



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P1  
NOVEMBER 2022

MARKS: 150

TIME: 3 hours

*Stanmorephysics*

This question paper consists of 20 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 use a magnifying glass.
13. Write neatly and legibly.

## SPECIFIC INSTRUCTIONS AND INFORMATION FOR SECTION B

14. A 1 : 50 000 topographic 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 topographic map represents the area covered by the orthophoto map.
16. Marks will be allocated for steps in calculations.
17. You must hand in the topographic and orthophoto map to the invigilator at the end of this examination session.

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

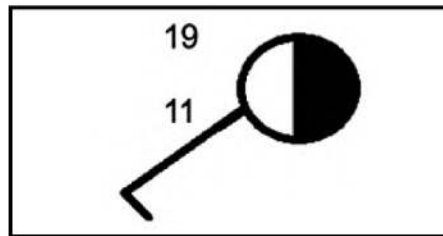
**QUESTION 1: CLIMATE AND WEATHER**

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.8) in the ANSWER BOOK, e.g. 1.1.9 D.

1.1.1 Lines that join places of equal atmospheric pressure on a synoptic weather map are known as ...

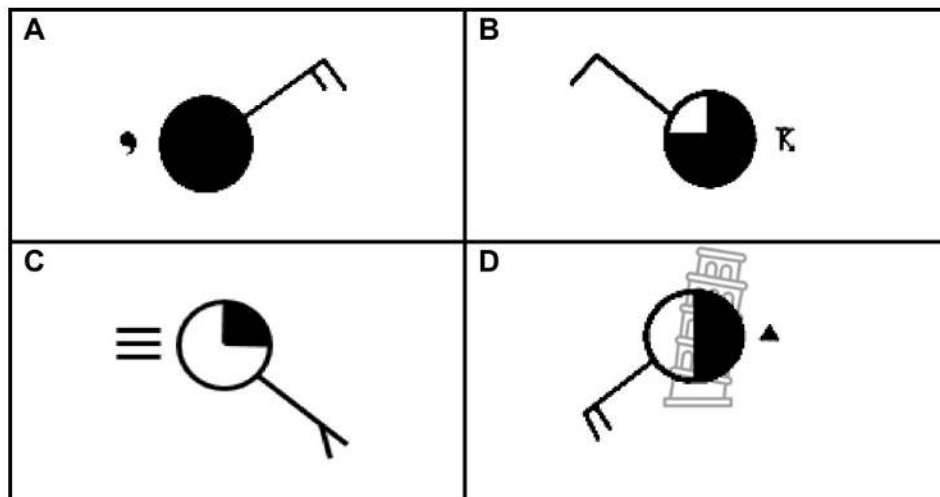
- A isolines.
- B isotherms.
- C isohyets.
- D isobars.

1.1.2 The wind direction represented by the station model below is ...

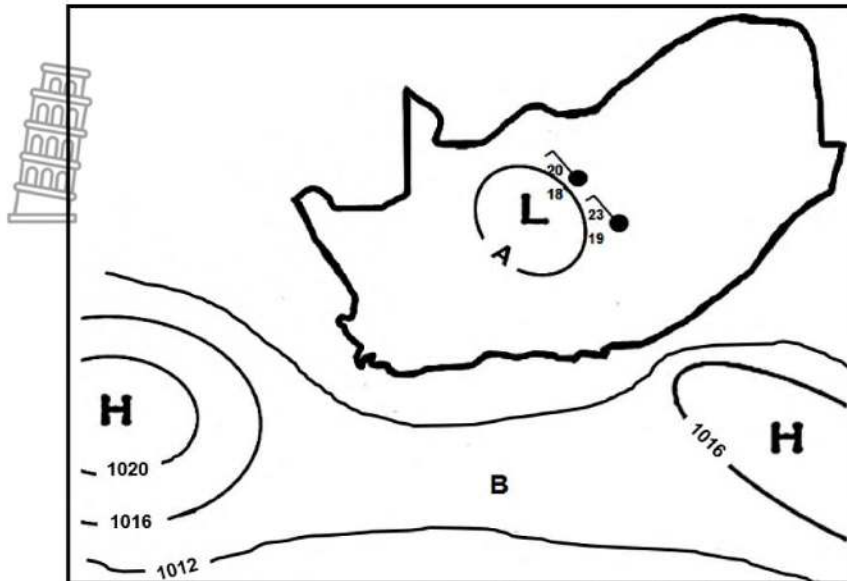


- A north-west.
- B south-west.
- C south-east.
- D north-east.

1.1.3 Which ONE of the station models below shows drizzle as a form of precipitation?



Refer to the sketch below to answer QUESTIONS 1.1.4 to 1.1.6.



[Source: Examiner's own sketch]

1.1.4 The atmospheric pressure reading at **A** is ... hPa.

- A 1004
- B 1008
- C 1012
- D 1016

1.1.5 Feature **B** is known as a ...

- A ridge.
- B trough.
- C wedge.
- D saddle.

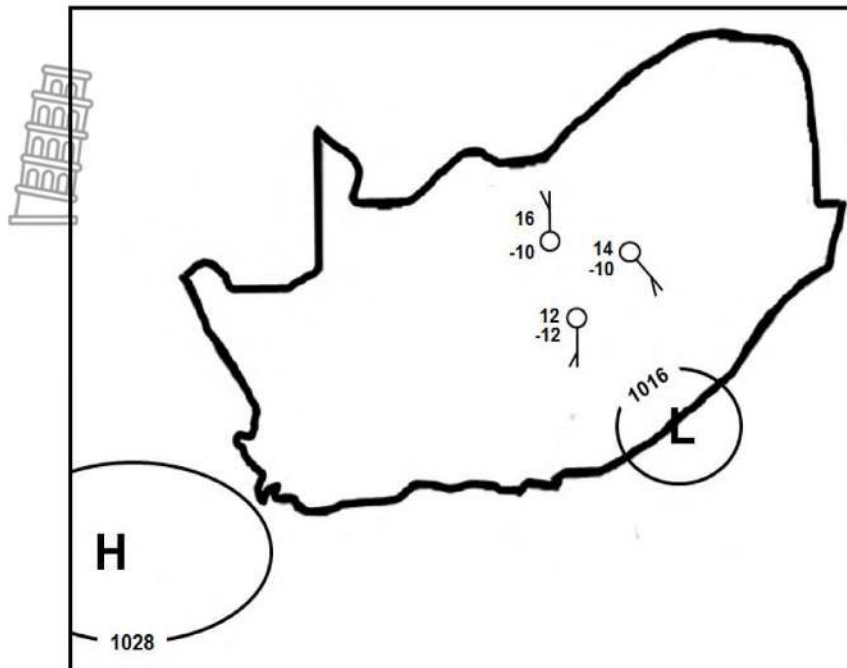
1.1.6 The low-pressure cell over the interior has caused north-westerly winds because of ... circulation and overcast conditions due to ... of air.

