



**KWAZULU-NATAL PROVINCE**

**EDUCATION**  
REPUBLIC OF SOUTH AFRICA

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**GEOGRAPHY P1**

**PREPARATORY EXAMINATION**

**SEPTEMBER 2023**

**MARKS: 150**

**TIME: 3 hours**

*Stanmorephysics*

**This question paper consists of 16 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 in the ANSWER BOOK provided.
3. ALL diagrams are included in the QUESTION PAPER.
4. Leave a line open between subsections of questions answered.
5. Start EACH question at the top of a NEW page.
6. Number your answers correctly according to the numbering system used in this question paper.
7. Do NOT write in the margins of your ANSWER BOOK.
8. Draw fully labelled diagrams when instructed to do so.
9. Answer in FULL SENTENCES except where you have to state, name, identify or list.
10. The unit of measurement MUST be given in the final answer, where applicable, e.g. 10km, 4°C, east.
11. You may use a non-programmable calculator.
12. You may use a magnifying glass.
13. Write neatly and legibly.

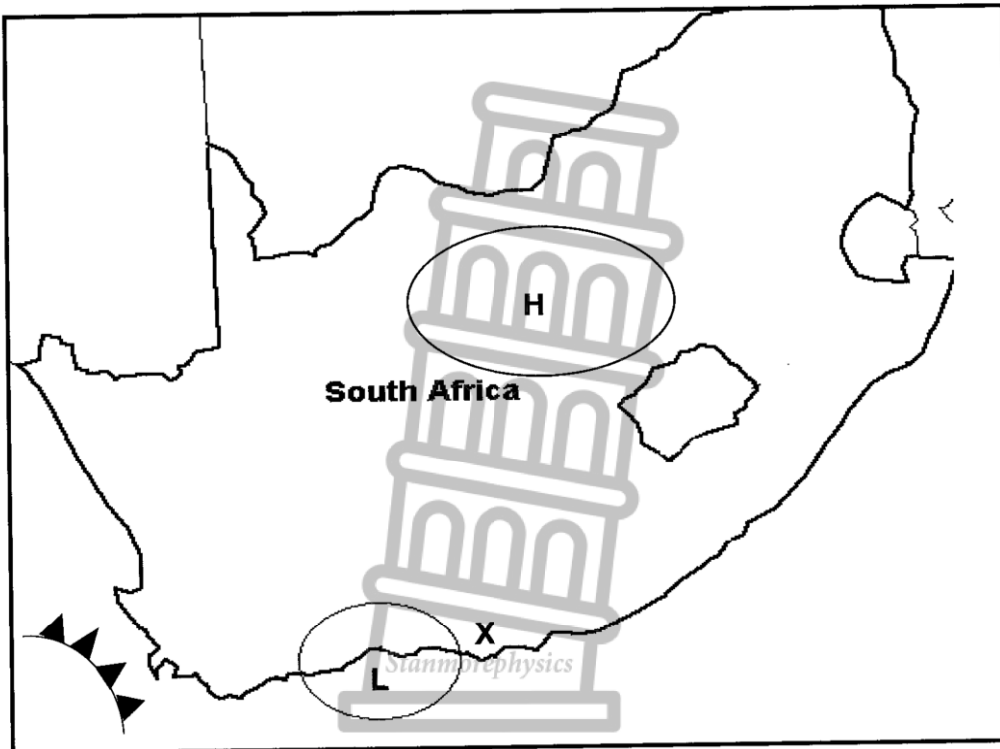
**SPECIFIC INSTUCTIONS AND INFORMATION FOR SECTION B**

14. A 1 : 50 000 topographical map 2930CA MERRIVALE and a 1 : 10 000 orthophoto map 2930 CA 5 MERRIVALE 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 calcuations.
17. The topographical and orthophoto map must be handed in to the invigilator at the end of this examination session.

**SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY**

**QUESTION 1: CLIMATE AND WEATHER**

1.1 Refer to the sketch map below which illustrates berg wind conditions over the coast at **X**. Choose the word/term from between brackets that makes the statement true.. Write the answer next to the question numbers (1.1.1 to 1.1.7) in the ANSWER BOOK e.g., 1.1.8 South Africa.



[Source: adapted from South African Weather Patterns]

- 1.1.1 Berg wind conditions are regarded as a (winter/summer) phenomena on South Africa
- 1.1.2 The low pressure cell in the sketch is a (cut off low / coastal low).
- 1.1.3 Berg winds blow (from the interior of South Africa / from the sea toward South Africa).
- 1.1.4 The wind that blows at **X** is a (dry / humid) wind.
- 1.1.5 The temperature at **X** is going to (increase / decrease).
- 1.1.6 Berg winds leads to a (greater / smaller) chance of veld fires occurring.
- 1.1.7 Berg winds occur when a (cold front is approaching / has already passed over) the area.

(7 x 1)(7)

1.2 Choose the term/concept from COLUMN B that completes the statement in COLUMN A. Write down only Y or Z next to the question numbers (1.2.1 to 1.2.7) in the ANSWER BOOK, e.g. 1.2.9 Y.

Place	Average Temperature		Vegetation
	Day	Night	
A	18°C	8°C	Pine tree plantation
B	14°C	-2°C	Citrus fruit farms (Orange and lemons)
C	24°C	14°C	Deciduous fruit farms (Peaches and grapes)

