basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE



GRADE 12

GEOGRAPHY P1

NOVEMBER 2024

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MARKS: 150

TIME: 3 hours

This question paper consists of 17 pages.

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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.

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 topographical map represents the area covered by the orthophoto map.

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

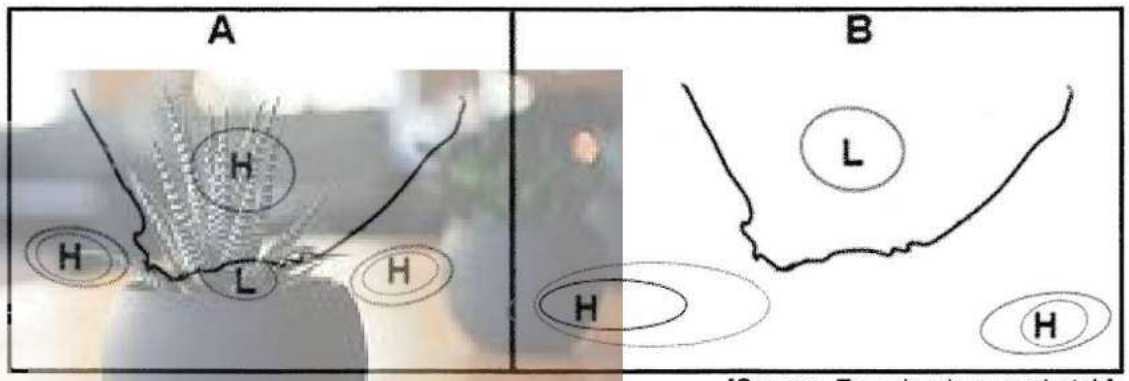
17. You must hand in the topographical and orthophoto map to the invigilator at the end of this examination.

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SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY

QUESTION 1: CLIMATE AND WEATHER

1.1 Refer to sketches **A** and **B** below. Various options are provided as possible answers to the following questions based on the influence of anticyclones in South Africa. 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.



[Source: Examiner's own sketch]

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1.1.1 Sketch **A** shows typical ... conditions.

A summer
B spring
C winter
D autumn

1.1.2 The low-pressure system in sketch **B** forms due to ... over the land.

A low evaporation
B intense heating
C cold dense air
D heavy rainfall

1.1.3 ... is the concept used to describe the elongation of the isobars associated with the South Atlantic anticyclone in sketch **B**.

A Backing
B Divergence
C Ridging
D Convergence

1.1.4 The anticyclones in sketch **A** and **B** change their positions seasonally because of the ...

A rotation of the Earth.
B frictional drag.
C shifting of the ITCZ.
D Coriolis force.

1.1.5 The South Indian anticyclone in sketch **B** is likely to feed more moisture over the east coast in comparison with sketch **A** because it ...

A is a blocking high.
B has a larger fetch (distance).
C diverges dry air.
D has a smaller fetch (distance).

1.1.6 The low-pressure system in sketch **A** will move in a ... direction.

A northerly
B westerly
C easterly
D southerly

1.1.7 Berg winds are most likely to develop in sketch **A** because of the presence of the ... and ...

(i) Kalahari anticyclone
(ii) coastal low
(iii) South Indian anticyclone
(iv) heat low

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

1.1.8 The inversion layer that forms over the escarpment in sketch **B** will favour the formation of ... and ...

(i) frost
(ii) rainfall
(iii) fog
(iv) hail

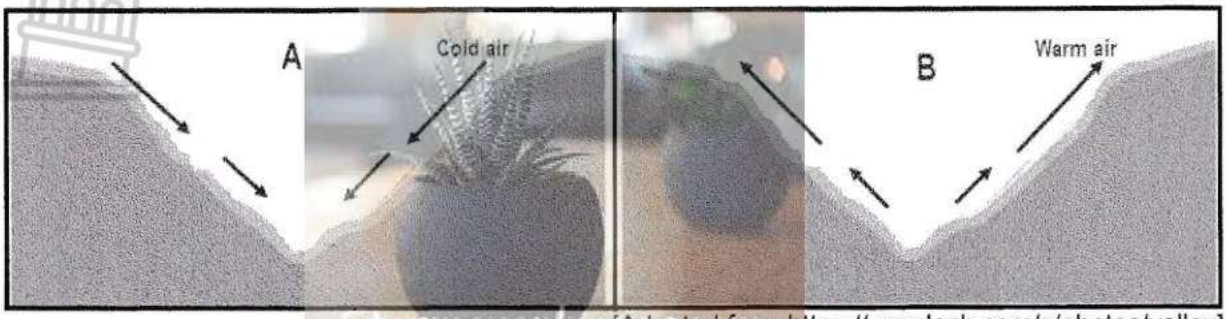
A (i) and (ii)
B (i) and (iii)
C (ii) and (iv)
D (iii) and (iv)

(8 x 1) (8)

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1.2 Match the descriptions below with sketches **A** and **B**. Write only **A** or **B** next to the question numbers (1.2.1 to 1.2.7) in the ANSWER BOOK, e.g.1.2.8 B.

Refer to sketches **A** and **B** on valley climates below to answer QUESTIONS 1.2.1 to 1.2.4.