- (i) clockwise
- (ii) anticlockwise
- (iii) descending
- (iv) ascending

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



Refer to the sketch below to answer QUESTIONS 1.1.7 and 1.1.8.



[Source: Examiner's own sketch]

1.1.7 The low-pressure cell in the sketch is a ...

- A mid-latitude cyclone.
- B tropical depression.
- C coastal low.
- D thermal low.

1.1.8 The interior of South Africa experiences ... conditions with a greater temperature variation due to ... climatic conditions.

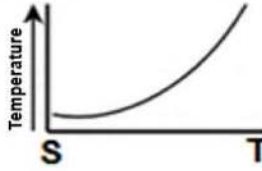
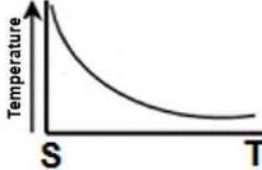
- (i) unstable
- (ii) stable
- (iii) continental
- (iv) maritime

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



(8 x 1) (8)

1.2 Complete the statements in COLUMN A with the options in COLUMN B. Write down only **Y** or **Z** next to the question numbers (1.2.1 to 1.2.7) in the ANSWER BOOK, e.g. 1.2.8 Y.

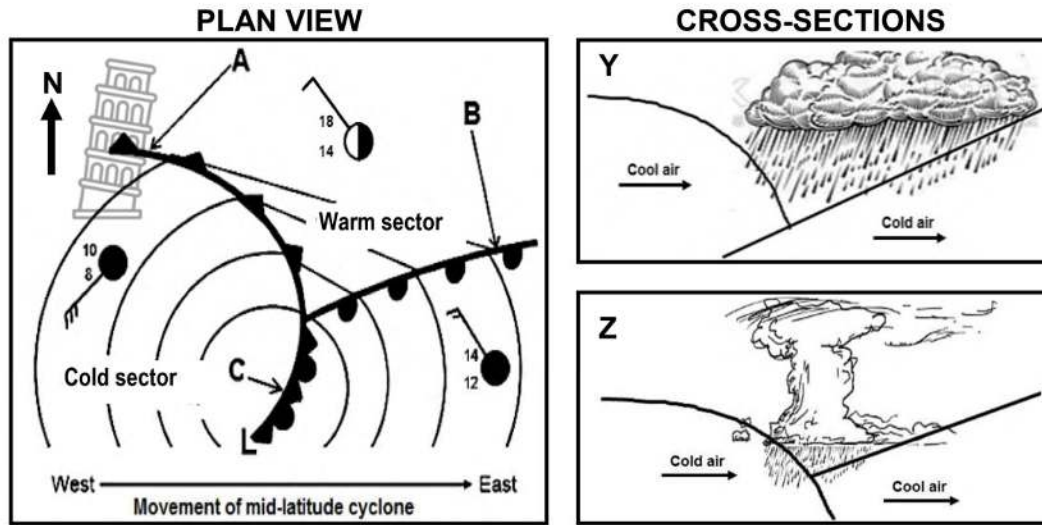
COLUMN A		COLUMN B	
1.2.1	Increased absorption of heat in urban areas is due to ... surfaces.	<b>Y</b>	natural
		<b>Z</b>	artificial
1.2.2	The intensity of multiple reflections of heat is increased due to the ... dimension of buildings.	<b>Y</b>	vertical
		<b>Z</b>	horizontal
1.2.3	The air pressure will generally be ... in urban areas than in rural areas.	<b>Y</b>	lower
		<b>Z</b>	higher
1.2.4	The wind speed in urban areas is ... than in rural areas.	<b>Y</b>	faster
		<b>Z</b>	slower
1.2.5	The relative humidity over urban areas is lower than over rural areas due to ... evaporation.	<b>Y</b>	more
		<b>Z</b>	less
1.2.6	Urban areas have a higher frequency of precipitation than rural areas due to ...	<b>Y</b>	hygroscopic particles
		<b>Z</b>	building structures
1.2.7	Temperature graph ... represents the change in temperature from the urban areas ( <b>S</b> ) to the rural areas ( <b>T</b> ).	<b>Y</b>	
		<b>Z</b>	

(7 x 1)

(7)



1.3 Refer to the sketches below on a mid-latitude cyclone.



1.3.1 Name the wind belt that causes the easterly movement of the mid-latitude cyclone. (1 x 1) (1)

Refer to the plan view.

1.3.2 Identify front **A**. (1 x 1) (1)

1.3.3 Which ONE of fronts **A** or **B** is moving faster? (1 x 1) (1)

1.3.4 Give a reason for your answer to QUESTION 1.3.3. (1 x 2) (2)

1.3.5 Give evidence from the sketch that the mid-latitude cyclone is found in the Southern Hemisphere. (1 x 2) (2)

Refer to the cold front occlusion **C** and the cross-sections.

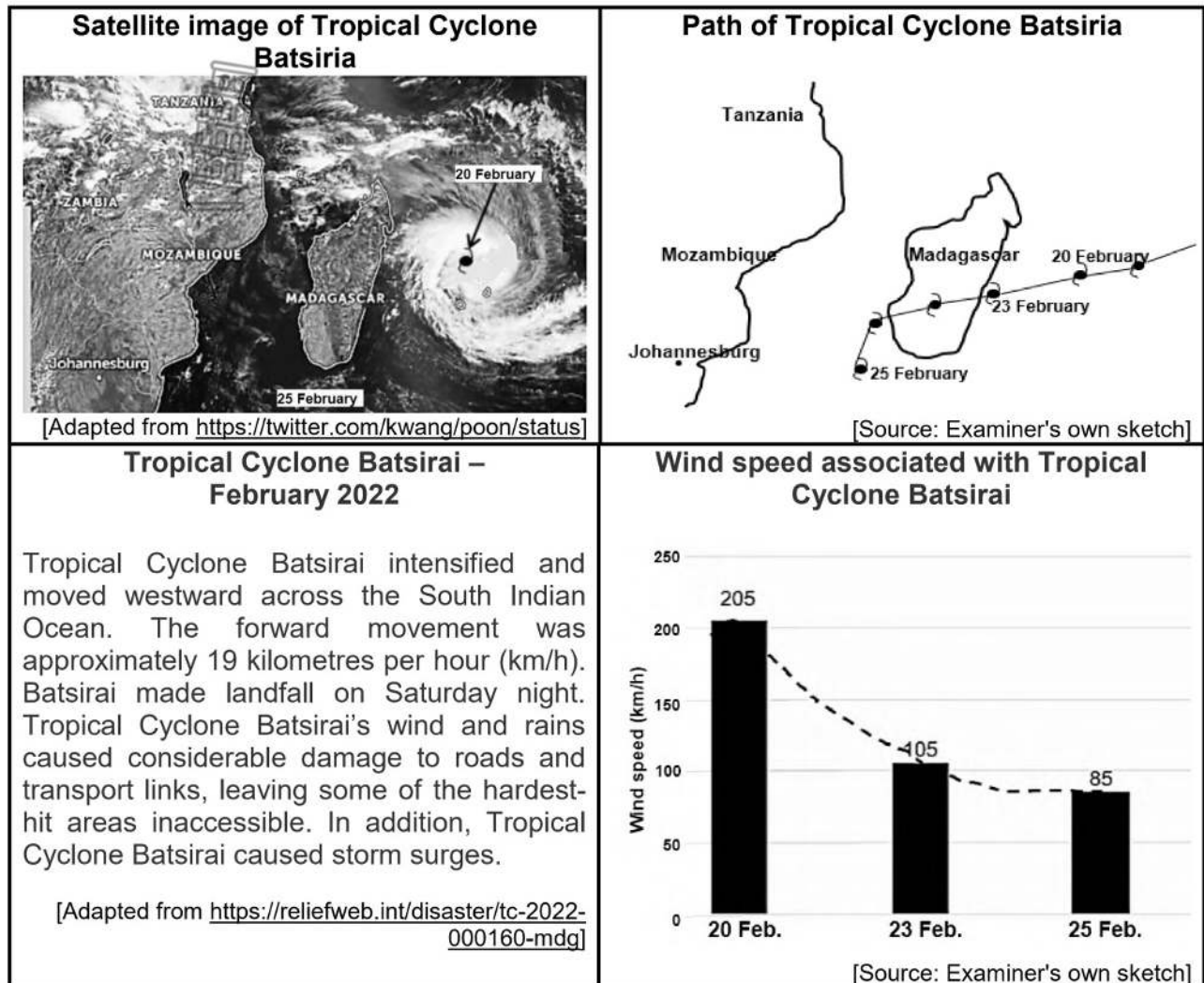
1.3.6 (a) Which ONE of the cross-sections **Y** or **Z** represents the cold front occlusion at **C**? (1 x 2) (2)