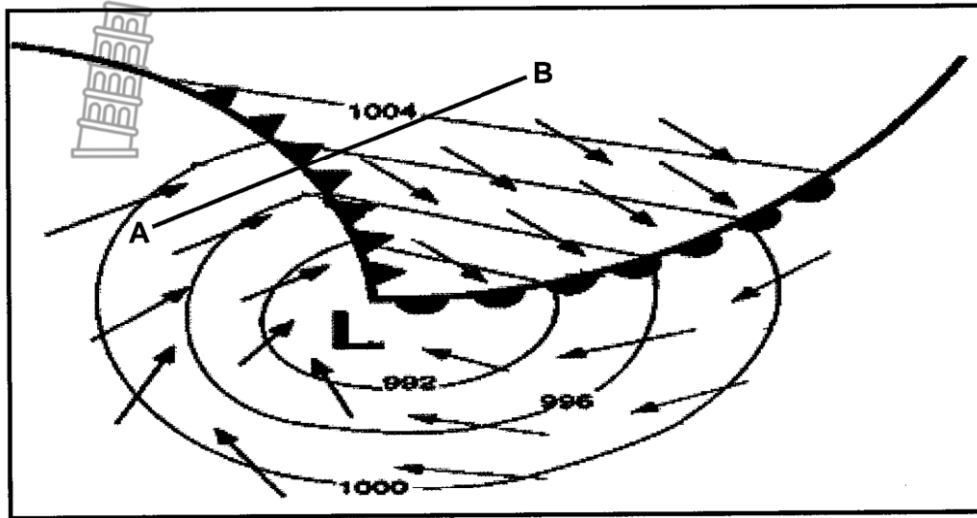
[Source: Adapted from *Understanding Geography*]

COLUMN A	COLUMN B
1.2.1 The study of climate over a small area	Y. Macro climate Z. Micro climate
1.2.2 The sketch above represents a valley in the ... hemisphere	Y. Southern Z. Northern
1.2.3 Slope A receives ... sun's rays	Y. Direct Z. Oblique
1.2.4 When the air at B drops to below freezing point ... forms	Y. Fog Z. Frost
1.2.5 ... fruit is planted on slope C.	Y. Deciduous Z. Citrus
1.2.6 The average temperature range between day and night at place C is ...	Y. 38°C Z. 10°C
1.2.7 People living in settlement D are most affected by pollution during the ...	Y. Day Z. Night
1.2.8 The geometric shape of the buildings in settlement labelled E causes ... surface area to absorb sun's heat	Y. larger Z. smaller

(8 x 1) (8)



1.3 Refer to the sketch below, showing a plan view of a mid-latitude Cyclone in the mature stage.



[Source adapted from: www.quora.com/How-do-mid-latitude-cyclones]

1.3.1 State the general direction of movement of mid-latitude cyclone. (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 Draw a fully labelled cross-section from A to B on the mid-latitude cyclone. Indicate the following on the cross section:

- (a) Cloud cover
  - (b) Air masses
  - (c) Front
- (4 x 1) (4)

1.3.4 Discuss TWO negative impacts of the mid-latitude cyclones on the physical environment. (2 x 2) (4)

1.3.5 Suggest TWO precautionary measures the local authorities can put in place to alert (warn) the following groups of people.

- (a) Road users
  - (b) Fishing communities
- (2 x 2) (4)

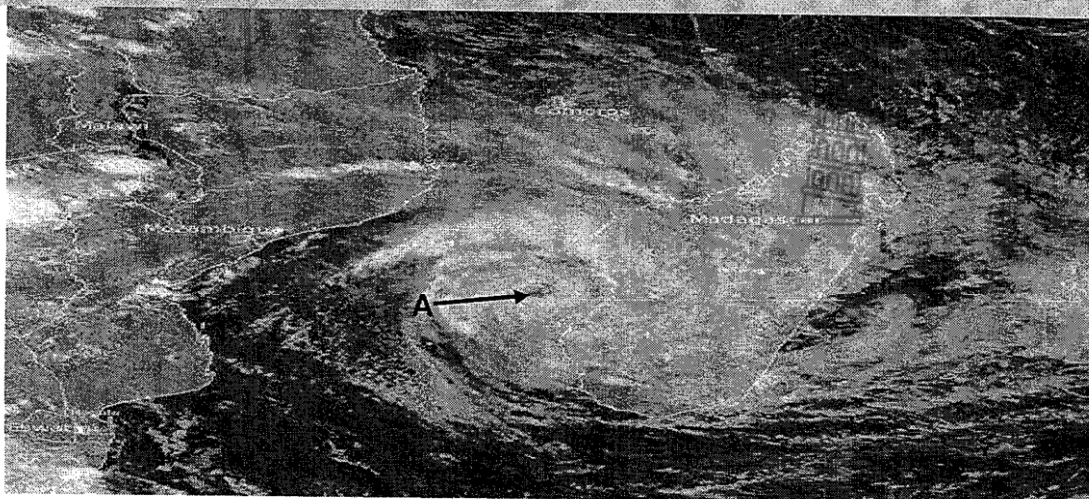
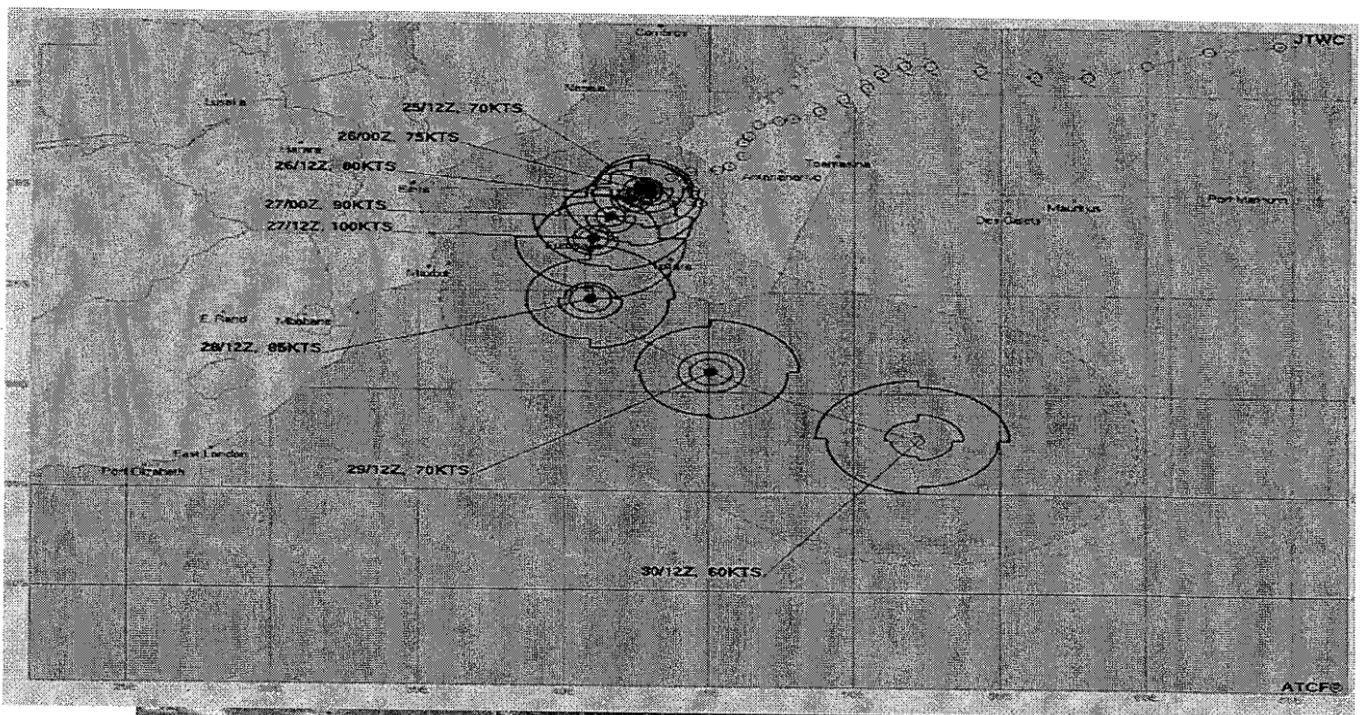