[Adapted from https://unsplash.com/s/photos/valley]

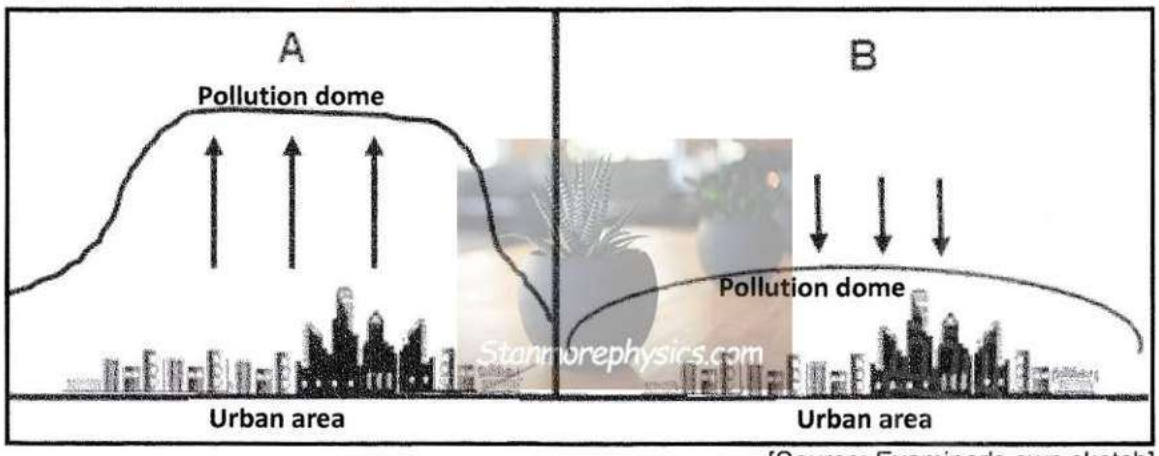
1.2.1 Represents an anabatic wind

1.2.2 Cold air forces the warm air to rise which forms an inversion layer

1.2.3 Occurs during the day due to insolation

1.2.4 Frost forms on the valley floor when the temperature drops below 0 °C

Refer to sketches **A** and **B** on pollution domes below to answer QUESTIONS 1.2.5 to 1.2.7.



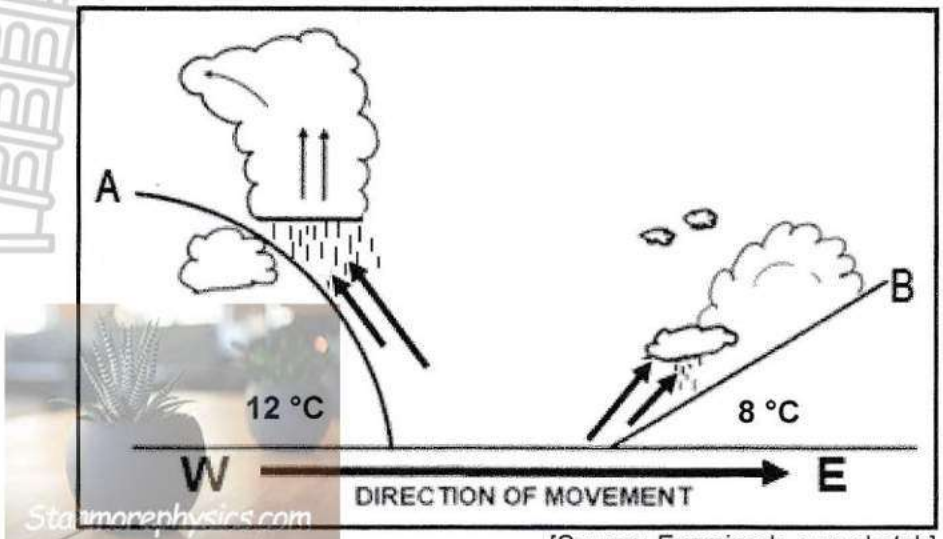
[Source: Examiner's own sketch]

1.2.5 Represents a pollution dome at night

1.2.6 Pollutants are dispersed

1.2.7 Denser concentration of pollutants over the urban area (7 x 1) (7)

1.3 Refer to the cross-section below of a mid-latitude cyclone.



[Source: Examiner's own sketch]

1.3.1 In which general direction do mid-latitude cyclones move? (1 x 1) (1)

1.3.2 Give a reason for your answer to QUESTION 1.3.1. (1 x 2) (2)

1.3.3 How does front **A** give rise to the formation of cumulonimbus clouds? (2 x 2) (4)

1.3.4 In a paragraph of approximately EIGHT lines, explain strategies that can be put in place to manage the negative environmental impact of the heavy rainfall associated with mid-latitude cyclones. (4 x 2) (8)