(b) Give evidence that **C** is a cold front occlusion. (1 x 2) (2)

(c) Explain how the cold front occlusion developed. (2 x 2) (4)



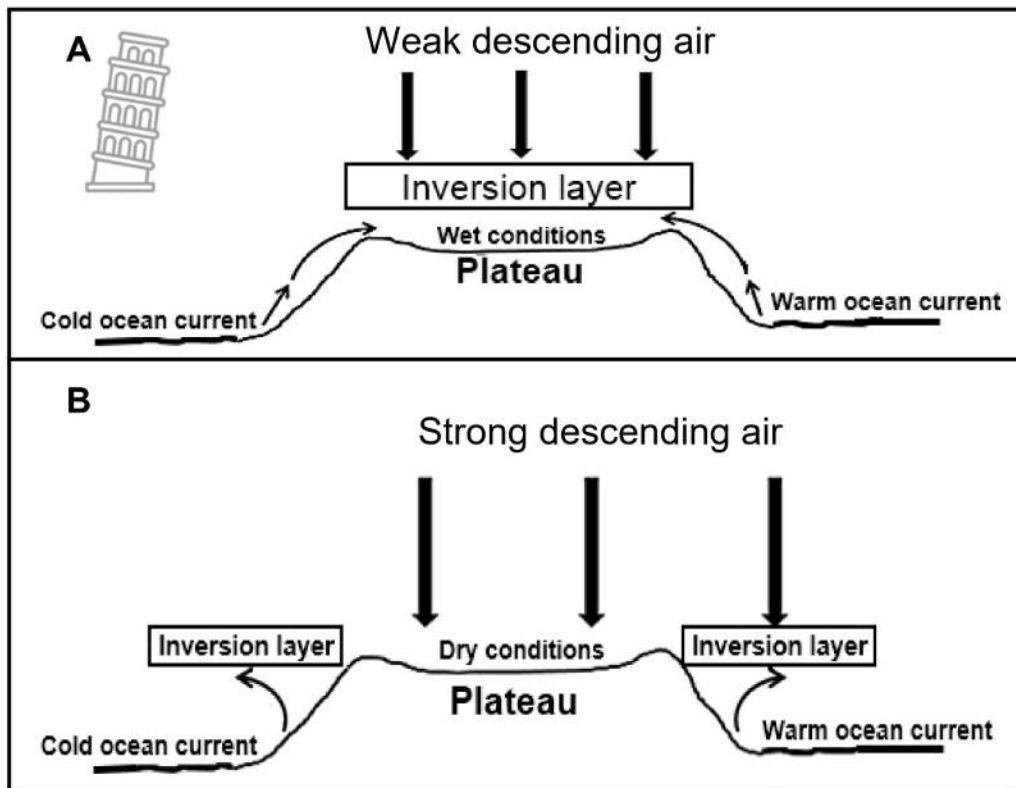
1.4 Refer to the infographic below on Tropical Cyclone Batsirai.



- 1.4.1 Give the date on which Tropical Cyclone Batsirai reached the mature stage. (1 x 1) (1)
- 1.4.2 According to the infographic, Tropical Cyclone Batsirai moved westward across the South Indian Ocean. Give ONE reason for this movement. (1 x 2) (2)
- 1.4.3 Suggest TWO reasons for the large decrease in wind speed between 20 and 25 February 2022. (2 x 2) (4)
- 1.4.4 How could storm surges negatively impact the physical environment on the east coast of Madagascar? (4)
- 1.4.5 Explain the importance of monitoring tropical cyclones like Batsirai for Madagascar. (2 x 2) (4)



1.5 Refer to the sketches below showing the changes in the position of the inversion layer over South Africa.



[Source: Examiner's own sketch]

Refer to sketch **A**.

- 1.5.1 Identify the season illustrated in sketch **A**. (1 x 1) (1)
- 1.5.2 Give a reason for your answer to QUESTION 1.5.1. (1 x 2) (2)

Refer to sketch **B**.

- 1.5.3 Identify TWO factors, visible in the sketch, which influence the climate of South Africa. (2 x 1) (2)
- 1.5.4 Explain the role played by descending air in the development of the inversion layer. (1 x 2) (2)

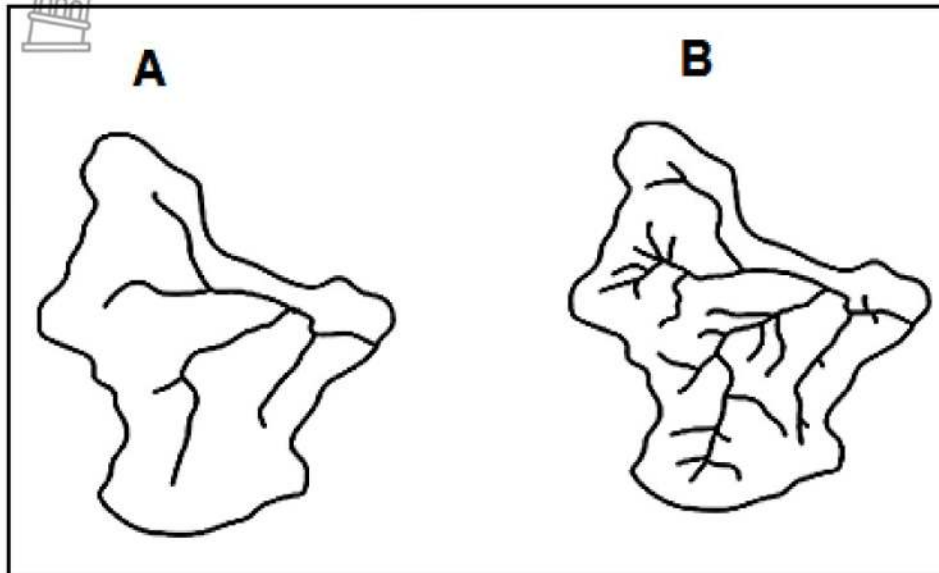
Refer to sketches **A** and **B**.