1.4 Refer to the infographic on Tropical Cyclone Cheneso.

### TROPICAL CYCLONE CHENESO CAUSES DEADLY FLOODING IN MADAGASCAR

Tropical Cyclone Cheneso blasted Madagascar with flooding rain and damaging winds for 10 straight days. The storm, which first strengthened into a tropical storm on January 18, meandered in the waters near Madagascar for nearly two weeks, making two landfalls during that time. The cyclone then crossed the country and emerged into the waters of the Mozambique Channel. The warm tropical waters of the channel allowed Cheneso to peak as a tropical cyclone on Wednesday, January 25, prior to making a second landfall on Thursday, this time on the western coast of Madagascar. Authorities in the country confirmed wind gusts as high as 170 km/h, equivalent to a Category 2 hurricane in the Atlantic or East Pacific ocean basin. Cheneso later strengthened into a tropical cyclone on 25 January 2023. The system continued moving southeast, before transitioning into a post-tropical depression on 29 January. Humanitarians and authorities also supported post-storm preparation and relief efforts, as millions were expected Source: Adapted from:

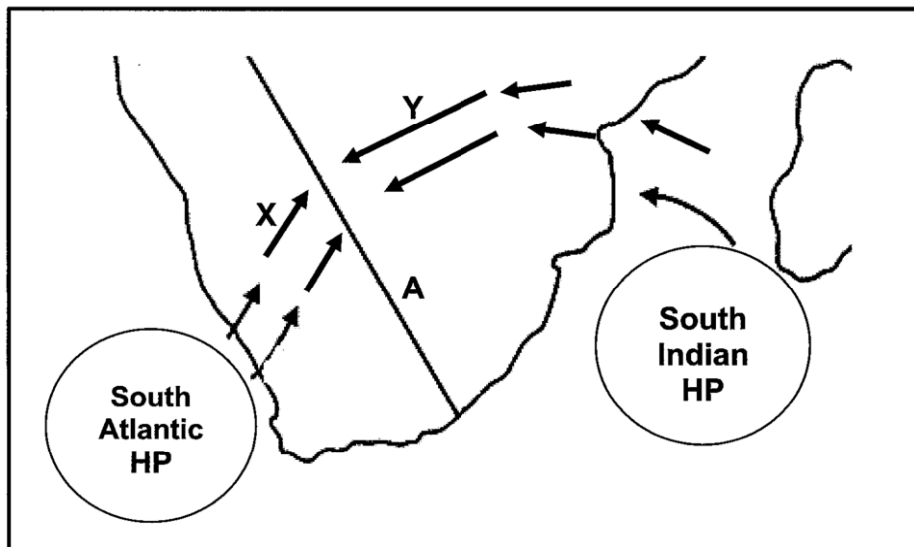
<https://zoom.earth/storms/cheneso-2023> to be impacted.



[Source: [https://upload.wikimedia.org/wikipedia/commons/1/1c/Cheneso\\_2023\\_01\\_25\\_0000.jpg](https://upload.wikimedia.org/wikipedia/commons/1/1c/Cheneso_2023_01_25_0000.jpg)]



- 1.4.1 According to the extract what is a *category 2 storm*? (1 x 2) (2)
- 1.4.2 Refer to the satellite image of Tropical Cyclone Cheneso.
- (a) Converging air circulates in a (anticlockwise/clockwise) direction around the centre of the cyclone. (1 x 1) (1)
- (b) Give ONE reason why the eye of the cyclone is:
- (i) calm
- (ii) cloudless (2 x 2) (4)
- 1.4.3 In a paragraph of approximately EIGHT lines, explain why Tropical Cyclone Cheneso was downgraded from a category 2 hurricane strength system to a post-tropical depression. (i.e. started dissipating) (4 x 2) (8)
- 1.5 Refer to the sketch below depicting a line thunderstorm.



[Source: Adapted from: South African Weather Patterns]

- 1.5.1 Why is the line labelled **A** referred to as a *moisture front*? (1 x 2) (2)
- 1.5.2 Identify the winds labelled **X** and **Y** that converge at the *moisture front*. (2 x 1) (2)
- 1.5.3 Indicate which ONE of the two winds, **X** or **Y**, mentioned in QUESTION 1.5.2 is colder and drier. (1 x 1) (1)
- 1.5.4 Give ONE reason for your answer to QUESTION 1.5.3. (1 x 2) (2)
- 1.5.5 Explain why line thunderstorms develop to the east of the *moisture front*. (2 x 2) (4)
- 1.5.6 Suggest TWO ways in which line thunderstorms can impact positively on the physical (natural) environment. (2 x 2) (4)