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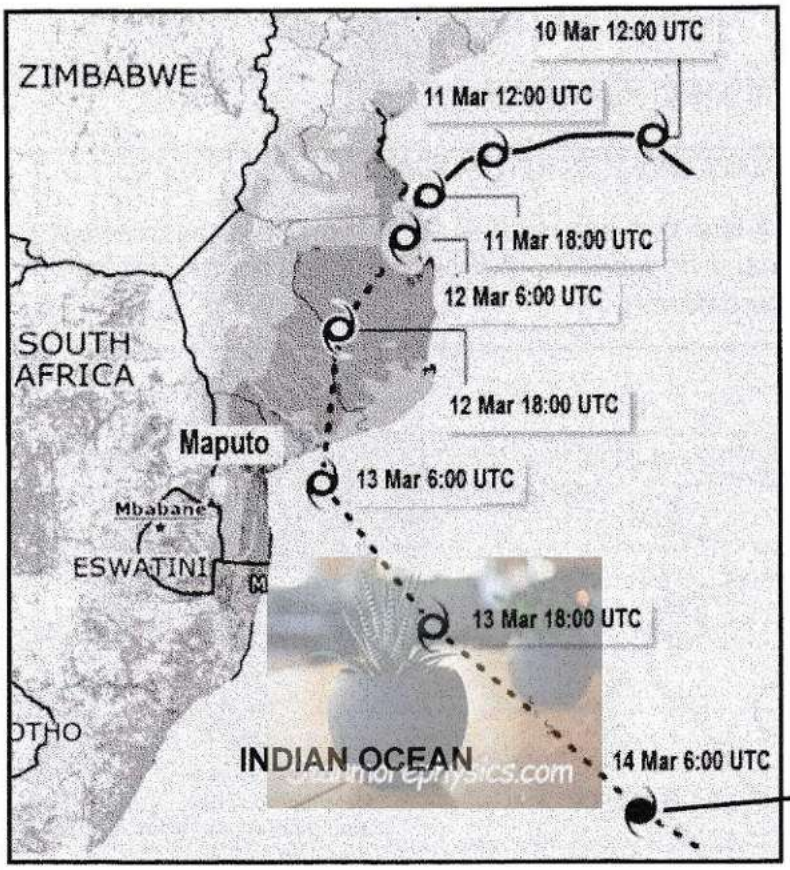
1.4 Refer to the infographic below based on Tropical Cyclone Filipo.

TROPICAL CYCLONE FILIPO

The tropical storm made landfall in Mozambique on 12 March after strengthening off the coast of southeast Africa, bringing strong winds and heavy rain to Mozambique.

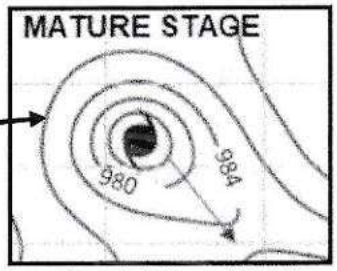
On 13 March, Tropical Storm Filipo moved back over the ocean and developed into a tropical cyclone on 14 March.

PATH OF TROPICAL CYCLONE FILIPO



INFORMATION ON THE PATH OF TROPICAL CYCLONE FILIPO

DATE	TIME	WIND
10 Mar	12:00 UTC	63 km/h
11 Mar	12:00 UTC	95 km/h
11 Mar	18:00 UTC	116 km/h
12 Mar	06:00 UTC	95 km/h
12 Mar	18:00 UTC	74 km/h
13 Mar	06:00 UTC	84 km/h
13 Mar	18:00 UTC	106 km/h
14 Mar	06.00 UTC	127 km/h



[Source: South African Weather Services]

1.4.1 State ONE condition that could have led to the development of Tropical Cyclone Filipo. (1 x 1) (1)

1.4.2 Give evidence from the map and table of information that Tropical Cyclone Filipo had strengthened from 10 to 11 March. (2 x 1) (2)

1.4.3 Give TWO reasons for the decrease in wind speed from 06:00 to 18:00 on 12 March. (2 x 2) (4)

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1.4.4 On 14 March, Tropical Cyclone Filipo reached the mature stage. Draw a labelled cross-section of Tropical Cyclone Filipo in its mature stage. Marks will be awarded for the following:

(a) Cross-section (1 x 1) (1)

(b) Cloud type (1 x 1) (1)

(c) Eye (1 x 1) (1)

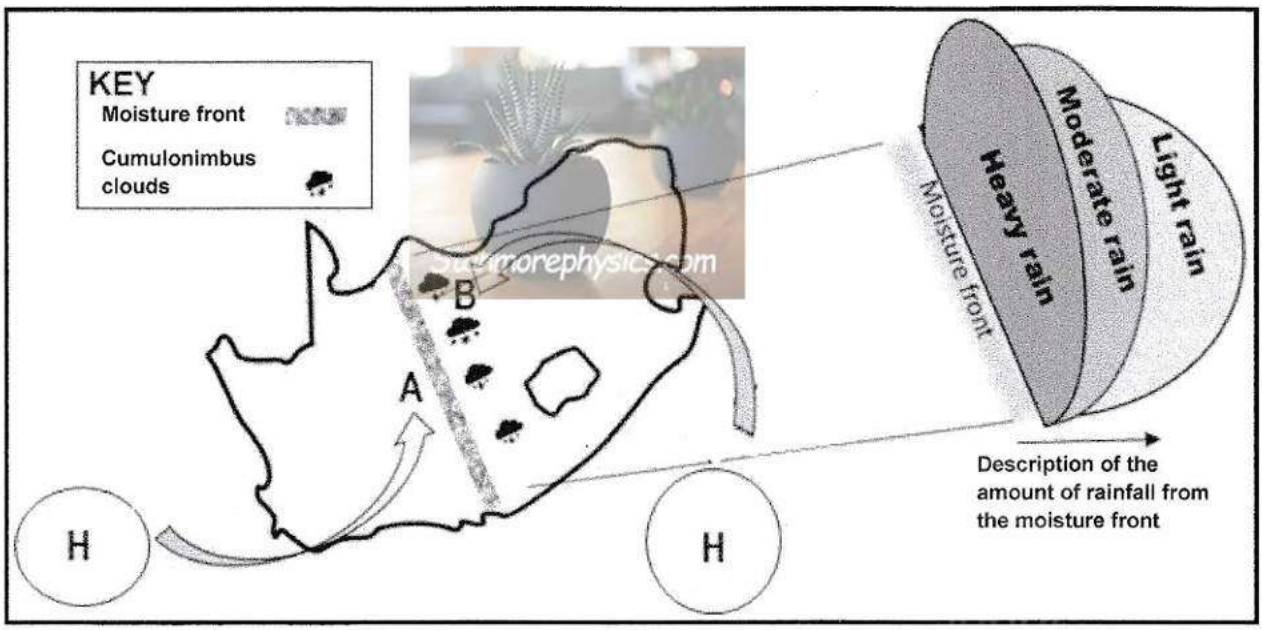
(d) Air movement in the eye (1 x 1) (1)