- 1.5.5 In a paragraph of approximately EIGHT lines, describe how the position of the inversion layer in sketches **A** and **B** influences the amount of rainfall in the interior of South Africa. (4 x 2) (8)

[60]

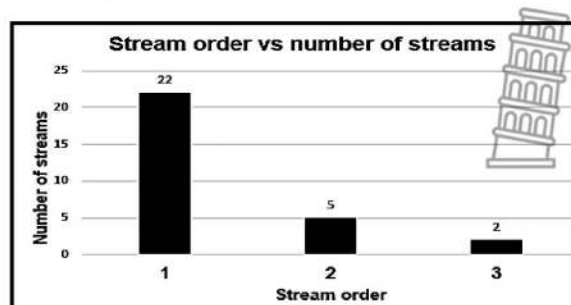
**QUESTION 2: GEOMORPHOLOGY**

2.1 Refer to drainage basins **A** and **B** below which have different drainage densities. Match the descriptions in QUESTIONS 2.1.1 to 2.1.8 with **A** and **B**. Write down only **A** or **B** next to the question numbers (2.1.1 to 2.1.8) in the ANSWER BOOK, e.g. 2.1.9 **A**.



[Source: <https://www.google.com/search?q=drainage+basins>]

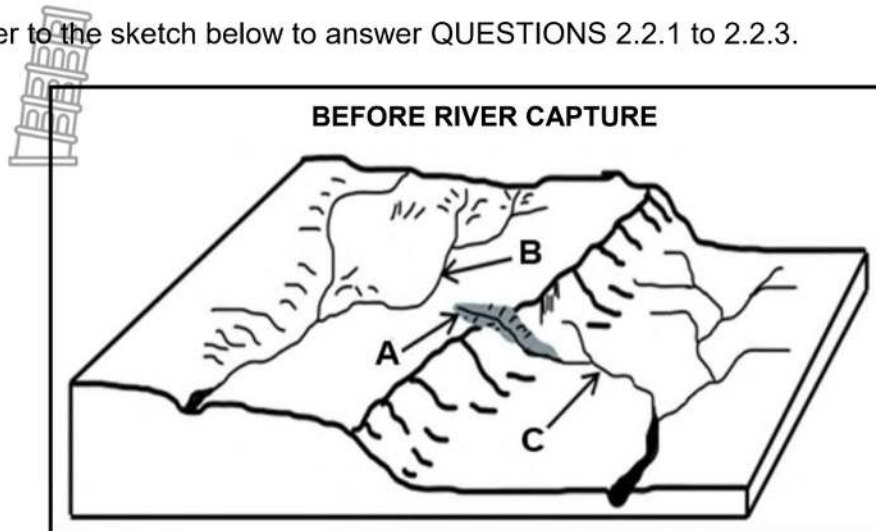
- 2.1.1 Higher drainage density
- 2.1.2 Lower infiltration rate
- 2.1.3 Denser vegetation
- 2.1.4 Higher soil moisture content
- 2.1.5 Developed on the least resistant (soft) rock
- 2.1.6 Lower degree of permeability
- 2.1.7 Higher stream order
- 2.1.8 The graph below represents this drainage basin.



(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. D.

Refer to the sketch below to answer QUESTIONS 2.2.1 to 2.2.3.



[Source: Examiner's own sketch]

2.2.1 ... erosion at **A** is responsible for the lengthening of the river.

- A Vertical
- B Lateral
- C Sheet
- D Headward

2.2.2 The landform caused by the type of erosion in QUESTION 2.2.1 is a ...

- A spur.
- B rapid.
- C gorge.
- D meander.

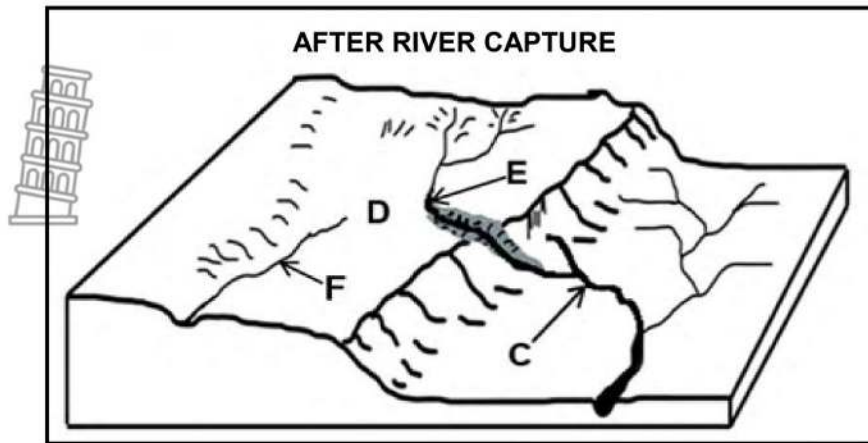
2.2.3 River **C** will eventually capture river **B** because it flows on a ... gradient and over ... rock.

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

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



Refer to the sketch below to answer QUESTIONS 2.2.4 to 2.2.7.



[Source: Examiner's own sketch]

2.2.4 River **C** is known as the ... stream.

- A captive
- B captor
- C captured
- D misfit

2.2.5 Feature **D** is referred to as ...

- A a waterfall.
- B river gravel.
- C a wind gap.
- D an elbow of capture.

2.2.6 The resultant fluvial landform of river capture at **E** is a/an ...

- A meander.
- B waterfall.
- C misfit stream.
- D oxbow lake.