**QUESTION 2: GEOMORPHOLOGY**

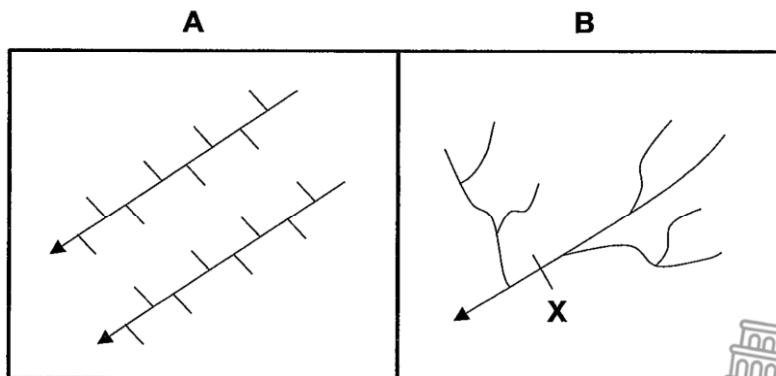
2.1 Choose the word/term from COLUMN B that matches the statement in COLUMN A. Write down only **Y** or **Z** next to the question numbers (2.1.1 to 2.1.8) in the ANSWER BOOK, e.g. 2.1.9 **Y**.

COLUMN A	COLUMN B
2.1.1 The starting point of a river	<b>Y.</b> Source <b>Z.</b> Mouth
2.1.2 Point where two or more streams join	<b>Y.</b> Catchment <b>Z.</b> Confluence
2.1.3 High-lying area that separates two streams in the same river system	<b>Y.</b> Watershed <b>Z.</b> Interfluve
2.1.4 Water that flows in complex circular movements	<b>Y.</b> Laminar <b>Z.</b> Turbulent
2.1.5 Upper level of ground water	<b>Y.</b> Water table <b>Z.</b> Aquifer
2.1.6 Water found below the surface	<b>Y.</b> Groundwater <b>Z.</b> Lake
2.1.7 A river that is younger than the underlying rock structure over which it flows	<b>Y.</b> Superimposed <b>Z.</b> Antecedent
2.1.8 A river profile that has many obstacles along its course	<b>Y.</b> Graded <b>Z.</b> Ungraded

(8 x 1) (8)

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 2.2.7) in the ANSWER BOOK, e.g. 2.2.8 B.

Refer to the sketches below to answer QUESTIONS 2.2.1 to 2.2.3



[Source: Examiner's own sketch]

2.2.1 The drainage pattern illustrated (shown) in sketch **A** is ...

- A. dendritic
- B. trellis
- C. radial
- D. rectangular



2.2.2 The stream order of the river system in sketch **B** at point **X** is ...

- A. 1
- B. 2
- C. 3
- D. 4

2.2.3 The drainage pattern illustrated (shown) in sketch **B** is associated with ...

- A. rocks which have varying resistance to erosion
- B. rocks which have uniform resistance to erosion
- C. rocks which have many joints
- D. rocks which are geologically young

2.2.4 This type of river only flows after heavy rainfall:

- A. periodic
- B. exotic
- C. perennial
- D. episodic

2.2.5 The ability of rock to allow water to pass through it:

- A. non-porous
- B. impervious
- C. permeability
- D. precipitation

2.2.6 TWO factors that result in a lower rate of infiltration:

- (i) light rain
  - (ii) heavy rain
  - (iii) steep gradient
  - (iv) gentle gradient
- A. (i) and (ii)
  - B. (ii) and (iii)
  - C. (iii) and (iv)
  - D. (i) and (iv)

2.2.7 A lower rate of infiltration will result in a:

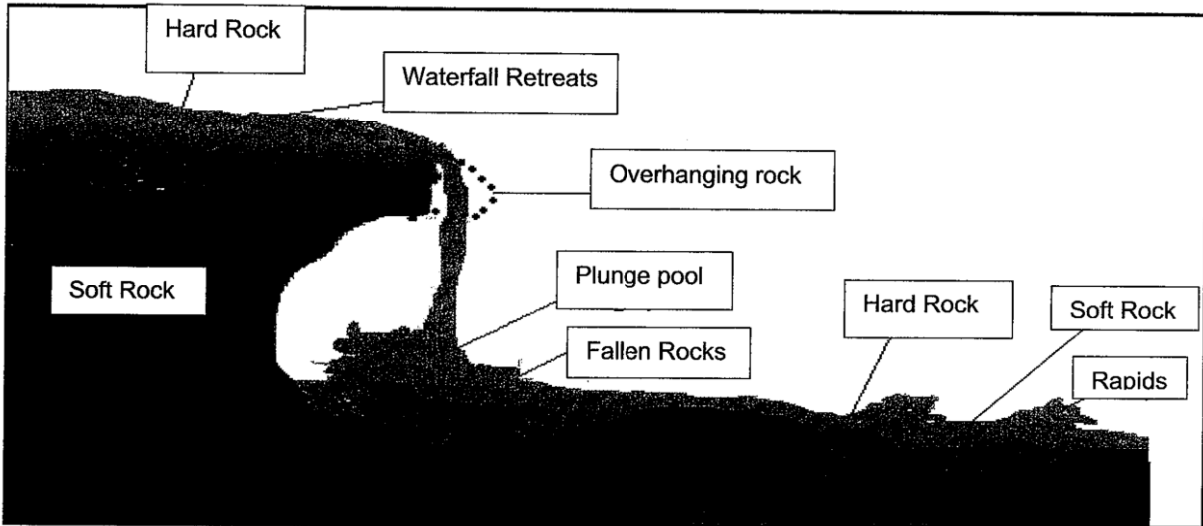
- (i) higher stream order
  - (ii) higher drainage density
  - (iii) higher water table
  - (iv) higher soil moisture content
- A. (i) and (ii)
  - B. (ii) and (iii)
  - C. (iii) and (iv)
  - D. (i) and (iv)



(7 x 1)(7)

Downloaded from Stanmorephysics.com

2.3 Refer to the sketch below showing a waterfall and rapids.



[Source: <https://www.geographypods.com/21-river-features.html>]