1.4.5 Account for the lack of rainfall and clouds in the eye of the tropical cyclone. (2 x 2) (4)

1.5 Refer to the source below based on line thunderstorms.

LINE THUNDERSTORMS OVER SOUTH AFRICA

During summer, thunderstorms can form a line that can extend for hundreds of kilometres. These line thunderstorms can persist for many hours and produce damaging winds and hail, which impacts negatively on the natural environment.



[Adapted from https://www.noaa.gov/jetstream/tstrmtypes and examiner's own sketch]

1.5.1 According to the extract, in which season do line thunderstorms commonly occur? (1 x 1) (1)

1.5.2 Describe the temperature and moisture content of wind **A** and wind **B** that led to the formation of the line thunderstorm. (2 x 2) (4)

1.5.3 Explain why the heaviest rainfall occurs closest to the moisture front, as evident in the source. (2 x 2) (4)

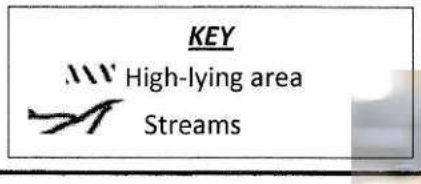
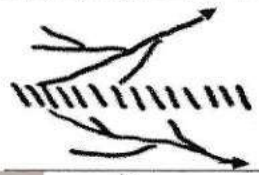
1.5.4 Explain the negative physical (natural) impact of line thunderstorms. (3 x 2) (6)

[60]

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QUESTION 2: GEOMORPHOLOGY

2.1 Match the statements in COLUMN A with the options in COLUMN B on drainage basins. 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.

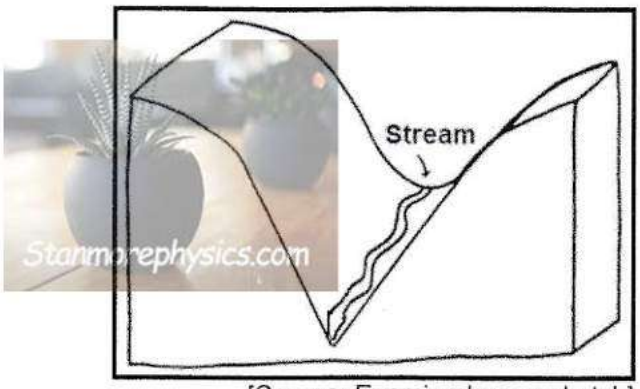
	COLUMN A	COLUMN B
2.1.1	Area drained by a river and its tributaries	**Y** catchment area **Z** drainage basin
2.1.2	Promotes a rapid rise in the water table	**Y** gentle gradient **Z** steep gradient
2.1.3	The upper level of ground water	**Y** water table **Z** through flow
2.1.4	Seepage of water into the ground	**Y** infiltration **Z** run-off
2.1.5	Causes reduction of surface run-off	**Y** impermeable rocks **Z** dense vegetation
2.1.6	The confluence is located at **Y/Z**	**Y**  **Z** 
2.1.7	High-lying area separating two tributaries in the same river system 	**Y**  **Z** 

(7 x 1) (7)

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2.2 Various options are provided as possible answers to the following questions on fluvial processes and landforms/features. 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.

2.2.1 … is responsible for the shape of the river valley below.



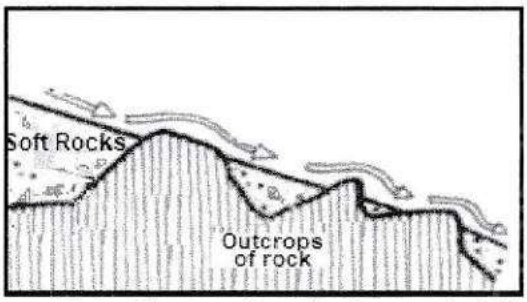
[Source: Examiner's own sketch]

A Deposition
B Lateral erosion
C Weathering
D Vertical erosion

2.2.2 A … forms at the base of a waterfall.

A braided stream
B delta
C gorge
D plunge pool

2.2.3 The fluvial landform/feature depicted in the sketch is a …



[Source: Examiner's own sketch]

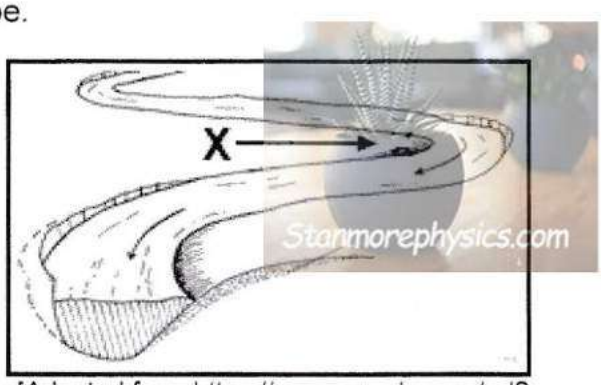
A waterfall.
B valley.
C rapid.
D cliff.