2.2.7 The characteristics of river **F** are that it flows in a ... valley and the volume of water ...

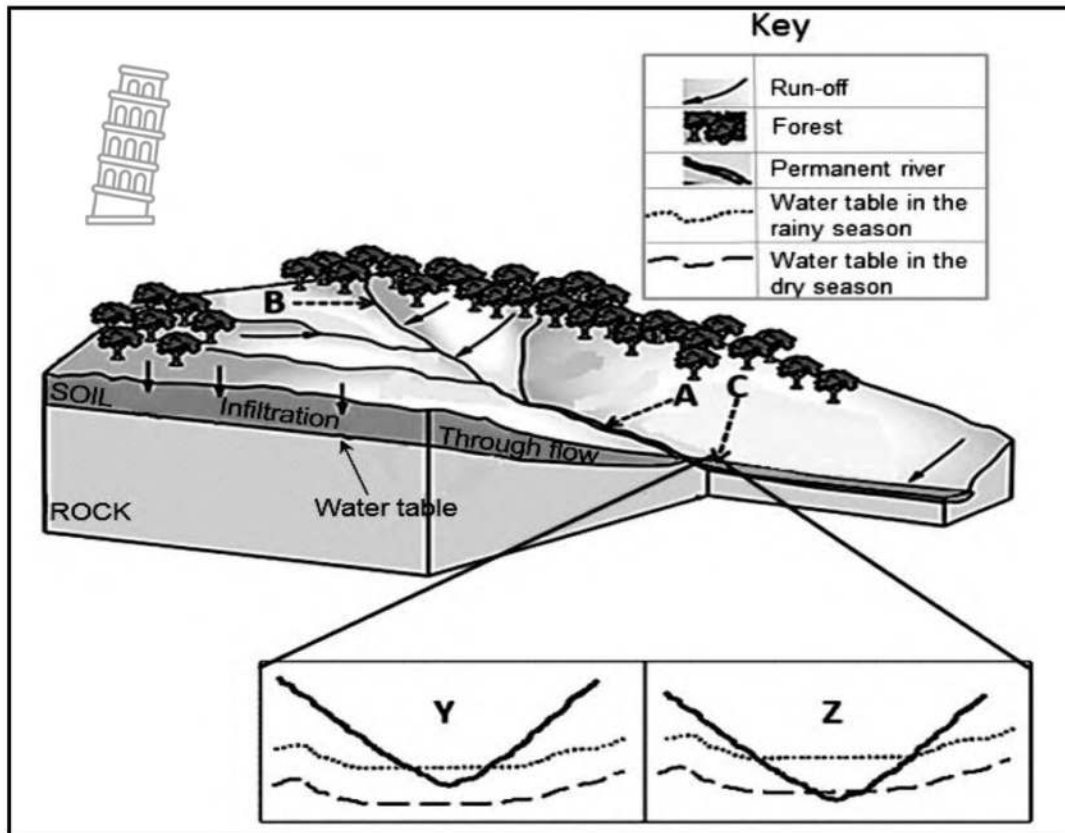
- (i) wide
- (ii) narrow
- (iii) increases
- (iv) decreases

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



(7 x 1) (7)

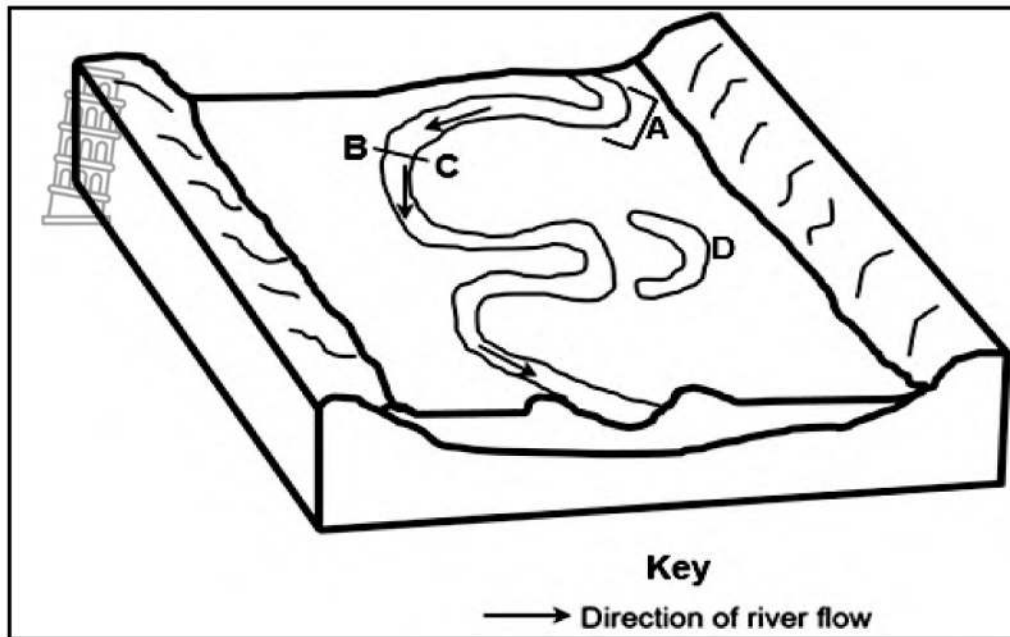
2.3 Refer to the drainage basin below.



[Adapted from <https://www.buddinggeographers.com/rivers/>]

- 2.3.1 The river illustrated in the sketch is (permanent/periodic). (1 x 1) (1)
- 2.3.2 State TWO characteristics of the river system evident in the sketch. (2 x 1) (2)
- 2.3.3 Give evidence from the sketch that the surface run-off is greater at **A** than at **B**. (2 x 2) (4)
- 2.3.4 Refer to **C**.
- (a) Which ONE of the cross-sections **Y** or **Z** represents the river at point **C**? (1 x 2) (2)
- (b) Give a reason for your answer to QUESTION 2.3.4(a). (1 x 2) (2)
- 2.3.5 How will a decrease in precipitation affect the following:
- (a) Water table (1 x 2) (2)
- (b) Type of river (1 x 2) (2)

2.4 Refer to the sketch on fluvial landforms below.



[Source: Examiner's own sketch]

- 2.4.1 The fluvial landforms, illustrated in the sketch, are mainly found in the (middle/lower) course. (1 x 1) (1)
- 2.4.2 Identify fluvial landform **A** on the sketch. (1 x 1) (1)
- 2.4.3 (a) Draw a rough cross-section from **B** to **C**. (2 x 1) (2)
- (b) Will erosion take place at **B** or **C**? (1 x 1) (1)
- (c) Give a reason for your answer to QUESTION 2.4.3(b). (1 x 2) (2)
- 2.4.4 In a paragraph of approximately EIGHT lines, describe the processes that resulted in the change of fluvial landform **A** to an ox-bow lake at **D**. (4 x 2) (8)



2.5 Refer to the case study below on catchment and river management.

**MOOI RIVER CATCHMENT AREA**

The Mooi River has two major tributaries, namely Wonderfonteinspruit and Loopspruit. The Donaldson Dam in the upper Wonderfonteinspruit receives water from various sources, such as sewage facilities, mining areas and informal settlements, that has a negative impact on the quality of water.

The Mooi River flows south, through agricultural land, from where it eventually joins the Vaal River. The main types of land use in the Mooi River catchment area are crop farming and grazing.