2.3.1 In which course of a river are waterfalls and rapids usually found? (1 x 1)(1)

2.3.2 Explain how the plunge pool forms at the base of a waterfall. (2 x 2)(4)

2.3.3 Give TWO positive impacts of waterfalls for people. (2 x 2)(4)

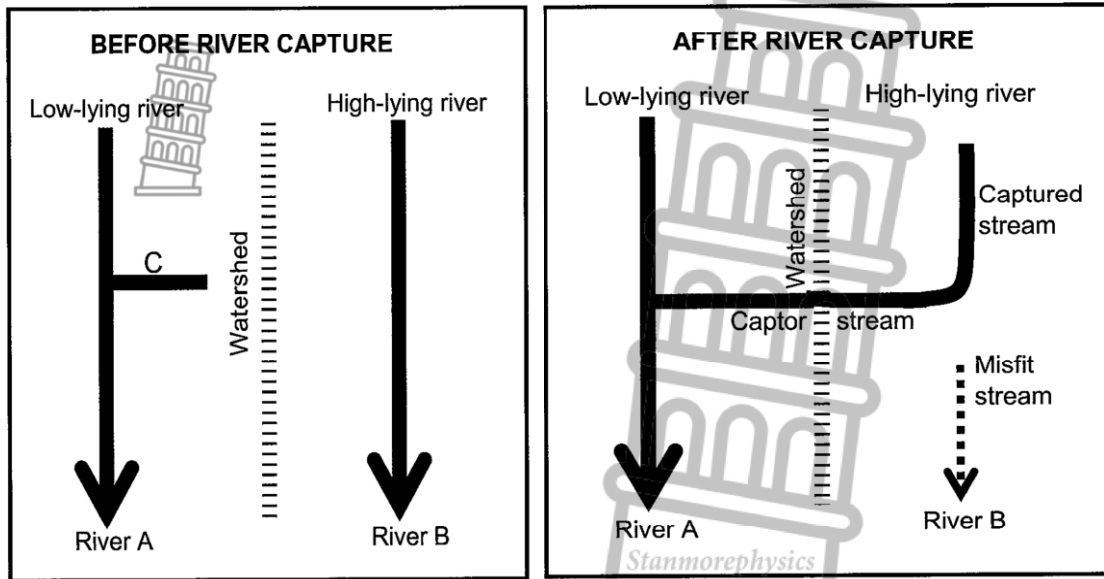
Refer to the rapids on the diagram.

2.3.4 Suggest ONE negative impact of rapids on transportation in rivers. (1 x 2)(2)

2.3.5 Explain how rapids form. (2 x 2)(4)



2.4 Refer to the sketches below on the river capture (stream piracy).



[Source: Examiner's own sketch]

- 2.4.1 Give TWO reasons why the captor stream eroded through the watershed. (2 x 1)(2)
- 2.4.2 Name the process of erosion that occurred in river C that caused river capture to take place. (1 x 1)(1)
- 2.4.3 River A becomes rejuvenated after river capture. Give TWO characteristics of a rejuvenated river. (2 x 1)(2)
- 2.4.4 Explain the processes that resulted in the formation of the misfit stream. (2 x 2)(4)
- 2.4.5 Discuss how river capture will have a negative impact on farming around the misfit stream (river B). (3 x 2)(6)





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

**UMGENI RIVER...**

Sewage polluted beaches pose a threat to the holiday makers and the environment. Escherichia coli (E.coli) in water pose a threat to human health as well as aquatic ecosystems.

About 80% of the pollution in the sea originates on land. Various pollutants like (chemicals, nutrients, litter, heavy metals and other toxic substances) are carried by streams and rivers from different land use activities such as farms, industries and urban areas to sea. The extent and frequency of pollution can make rivers and oceans water unsafe for humans. It also leads to large-scale environmental destruction such as fish deaths.

The ageing water infrastructure has steadily decayed due to non-maintenance, lack of human capacity and financial resources, poor water governance and delayed-or no-actions to address the deposition of sewage into various water courses such as the Umgeni River, and ultimately out to sea.

[Adapted from: Anja du Plessis. [www.news24.com](http://www.news24.com)]

- 2.5.1 What does the abbreviation E.coli stand for? (1 x 1)(1)
- 2.5.2 State TWO pollutants, from the extract that contributed to the pollution. (2 x 1)(2)
- 2.5.3 According to the extract the ageing water infrastructure is one of the causes of chemical spills and sewage pollution. Suggest TWO ways in which this problem can be addressed by the municipality. (2 x 2)(4)
- 2.5.4 As a member of eThekweni municipality environmental committee suggest possible strategies that can be implemented to eliminate the causes of river pollution mentioned in the extract. (4 x 2)(8)

**[60]**

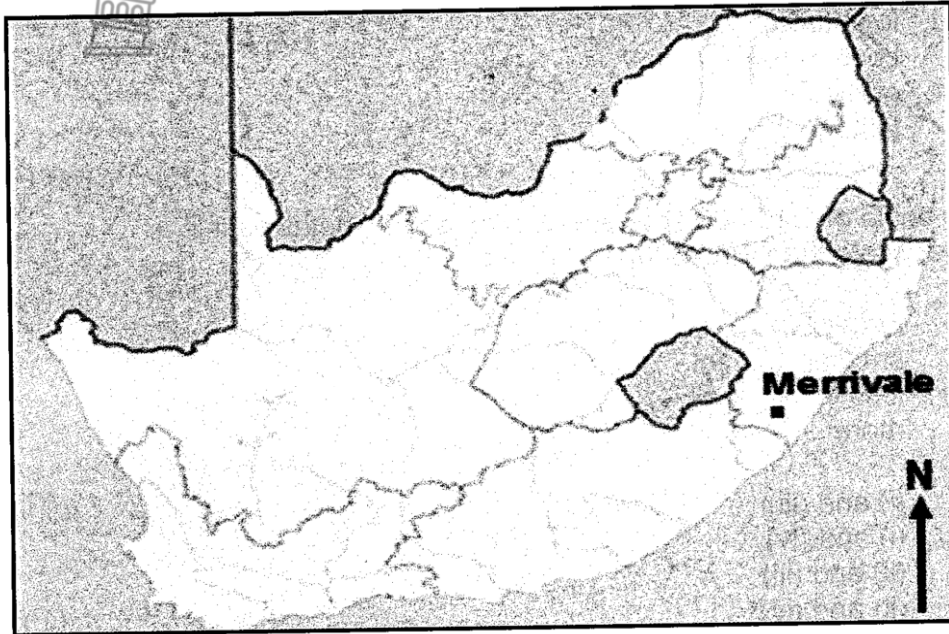


**SECTION B**

**QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES**



**GENERAL INFORMATION ON MERRIVALE**



**Coordinates: 29°31'S; 30°14'E**

Merrivale is a town in the Umgungundlovu District Municipality in KwaZulu-Natal. It is 145 km north-west of Durban and 5 km south-east of Howick.

