block D4 is in the lower course. Provide ONE reason to support this statement. | (1x2) | (2) |
| 3.2.5 | Suggest how the river supports the cultivated land at G. | (1x2) | (2) |
| 3.2.6 | Refer to block C5 on the orthophoto map.<br><br>Why will more deposition take place at **10** than at **11**? | (1x2) | (2)<br>**[12]** |

## 3.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

| | | | |
|---|---|---|---|
| 3.3.1 | The environmental feature labelled **J** in block C4 on the topographical map is a … feature.<br><br>A point<br>B polygon<br>C node<br>D line | (1x1) | (1) |
| 3.3.2 | Explain how the feature labelled **J** is an environmental issue. | (1x2) | (2) |
| 3.3.3 | The reference of the topographical map represents (spatial/attribute) data. | (1x1) | (1) |
| | Refer to **12** in block C2 on the orthophoto map | | |
| 3.3.4 | Define the term buffering. | (1x2) | (2) |
| 3.3.5 | How would buffering at 12 protect the quality of the water in the Klip River? | (1x2) | (2)<br>**[8]** |

**30**

**TOTAL: 150**