According to the Department of Water Affairs (DWA), irrigation and farming are the two major activities polluting the waters of the Mooi River drainage basin, following the removal of natural vegetation. Some small-scale diamond diggings also occur along the Mooi River, destroying the flood plain and riparian (wetlands next to river banks) habitats.

[Adapted from a case study by S Barnard, A Venter and CE van Ginkel]


- 2.5.1 What does the abbreviation *DWA* in the extract stand for? (1 x 1) (1)
- 2.5.2 Refer to the case study and identify TWO sources that negatively impact the quality of water of the Donaldson Dam. (2 x 1) (2)
- 2.5.3 Why are the water sampling points (testing points) important? (1 x 2) (2)
- 2.5.4 How do agricultural practices in the Mooi River catchment area cause water pollution of the river system? (2 x 2) (4)
- 2.5.5 Suggest THREE sustainable strategies that can be implemented in order to maintain the quality of water in the Mooi River catchment area. (3 x 2) (6)


**[60]**

**TOTAL SECTION A: 120**

**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 topographic map:

**ENGLISH**

Diggings  
Mooi River  
Sewerage Works  
Nature Reserve

**AFRIKAANS**

Delwery  
Moorivier  
Rioolwerke  
Natuurreservaat





3.1 MAP SKILLS AND CALCULATIONS

3.1.1 Study the information below. The orthophoto index map sheet west of 2930 CA 5 is ...



	2930 AC 24	2930 AC 25	2930 AD 21
29°30'	2930 CA 4	2930 CA 5	2930 CB 1
	2930 CA 9	2930 CA 10	2930 CB 6
	30°15'		

- A 2930 CB 1.
- B 2930 CA 4.
- C 2930 CB 6.
- D 2930 CA 9. (1 x 1) (1)

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

- (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)

Refer to the orthophoto map.

3.1.3 Calculate the straight-line distance in metres (m) that the power line covers from 6 in block B3 to 7 in block C5.

Formula: **Actual Distance = Map distance x Map scale** (2 x 1) (2)



Refer to the topographic map.

3.1.4 Draw a freehand cross-section from the recreation facility at point **F** in block **D2** to point **G** in block **D3**. Indicate **F** and **G** on your cross-section. (2 x 1) (2)

3.1.5 Is the recreation facility at **F** in block **D2** intervisible from point **G** in block **D3**? (1 x 1) (1)

3.1.6 Calculate the magnetic declination for 2022. The difference in years is 6 years and the annual change is 9' westwards. (3 x 1) (3)

3.2 **MAP INTERPRETATION**

3.2.1 The wind that blows during the night in block **C2** on the orthophoto map is a/an ... wind.

- A anabatic
  - B valley
  - C katabatic
  - D slope
- (1 x 1) (1)

Refer to block **D4** on the orthophoto map.

3.2.2 (a) Which time of the day (morning/afternoon) was the photograph taken? (1 x 1) (1)

(b) Give a reason for your answer to QUESTION 3.2.2(a). (1 x 2) (2)

3.2.3 Give a climatological reason for the large number of perennial water sources (dams) and furrows found on the topographic map. (1 x 2) (2)

Refer to river **H** in block **B1** on the topographic map.

3.2.4 (a) River **H** in block **B1** generally flows in a north-easterly direction. Give map evidence to support this statement. (1 x 1) (1)

(b) Give evidence why the type of flow of river **H** is associated with laminar flow. (1 x 2) (2)

3.2.5 The drainage pattern **I** encircled in blocks **C3** and **D3** on the topographic map is ...

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

3.2.6 Describe the underlying rock structure that is responsible for the drainage pattern (answer to QUESTION 3.2.5). (1 x 2) (2)

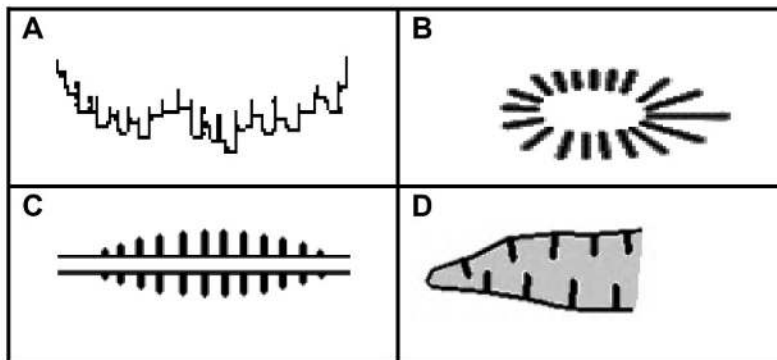
3.3 **GEOGRAPHICAL INFORMATION SYSTEMS (GIS)**

Refer to the photograph below that shows an environmental issue in block **C2** on the topographic map.



[Source :<https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=5574>]

3.3.1 Which symbol represents the environmental issue depicted in the photograph?



(1 x 1) (1)

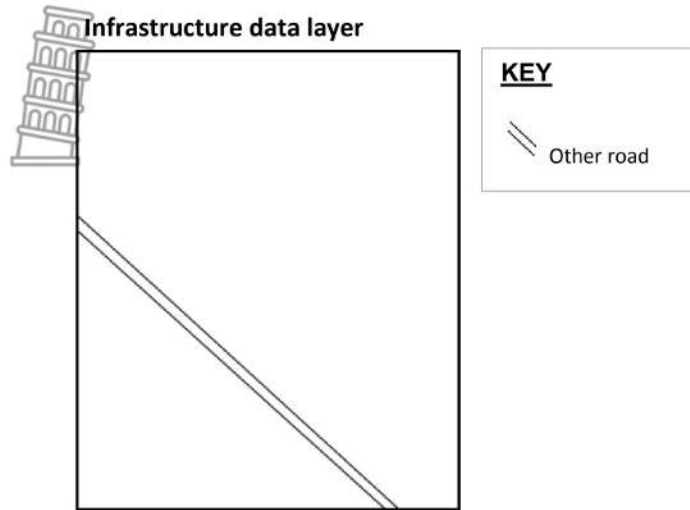
3.3.2 Classify the photograph as either primary or secondary data. (1 x 1) (1)

3.3.3 Give a reason for the high resolution of the photograph. (1 x 1) (1)

3.3.4 How would the high resolution of the photograph assist a GIS specialist to find a solution to the environmental issue depicted (answer to QUESTION 3.3.1)? (1 x 2) (2)



Refer to the sketch below of the infrastructure data layer in block **C3** on the orthophoto map.



- 3.3.5 Identify the missing infrastructure data layer, excluded (not indicated) on the sketch above. (1 x 1) (1)
- 3.3.6 Using the correct reference symbol, redraw the sketch and insert the infrastructure data layer identified in QUESTION 3.3.5. (2 x 1) (2)

**TOTAL SECTION B: 30**  
**GRAND TOTAL: 150**





# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**GEOGRAPHY P1  
NOVEMBER 2022  
MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 13 pages.**



## MARKING PRINCIPLES FOR GEOGRAPHY- NSC NOVEMBER 2022 AND NSC/SC JUNE 2023

The following marking principles have been developed to standardise marking in all provinces.