Merrivale experiences warm wet summers and dry winter seasons. The temperatures between winter and summer range from 5°C to 32°C. The topography within the surroundings of Merrivale varies in elevation from 1 018 metres to 2 308,8 metres above sea level.

[Adapted from <https://en.wikipedia.org/wiki/Merrivale>]

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

**ENGLISH**

- Diggings
- Mooi River
- Sewerage works
- Nature Reserve

**AFRIKAANS**

- Delwery
- Moorivier
- Rioolwerke
- Natuurreservaat



3.1 MAP SKILLS AND CALCULATIONS

3.1.1 In which province is Merrivale? (1 x 1)(1)

3.1.2 30 in the map index 2930 CA refers to ...

- A longitude
- B code
- C graticule
- D latitude

(1 x 1)(1)

3.1.3 The scale of 1:10 000 shows a ... area and ... detail as it is a larger scale than 1:50 000

- (i) larger
- (ii) smaller
- (iii) less
- (iv) more

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

(1 x 1)(1)

3.1.4 Calculate the area of block **A1** on the orthophoto map in km.

Formula: **Area = Length(L) x Breadth(B)**

(5 x 1)(5)

3.1.5 Determine the true bearing from spot height 1388, in block **D4**, to Trigonometrical Station 156, in block **D3**, on the topographical map.

(1 x 1)(1)

3.1.6 The magnetic declination for 2023 is 25° 45' west of true north. Use your answer to QUESTION 3.1.5 to calculate the present magnetic bearing.

Formula: **MB = True bearing (TB) + Magnetic declination (MD)** (1 x 1)(1)





**3.2 MAP INTERPRETATION**

3.2.1 Feature **6** in block **B3** on the orthophoto map represents a ...

- A  hiking trail.
- B  railway line.
- C  road.
- D  power line. (1 x 1)(1)

3.2.2 The natural feature/landform at **G** in block **D3** on the topographical map is a...

- A gap.
- B pass.
- C spur.
- D valley. (1 x 1)(1)

3.2.3 Refer to block **C2** on the orthophoto map.

- (a) Name the local wind that blows during the day in the valley. (1 x 1)(1)
- (b) Explain how the wind mentioned in QUESTION 3.2.3(a) forms. (1 x 2)(2)
- (c) Discuss the significance of this wind to the local people living in the valley. (1 x 2)(2)

3.2.4 Refer to the rivers in block **C4** on the topographical map.

- (a) State the general direction in which these rivers are flowing. (1 x 1)(1)
- (b) How do dam walls assist in identifying the direction in which these rivers are flowing? (1 x 2)(2)

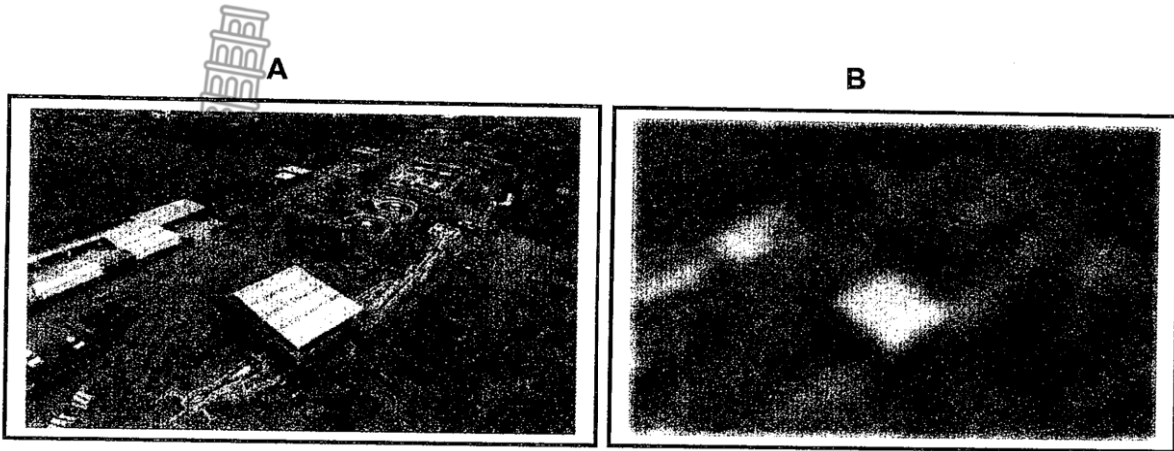
3.2.5 Refer to the orthophoto map.

- (a) E4 on the orthophoto map represents a gentle slope, provide map evidence to support this statement. (1 x 2)(2)



3.3 GEOGRAPHICAL INFORMATION SYSTEM (GIS)

3.3.1 Refer to images, **A** and **B** of an aerial view of the Mpophomeni water treatment plant in Howick.



[Source: <https://images.app.goo.gl/AFyVFZ7ejksYPBb7>]

- (a) Image **A** and **B** are representations of (vector/raster) data. (1 x 1)(1)
- (b) Which image, **A** or **B**, has a higher resolution? (1 x 1)(1)
- (c) Give a reason for your answer to QUESTION 3.3.1(b) (1 x 2)(2)

3.3.2 Refer to block **B4** on the topographical map.

- (a) Define the concept *data layering*. (1 x 2)(2)
- (b) How will the topography layer promote crop farming in the area? (1 x 2)(2)

[30]

**GRAND TOTAL: 150**





## **KWAZULU-NATAL PROVINCE**

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REPUBLIC OF SOUTH AFRICA

### **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**GEOGRAPHY P1**

**MARKING GUIDELINES**

**PREPARATORY EXAMINATION**

**SEPTEMBER 2023**

**MARKS: 150**

*Stanmorephysics*

**This marking guideline consists of 9 pages.**



**SECTION A**

**QUESTION 1**

- 1.1
- 1.1.1 winter ✓
  - 1.1.2 coastal low ✓
  - 1.1.3 from the interior of South Africa ✓
  - 1.1.4 dry ✓
  - 1.1.5 increase ✓
  - 1.1.6 greater ✓
  - 1.1.7 cold front is approaching ✓