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2.2.4 The flat, low-lying area along the banks of a river in the lower course is a/an ...

A meander.
B delta.
C flood plain.
D alluvial fan.

2.2.5 The slope at **X** on the inner bank of a meander is also referred to as a/an ... slope.



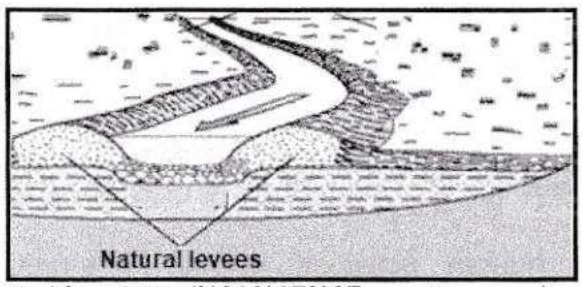
[Adapted from https://www.google.com/url?sa=www.quora.com%2F]

A steep
B undercut
C concave
D slip-off

2.2.6 A/An ... forms when the meander loop is cut off from the main stream.

A delta
B rapid
C ox-bow lake
D flood plain

2.2.7 The benefit of natural levees is ... on the flood plain.



[Adapted from https:/%3A%2F%2Frossettgeography.weebly.com%2F-levees]

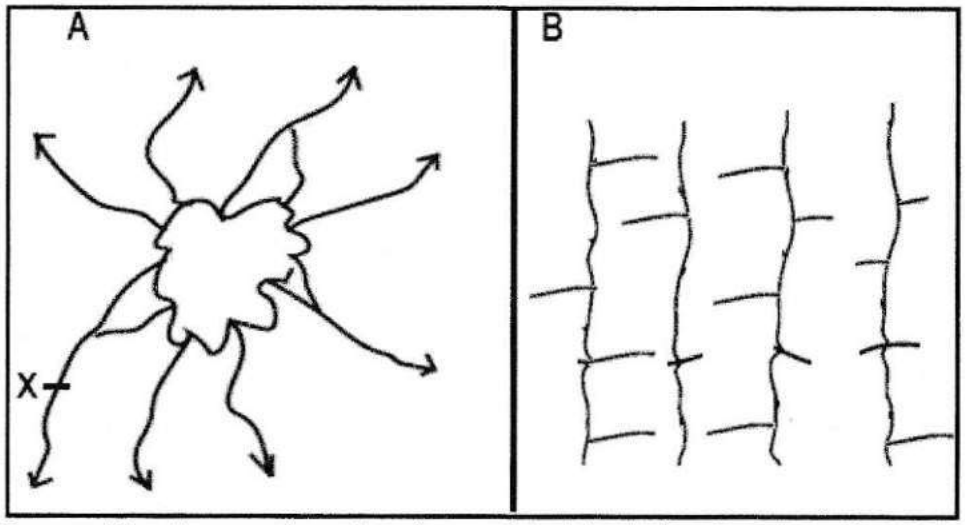
A increased deposition
B reduced flooding
C reduced fertility
D increased flooding

2.2.8 Deltas form at the river mouth when the following conditions occur:

(i) Shallow sea bed
(ii) Steep sea bed
(iii) Strong currents
(iv) Small tidal range

A (i) and (ii)
B (ii) and (iii)
C (iii) and (iv)
D (i) and (iv) (8 x 1) (8)

2.3 Refer to drainage patterns **A** and **B** below.



[Source: https://courses.lumenlearning.com/geo/chapter/reading-types-of-stream]

2.3.1 Identify drainage pattern **A**. (1 x 1) (1)

2.3.2 Determine the stream order of **X** in drainage pattern **A**. (1 x 2) (2)

2.3.3 Give a reason for the direction in which streams flow in drainage pattern **A**. (1 x 2) (2)

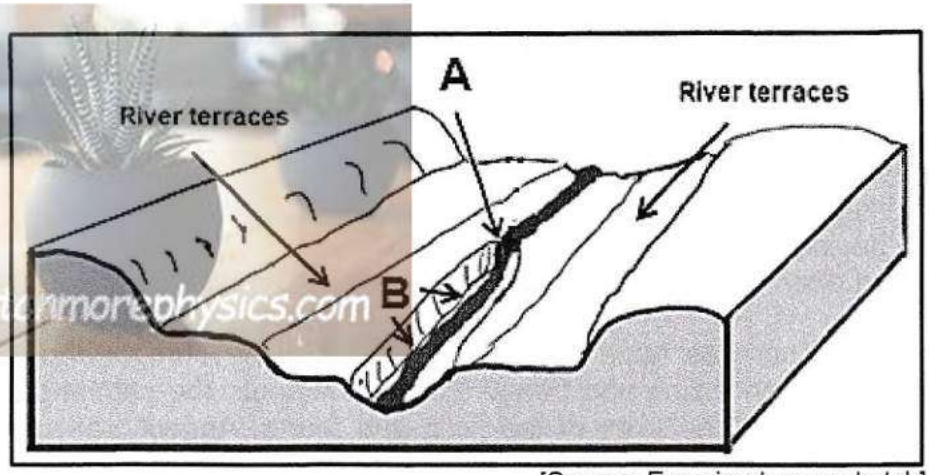
2.3.4 How does the joining of the tributaries to the mainstream differ in drainage patterns **A** and **B**? (1 x 2) (2)

2.3.5 State TWO conditions associated with the underlying rock that contributed to the formation of trellis drainage pattern **B**. (2 x 2) (4)

2.3.6 Why are human activities limited in areas where drainage patterns **A** and **B** are found? (2 x 2) (4)

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2.4 Refer to the sketch below on river rejuvenation.