### MARKING

- ALL questions MUST be marked, irrespective of whether it is correct or incorrect
- Where the maximum marks have been allocated for a particular question, place an over the remainder of the text to indicate the maximum marks have been achieved.
- A clear, neat tick must be used: ✓
  - If ONE mark is allocated, ONE tick must be used: ✓
  - If TWO marks are allocated, TWO ticks must be used: ✓✓
  - The tick must be placed at the FACT that a mark is being allocated for
  - Ticks must be kept SMALL, as various layers of moderation may take place
- Incorrect answers must be marked with a clear, neat cross: ✗
  - Use MORE than one cross across a paragraph/discussion style questions to indicate that all facts have been considered
  - Do NOT draw a line through an incorrect answer
  - Do NOT underline the incorrect facts

For the following action words, ONE word answers are acceptable: **list, name, state, identify**

For the following action words, a FULL sentence must be written: **describe, explain, evaluate, analyse, suggest, differentiate, distinguish, define, discuss, why, how**

The following action words need to be read within its context to determine whether a ONE- word answer or FULL sentence is required: **provide, what, tabulate and give**

### NOTE THE FOLLOWING

- If the numbering is incorrect or left out, as long as the sequence of answers to questions is followed candidates can be credited
- Spelling errors if recognisable, award the marks provided the meaning is correct.
- Be sensitive to the sense of an answer, which may be stated in a different way
- In questions where a letter is the accepted response, but the learner writes the actual answer- award marks.
- There will be additional guidelines for the marking of certain questions. (\*)

### TOTALLING AND TRANSFERRING OF MARKS

- Each sub-question must be totalled
  - Questions in Section A has five sub-sections, therefore five sub-totals per question required. Section B has three sub-sections and three sub-totals.
  - Sub-section totals to be written in the right-hand margin at the end of the sub-section and underlined
  - Sub-totals must be written legibly
  - Leave room to write in moderated marks on different levels
- Total sub-totals and transfer total to top left-hand margin next to question number
- Transfer total to cover of answer book

**QUESTION 1**

- 1.1.1 A (South Atlantic High) (1) ✓
- 1.1.2 B (Kalahari High) (1) ✓
- 1.1.3 B (South Indian) (1) ✗ 2
- 1.2.1 Melting snow ✓
- 1.2.2 Mouth ✗
- 1.2.3 Third order ✓ 2
- 1.3.1 Katabatic ✗
- 1.3.2 1 occurs during the day while 2 occurs at night ✓✓
- 1.3.3 Cold air rolls down into the valley and forms an inversion ✓✓



- 1.4.1 Shape of front concave ✗  
Steep gradient of front ✓ 6
- 1.4.2 Warm air undercuts the cold air ✗
- 1.4.3 Air behind the cold front is colder than the air in front. Cold air moves faster than warm air ahead of it. Cold front catches up with the warm front. ✓✓ 7
- 1.5.1 (a) A river that only flows all year round ✗  
(b) The river channel is wide ✗  
(c) Regularity of rainfall and the soil type over which the streams flow. ✓✓
- 1.5.2 Gauteng and the Eastern Cape ✗
- 1.5.3 The cost of food production will increase as it is costly to buy purified water. Farmers will have to buy more chemicals to purify water. Chemicals cost a lot and this will increase production costs. It will be costly to purify water for use in electricity generation. These costs will be included in electricity prices. Costs will increase the price of electricity during production. There will be less clean water to generate hydro- electricity. ✓✓ 13



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

**QUESTION 1: CLIMATE AND WEATHER**

- 1.1 1.1.1 D (1)
- 1.1.2 B (1)
- 1.1.3 A (1)
- 1.1.4 B (1)
- 1.1.5 D (1)
- 1.1.6 C (1)
- 1.1.7 C (1)
- 1.1.8 D (1) (8 x 1) (8)
- 1.2 1.2.1 Z (1)
- 1.2.2 Y (1)
- 1.2.3 Y (1)
- 1.2.4 Z (1)
- 1.2.5 Z (1)
- 1.2.6 Y (1)
- 1.2.7 Z (1) (7 x 1) (7)





1.3	1.3.1	Westerlies (1)	(1 x 1)	(1)
	1.3.2	Cold front (1)	(1 x 1)	(1)
	1.3.3	A (1)	(1 x 1)	(1)
	1.3.4	The windspeed behind the cold front is faster (30 knots) (2) The windspeed behind the warm front is slower (10 knots) (2) Ahead of the cold front the air is warmer/less dense/lighter (2) Ahead of the warm front the air is colder/denser/heavier (2) Warm front use energy to move forward and rise (2) The pressure gradient associated with the cold front is steeper (2) <b>[ANY ONE]</b>	(1 x 2)	(2)
	1.3.5	Clockwise circulation of air (2) Position of the low pressure is south of the system (2) Warm sector / Cold front is to the north (2) Cold sector / Warm front is to the south (2) Backing of the wind occurs (2) Apex is to the south (2). <b>[ANY ONE]</b>	(1 x 2)	(2)
	1.3.6	(a) Z (2)	(1 x 2)	(2)
		(b) The air behind the cold front is colder (10°C) than the cool air in front of the warm front (14°C) (2) The cold front symbol is at the apex of the mid-latitude cyclone (2) Cold front touches the surface (2) Cold front has uplifted the warm front (2) Cumulonimbus clouds evident (2) <b>[ANY ONE]</b>	(1 x 2)	(2)
		(c) The cold front which is moving faster undercuts/overtakes (✓) the warm front (2) The warm air is forced to rise (✓), resulting in the narrowing of the warm sector (2) The cool air (in front of the warm front) (✓) is completely uplifted (2) <b>[ANY TWO – Accept 2 x 1 if not qualified]</b> <i>Part marking guideline</i> <i>Process: 1. undercutting</i> <i>2. Upliftment</i> <i>3. Position</i>	(2 x 2)	(4)
1.4	1.4.1	20 February (1)	(1 x 1)	(1)
	1.4.2	Batsirai is located in the tropical easterly wind belt (2) Driven by the easterlies/trade winds (2) <b>[ANY ONE]</b>	(1 x 2)	(2)