(7 x 1) (7)

- 1.2
- 1.2.1 Z ✓
  - 1.2.2 Y ✓
  - 1.2.3 Y ✓
  - 1.2.4 Z ✓
  - 1.2.5 Y ✓
  - 1.2.6 Z ✓
  - 1.2.7 Z ✓
  - 1.2.8 Y ✓

(8 x 1) (8)



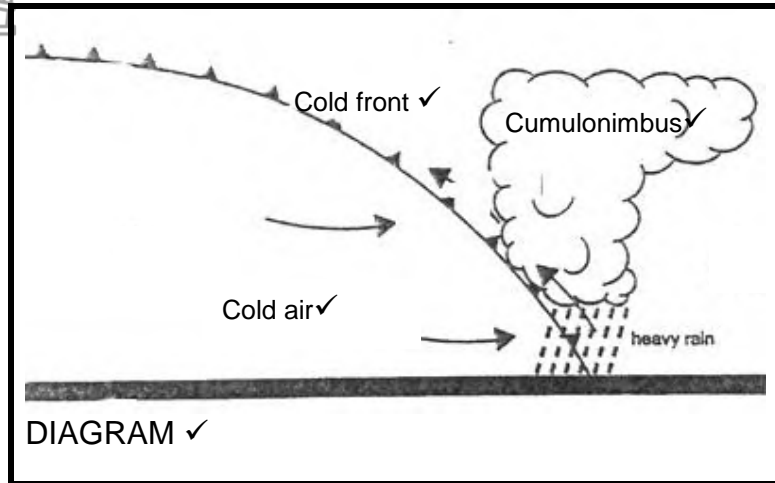
1.3

1.3.1 West to east/Eastwards/ Easterly ✓(1 x 1) (1)

1.3.2 Driven by the Westerlies ✓✓

(1 x 2) (2)

1.3.3



(a) Cloud cover ✓

(b) Air masses/cold/warm ✓

(c) Fronts ✓

(4 x 1) (4)

1.3.4 Soil erosion results from heavy rains and damages the environment ✓✓

Flooding resulting from heavy rains disrupts ecosystems ✓✓

High waves damage the coastline ✓✓

**(ANY TWO)**

(2 x 2) (4)

1.3.5

(a) As visibility is poor, minimize driving and remain indoors until weather clears ✓✓  
Stay away from mountainous areas because of the danger from rock falls and slippery roads. ✓✓  
Strong winds could make driving difficult for people with light vehicles ✓✓

**(ANY ONE)**

(1 x 2) (2)

(b) Do not venture out into open sea during frontal weather conditions. ✓✓  
Secure fishing vessels to harbors and keep track of the weather on the media before attempting to go out. ✓✓  
High waves/storm surges will pose a danger to small fishing vessels ✓✓


**(ANY ONE)**

(1 x 2) (2)

1.4

1.4.1 Wind gusts as high as 170 km/h ✓✓ (1 x 2) (2)

1.4.2 (a) clockwise ✓ (1 x 1) (1)

(b)  **Calm conditions** - Coriolis force deflects the converging winds away from the eye, causing a weak pressure gradient ✓✓ (1 x 2) (2)

**Cloud free** - Descending air evaporates the moisture in the eye, causing the cloudless conditions ✓✓ (1 x 2) (2)

1.4.3 As Cheneso's track changed to southeast it began to move to colder waters ✓✓  
 The cyclone moved below the 30° latitude, away from the tropics ✓✓  
 Moisture supplies were reduced due to less evaporation ✓✓  
 Evident in the tracking map where atmospheric pressure began to increase significantly, noted by the widely spaced isobars ✓✓  
 Decreased pressure gradient resulted in a drop in wind speed ✓✓  
 The eye began to become deformed and finally disappeared ✓✓ (4 x 2) (8)  
**[Any FOUR]**

1.5

1.5.1 Moisture front is a zone that separates two air masses with different moisture contents. ✓✓ [CONCEPT] (1 x 2) (2)

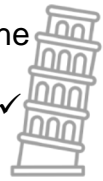
1.5.2 X - South westerlies ✓  
 Y - North easterlies ✓ (2 x 1) (2)

1.5.3 X ✓ (1 x 1) (1)

1.5.4 Originates from over a cold ocean ✓✓ (1 x 2) (2)

1.5.5 The air is warm and moist toward the east ✓✓  
 Line Thunderstorms develop to the east of the moisture front due to uplift over the colder air from the west ✓✓ (2 x 2) (4)

1.5.6 Rainfall will fill dams for irrigation purposes ✓✓  
 After flooding the soil will be naturally fertilized due to silt deposits ✓✓  
 Ground water will be revived ✓✓  
 Natural vegetation will grow well and contribute to be the feed for animals ✓✓  
 Growth of natural vegetation will prevent soil erosion ✓✓  
 Increase in the habitat for fauna and flora ✓✓  
 Biodiversity will increase ✓✓  
 Rainfall will fill natural water bodies providing a water source ✓✓ (2 x 2) (4)  
**(Any TWO)**



[60]

**QUESTION 2**

2.1

2.1.1 Y ✓

2.1.2 Z ✓

2.1.3 Z ✓

2.1.4 Z ✓

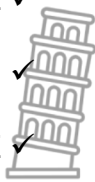
2.1.5 Y ✓

2.1.6 Y ✓

2.1.7 Y ✓

2.1.8 Z ✓

(8 x 1) (8)



2.2

2.2.1 B ✓

2.2.2 C ✓

2.2.3 B ✓

2.2.4 D ✓

2.2.5 C ✓

2.2.6 B ✓

2.2.7 A ✓

(7 x 1) (7)

2.3

2.3.1 upper course ✓

(1 x 1) (1)

2.3.2 Softer rock is found below the hard resistant rock ✓✓

Water plunges over the hard resistant rock onto the softer rock ✓✓

Softer rock is being eroded quicker ✓✓

Undercutting of the softer rock causes an overhanging hard resistant layer ✓✓

**(ANY TWO)**

(2 x 2) (4)