[Source: Examiner's own sketch]

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

2.4.2 Identify the feature at **A**. (1 x 1) (1)

2.4.3 How does feature **A** indicate that river rejuvenation has taken place? (1 x 2) (2)

2.4.4 Describe the change that river rejuvenation has made to the landscape at **B**. (1 x 2) (2)

Refer to the river terraces in the sketch above.

2.4.5 How do river terraces form? (2 x 2) (4)

2.4.6 Why are some river terraces not suitable for farming? (2 x 2) (4)

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

MANAGEMENT OF CATCHMENT AREAS AND RIVER NETWORKS (SYSTEMS)

River catchments are under severe pressure in some parts of South Africa. The plentiful water they provide has meant that the fertile ground surrounding them is an ideal place for agricultural activities. They are areas of natural beauty and often support both plant and animal species.

Unfortunately, humans have not always recognised the importance of river catchments. When toxins and heavy metals leach into the catchment areas, they can endanger the lives of the flora and fauna. Agricultural run-off can carry chemicals into river catchments, creating an imbalance in nutrient levels and impacts on different species in different ways.

Fortunately, we are now beginning to pay attention to the conservation of these vital natural resources.

[Adapted from https://www.envirotech-online.com/news/water-wastewater/9/breaking-news/what-is-classed-as-a-river-58892]

2.5.1 What is *river management*? (1 x 2) (2)

2.5.2 Name ONE human activity in the extract that has a negative impact on South Africa's catchment areas. (1 x 1) (1)

2.5.3 How does the human activity (answer to QUESTION 2.5.2) negatively impact the health (water quality) of a catchment area? (2 x 2) (4)

2.5.4 In a paragraph of approximately EIGHT lines, suggest sustainable strategies the government can put in place to preserve river catchment areas. (4 x 2) (8)

[60]

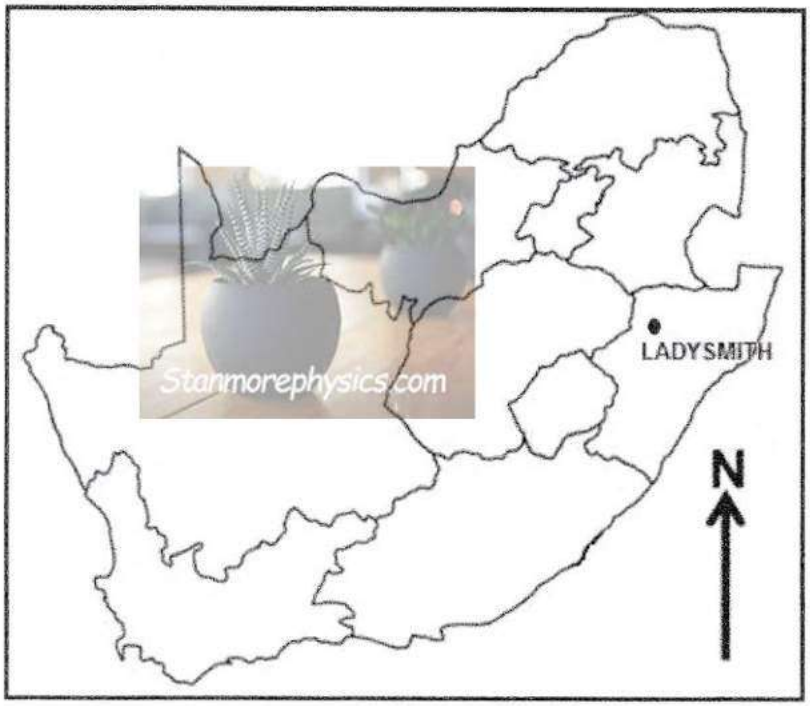
TOTAL SECTION A: 120

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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 topographical map:

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

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3.1 MAP SKILLS AND CALCULATIONS

3.1.1 The town closest to Ladysmith is ...

A Glencoe.
B Harrismith.
C Newcastle.
D Colenso. (1 x 1) (1)

3.1.2 The feature located at grid reference (coordinates) 28°31'32"S and 29°47'22" E is ...

A cultivated land.
B perennial water.
C a road.
D a reservoir. (1 x 1) (1)

3.1.3 The mean magnetic declination for the year ... was 21°03' west of true north.

A 2000
B 1995
C 2001
D 2024 (1 x 1) (1)

3.1.4 Determine the total annual change for 2024. (2 x 1) (2)

Refer to the orthophoto map.

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3.1.5 Calculate the area of the demarcated feature **6** in blocks **A4/A5** and block **B4**. Give the answer in km².

Use the following information: Length is 3,0 cm.

Formula: **Length x Breadth** (4 x 1) (4)

3.1.6 Give a reason why the expansion of the demarcated feature **6** (answer to QUESTION 3.1.5) is limited in a south-easterly direction? (1 x 1) (1)

3.2 MAP INTERPRETATION

Refer to **F** in block **C2** and **G** in block **D4** on the topographical map.

3.2.1 (a) The temperature at **F** in the centre of the town is 2 °C higher than at **G**. Name the concept that describes this difference. (1 x 1) (1)

(b) Give ONE reason why the high density of buildings at **F** generally contributes to the higher temperatures. (1 x 2) (2)

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Refer to blocks **D2** and **D3** on the orthophoto map.

3.2.2 Explain how aspect of slope determined the location of Rose Park at **7** on the orthophoto map. (1 x 2) (2)

Refer to the dam **H** in block **B1** on the topographical map.

3.2.3 The dam wall indicates that the river is flowing in a … direction.

A south-westerly
B north-easterly
C north-westerly
D south-easterly (1 x 1) (1)

Refer to the weir at I in block **A3** on the topographical map.

3.2.4 A weir is used to regulate (control) the flow of water in a river. Explain why the construction of the weir was necessary. (1 x 2) (2)

Refer to the section of the Klip River from **8** in block **A2** to **9** in block **A5** on the orthophoto map.

3.2.5 Identify the fluvial landform/feature. (1 x 1) (1)

3.2.6 Give evidence why this fluvial landform/feature (answer to QUESTION 3.2.5) developed in this area. (1 x 1) (1)

Refer to block **C5** on the orthophoto map.

3.2.7 Why will more erosion take place at **11** than at **10**? (1 x 2) (2)

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

3.3.1 The vertical aerial photograph used to make the orthophoto map has a (high/low) resolution. (1 x 1) (1)

3.3.2 The reference of the topographical map represents (spatial/attribute) data. (1 x 1) (1)

3.3.3 How does this data (answer to QUESTION 3.3.2) assist in identifying feature **J** on the topographical map? (1 x 2) (2)

Refer to **12** in block **C2** on the orthophoto map.

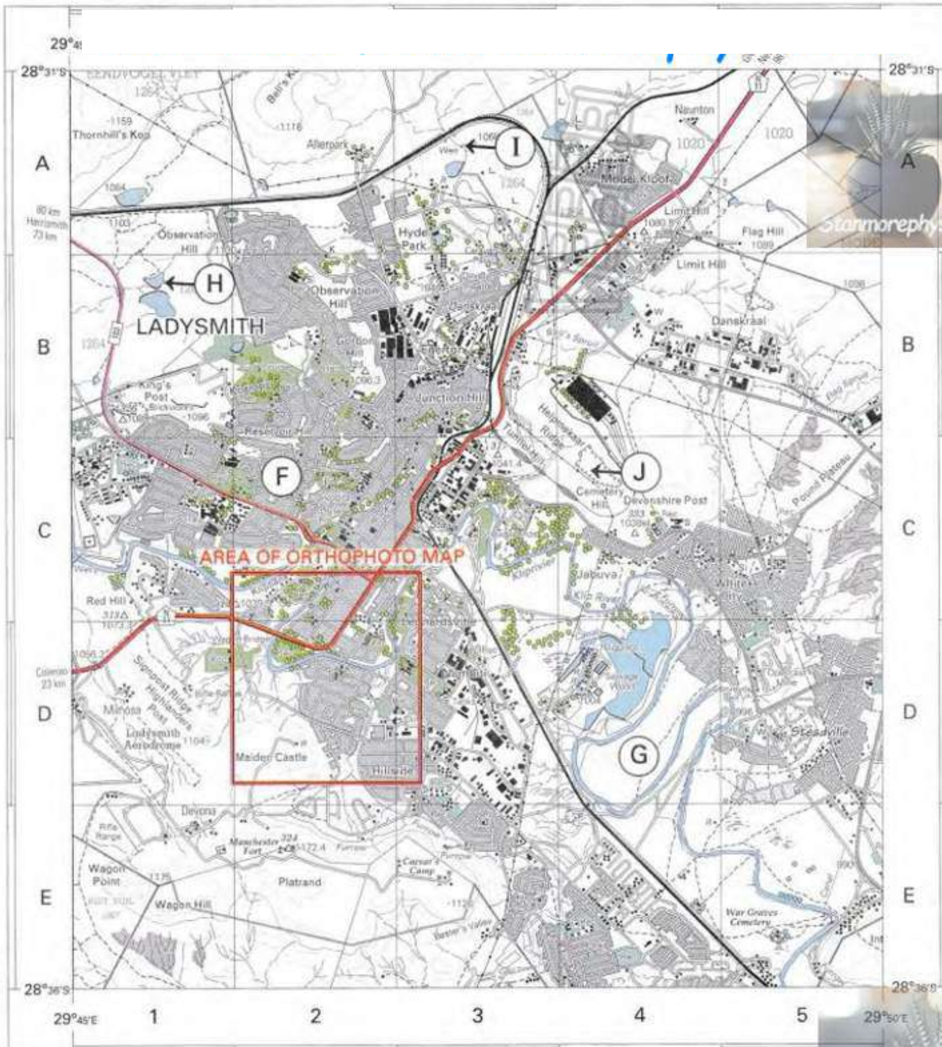
3.3.4 Define the term *buffering*. (1 x 2) (2)