2.3.3 Forms tourist attractions ✓✓

Used to generate hydro- electricity ✓✓

(2 x 2) (4)





2.3.4 Boats cannot travel up and down rapids. ✓  
 Hard to build bridges across them. ✓  
**(ANY ONE)** (1 x 2) (2)

2.3.5 Rapids form when the hard, resistant layer of rocks dips downstream.  
 As erosion of soft rock takes place more hard rock is exposed creating rapids. ✓✓  
 The layers of soft rock erode quicker than the layers of hard rock. ✓✓  
 This makes the bed of the river uneven creating rough turbulent water. ✓✓  
**(ANY TWO)** (2 x 2) (4)

2.4

2.4.1 steeper gradient/river flowing at a lower level ✓  
 Greater rainfall ✓  
 Softer rock ✓  
**(ANY TWO)** (2 x 1) (2)

2.4.2 Headward erosion ✓ (1 x 1) (1)

2.4.3 Erosive ability increase due to increased flow ✓  
 Flow faster/high velocity due to an increase in volume of water ✓  
 Entrenched meander ✓  
 Valley within a valley/river terraces ✓  
 Knickpoint/waterfall ✓ (2 x 1) (2)

2.4.4 River C eroded headwards into the watershed and lengthened its course ✓✓  
 Capture the headwaters of river B and diverted it into river A ✓✓  
 resulting in river B having too little water for the valley within which it flows. ✓✓ **(ANY TWO)** (2 x 2) (4)

2.4.5 Less water for irrigation of crops/livestock ✓✓  
 Reduced yields due to the lack of water ✓✓  
 Increase in costs to obtain sufficient water ✓✓  
 Reduced flooding decreases natural fertilization of soil ✓✓  
 Input costs to farm increases ✓✓  
 Farming no longer economically viable ✓✓  
 Loss of jobs as farming areas decline ✓✓  
 Poverty increases due to lack of crops to sell and access to food (food insecurity) ✓✓  
 Rural urban migration sets in ✓✓  
 Lack of domestic water for farmers ✓✓  
**(Any THREE)** (3 x 2) (6)



2.5

2.5.1 Escherichia coli ✓ (1 x 1) (1)

2.5.2 Chemicals ✓  
 Nutrients ✓  
 Litter ✓  
 Heavy metals ✓  
 Toxic substances ✓  
 Sewage ✓  
**(ANY TWO)** (2 x 1) (2)

2.5.3 To replace the ageing water infrastructure instead of patching leaks ✓✓  
 Include adequate funds when budgeting for replacement of ageing infrastructure (pipes etc.) ✓✓  
 Material used for infrastructure development should accommodate unusual weather conditions and accommodate for population growth/durable material ✓✓  
 Proper utilization of funds ✓✓  
 Employ qualified managerial staff to oversee and implement maintenance timeously ✓✓  
 Maintenance must be conducted on a regular basis ✓✓  
**(ANY TWO)** (2 x 2) (4)

2.5.4 Frequent monitoring of water quality needs to continue. ✓✓  
 Lack of accountability, delayed or no action and poor water governance should be investigated, addressed and improved upon. ✓✓  
 Public – private partnerships should be considered to address the continued sewage crisis. ✓✓  
 Create a buffer zone to prevent development too close to the river ✓✓  
 Implement legislation to discourage pollution of the river ✓✓  
 Educating farmers on sustainable farming methods ✓✓  
 Promote recycling of waste water before releasing back into the river. ✓✓  
 Fine those that break the rules ✓✓  
 Awareness campaigns, bill boards and poster ✓✓  
**(ANY FOUR)** (4 x 2) (8)



**SECTION B**

**QUESTION 3**

3.1

3.1.1 KwaZulu-Natal ✓

(1 x 1) (1)

3.1.2 A ✓

(1 x 1) (1)

3.1.3 D ✓

(1 x 1) (1)

3.1.4 Length  $4,2 \times 0,1 = 0,42$  ✓  
 Breadth  $3,9 \times 0,1 = 0,39$  ✓  
 Area =  $0,42 \text{ km} \times 0,39 \text{ km}$  ✓  
 =  $0,1638 \text{ km}^2$  ✓

Range  $0,41 - 0,43$   
 $0,38 - 0,40$

(0,1558 – 0,172)

(5 x 1) (5)

3.1.5  $TB = 180^\circ + 128^\circ = 308^\circ$  ( $307^\circ - 309^\circ$ ) ✓

(1 x 1) (1)

3.1.6  $MB = 308^\circ + 25^\circ 45'$   
 =  $333^\circ 45'$  west of true North  
 Range  $332^\circ 45'$  to  $334^\circ 45'$  ✓

(1 x 1) (1)

**3.2 MAP INTERPRETATION**

3.2.1 D ✓

(1 x 1) (1)

3.2.2 C ✓

(1 x 1) (1)

3.2.3 a) anabatic ✓

(1 x 1) (1)

b) During the day the slopes are heated and the air that is in contact with the slopes is also heated and rises. ✓✓

(1 x 2) (2)

c) The smoke released during the day into the lower atmosphere by industries located within the valley is carried away by the wind. ✓✓

(1 x 2) (2)

3.2.4 a) Northerly / northeast ✓

(1 x 1) (1)

b) The river flows towards the dam wall indicated by an accumulation of water before the wall. ✓✓

(1 x 2) (2)

3.2.5 a) The contour lines are far apart. ✓✓

(1 x 2) (2)

3.3.1

(a) raster ✓ (1 x 1) (1)

(b) A ✓ (1 x 1) (1)

(c) The quality and detail of image A is clearer than image B ✓✓  
Image A has a larger/greater number of pixels ✓✓



**(ANY ONE)** (1 x 2) (2)

3.3.2

(a) Data layering: maps showing different types of information are projected (placed) on top of one another. ✓✓ (1 x 2) (2)

**[CONCEPT]**

(b) The contour lines are far apart indicating gentle land which would promote the use of machinery on the farms increasing yields. ✓✓ (1 x 2) (2)

**GRAND TOTAL: 150**