3.3.5 How would buffering at **12** protect the quality of the water in the Klip River? (1 x 2) (2)

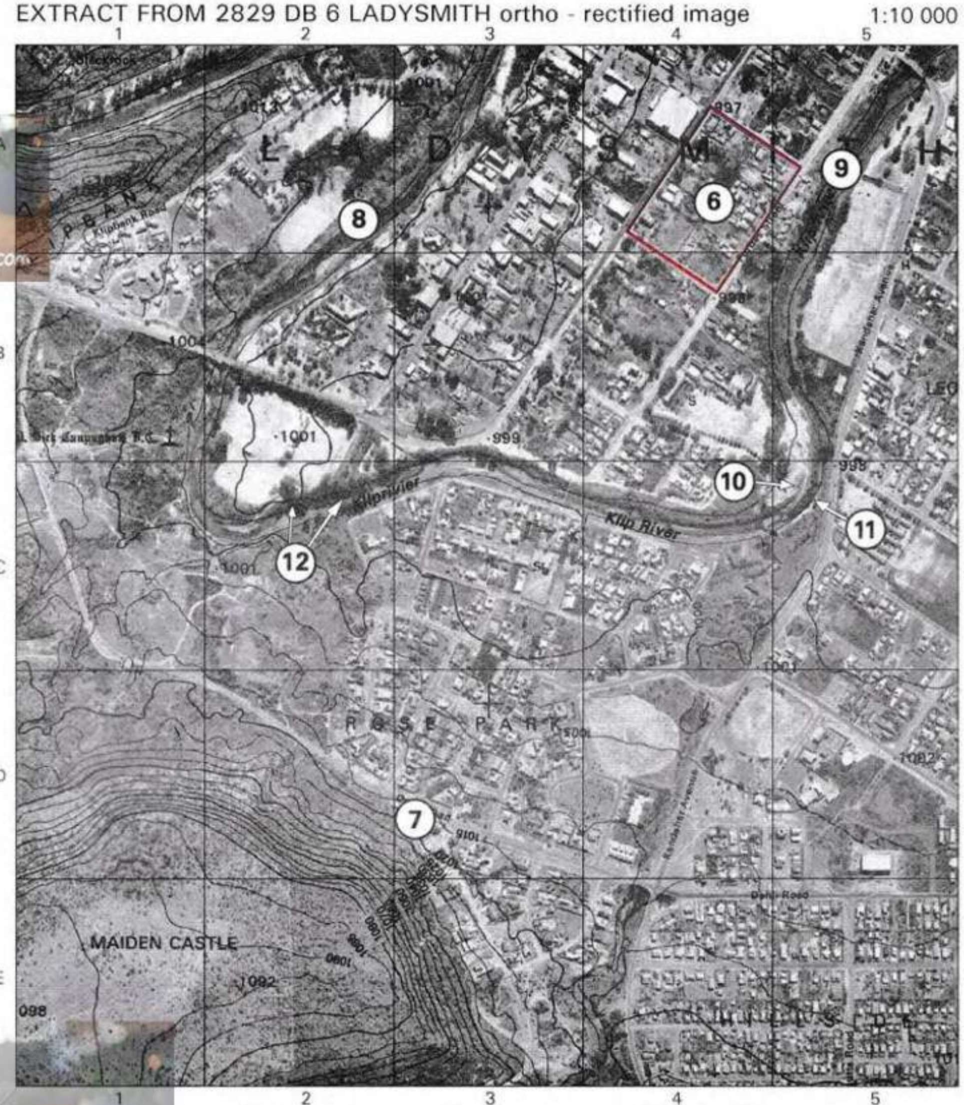
TOTAL SECTION B: 30
GRAND TOTAL: 150

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EXTRACT FROM 2829DB LADYSMITH 1:50 000



EXTRACT FROM 2829 DB 6 LADYSMITH ortho - rectified image 1:10 000



Metres 1000 0 1 2 3 4 5 Kilometres

0 km 1 km

Mean magnetic declination 21°03' West of True North (July 2001).
Mean annual change 8' Westwards (1995 - 2000).

CONTOUR INTERVAL 20 METRES - KONTOERTUSSENRUIMTE 20 METER

REFERENCE

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

CONTOUR INTERVAL 5 METRES - KONTOERTUSSENRUIMTE 5 METER

VERKLARING

Nasionale Deurpad; Nasionale Roete	Internasionale Grens en Baken	Draadheining; Muur
Hoofverkeersroete	Provinsiale Grens	Windpomp; Monument
Hoofpad	Bewarings Gebied	Kommunikasietoring
Sekondêre Pad; Hoogtemerk	Standhoudende Rivier	Mynhoop; Uitgrawing
Ander Pad; Brug	Standhoudende Water	Peilbaken; Seevaartbaken
Dowwe Pad en Voetslaanpad	Nie-standhoudende Rivier	Vuurtoring en Seevaartlig
Spoorweg; Stasie of Sylyn	Nie-standhoudende Water	Begraafplaas; Graf
Ander Spoorweg; Tonnel	Droë Loop	Erosie; Sand
Opvulling; Deurgrawing	Droë Pan	Beboste Gebied
Kraglyn	Moeras en Vlei	Bewerkte Land
Beboude Gebied (Hoë, Lae Digtheid)	Pyplyn (bo die grond)	Boord of Wingerd
Geboue; Murasie	Watertoring; Reservoir; Waterpunt	Ontspanningsterrein
Poskantoor; Polisiestasie; Winkel	Kuslynrotse	Rye Bome
Plek van Aanbidding; Skool; Hotel	Prominente Klipbank	Oorspronklike Plase

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