<p>1.4.3 SUGGEST TWO REASONS FOR THE LARGE DECREASE IN WIND SPEED BETWEEN 20 AND 25 FEBRUARY 2022.</p>	<p>The tropical cyclone reached the land (Madagascar) (2) Frictional drag over Madagascar (2) Decrease in moisture content (2) Less latent heat available (2) The tropical cyclone entered higher latitudes/cooler waters (2) Atmospheric pressure increases (2) <b>[ANY TWO]</b></p>	<p>(2 x 2) (4)</p>
<p>1.4.4 HOW COULD STORM SURGES NEGATIVELY IMPACT THE PHYSICAL ENVIRONMENT ON THE EAST COAST OF MADAGASCAR?</p>	<p>Coastal areas would be flooded (2) Re-shaping of coastline (accept examples) (2) Increased soil erosion (2) Possibility of mass movement (accept examples) (2) Destruction of biodiversity (accept examples)(2) Destruction of habitats (accept examples) (2) Pollution of water sources (2) Pollution of soil (2) (Accept) Damage to Infrastructure (accept examples) (2) <b>[ANY TWO]</b></p>	<p>(2 x 2) (4)</p>
<p>1.4.5 EXPLAIN THE IMPORTANCE OF MONITORING TROPICAL CYCLONES LIKE BATSIRAI FOR MADAGASCAR.</p>	<p>The area is prone to tropical cyclones (2) To observe the <b>path</b> of a tropical cyclone (2) To observe the <b>development</b> of a tropical cyclone (2) Enables advanced weather <b>predictions</b> (2) Enables the <b>collection</b> of data on rainfall rates/wind speed (2) Effective in providing early <b>warning systems</b> (2) To <b>reduce the level of impact</b> of the system (accept examples) (2) To be prepared and <b>limit possible damages</b> (accept examples) (2) To have enough <b>time to evacuate</b> (2) To <b>plan/prepare emergency</b> procedures (accept examples) (2) <b>[ANY TWO]</b></p>	<p>(2 x 2) (4)</p>
<p>1.5</p>	<p>1.5.1 Summer (1)</p>	<p>(1 x 1) (1)</p>
<p>1.5.2 GIVE A REASON FOR YOUR ANSWER TO QUESTION 1.5.1.</p>	<p>Weak descending air (2) The inversion layer is above the escarpment/plateau (2) Moist (onshore) winds will reach the interior (2) Wet conditions over the interior (2) <b>[ANY ONE]</b></p>	<p>(1 x 2) (2)</p>
<p>1.5.3 IDENTIFY TWO FACTORS, VISIBLE IN THE SKETCH, WHICH INFLUENCE THE CLIMATE OF SOUTH AFRICA.</p>	<p>Plateau (1) Height above sea level (1) Ocean currents (1) Inversion layer (1) Descending air/Kalahari HP (Anticyclonic movement) (1) Distance from the ocean (1) <b>[ANY TWO]</b></p>	<p>(2 x 1) (2)</p>



1.5.4 As air subsides it **compresses and heats** up (2)  
**Adiabatic heating** due to subsiding air (2)  
**[ANY ONE]** (1 x 2) (2)

EXPLAIN DESCENDING AIR IN THE DEVELOPMENT OF THE INVERSION LAYER.

1.5.5 **Sketch (A)**  
Inversion layer is above the level of the plateau/escarpment (2)  
Moist air flows into the interior (2)  
Unstable conditions cause air to rise (2)  
Condensation occurs and clouds form (2)  
Results in more rainfall (2)

**Sketch (B)**  
Inversion layer below the level of the plateau/escarpment (2)  
Moist air cannot reach the interior (2)  
Stable conditions cause clear skies (2)  
Less/No condensation occurs (2)  
Results in less/no rainfall (2)  
**[ANY FOUR – MUST INCLUDE CONDITIONS OF SKETCH A AND SKETCH B]** (4 x 2) (8)  
**[60]**

IN A PARAGRAPH OF APPROXIMATELY EIGHT LINES, DESCRIBE HOW THE POSITION OF THE INVERSION LAYER IN SKETCHES A AND B INFLUENCES THE AMOUNT OF RAINFALL IN THE INTERIOR OF SOUTH AFRICA.



**QUESTION 2 - GEOMORPHOLOGY**

- 2.1 2.1.1 B (1)
- 2.1.2 B (1)
- 2.1.3 A (1)
- 2.1.4 B (1)
- 2.1.5 A (1)
- 2.1.6 B (1)
- 2.1.7 B (1)
- 2.1.8 B (1) (8 x 1) (8)
- 2.2 2.2.1 D (1)
- 2.2.2 C (1)
- 2.2.3 C (1)
- 2.2.4 B (1)
- 2.2.5 C (1)
- 2.2.6 B (1)
- 2.2.7 C (1) (7 x 1) (7)
- 2.3 2.3.1 Permanent (1) (1 x 1) (1)
- 2.3.2 Dendritic drainage pattern (1)  
 Volume of water increases from source to mouth (1)  
 High water table (1)  
 Tributaries are divided by Interfluves (1)  
 2<sup>nd</sup> order stream (1)  
 Low drainage density (Few tributaries) (1)  
 Permanent / Perennial river (1)  
 The river intercepts the water table (in wet and dry season) (1)  
 Gentle gradient (1)  
 The tributaries are joining the mainstream at an acute angle (1)  
**[ANY TWO]** (2 x 1) (2)

2.3.3 Less vegetation at A (2)  
 More tributaries feed the channel at A (2)  
 The channel at A is wider (2)  
 Higher volume of water at A (The line indicating the river is thicker at A) (2)  
 A is in the middle or lower course (2)  
 Higher stream order at A (2)  
**[ANY TWO – MAY ANSWER WITH REFERENCE TO B]** (2 x 2) (4)

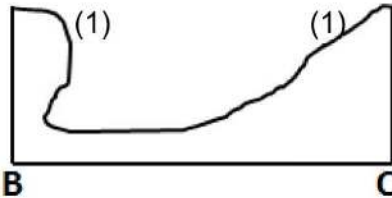
2.3.4 (a) Z (2) (1 x 2) (2)  
 (b) The river intercepts the wet and dry water tables (2) (1 x 2) (2)

2.3.5 (a) It will **lower** the water table (2) (1 x 2) (2)  
HOW WILL A DECREASE IN PRECIPITATION AFFECT THE FOLLOWING  
WATER TABLE

(b) It changes to a periodic or episodic river (non-perennial) (2)  
 The type of the river remains unchanged (permanent) (2)  
**[ANY ONE]** (1 x 2) (2)  
HOW WILL A DECREASE IN PRECIPITATION AFFECT THE FOLLOWING  
TYPE OF RIVER

2.4.1 Lower (1) (1 x 1) (1)

2.4.2 Meander (1) (1 x 1) (1)

2.4.3 (a)   
DRAW A ROUGH CROSS-SECTION FROM B TO C.

Marks to be allocated for the correct shape of the undercut (steep) and the slip-off slopes (gentler) (2 x 1) (2)

(b) B (1) (1 x 1) (1)

(c) The river **flow is faster** (at the outer bank) (2)  
 The river has **more energy** (2)  
**[ANY ONE]** (1 x 2) (2)  
GIVE A REASON FOR YOUR ANSWER TO QUESTION 2.4.3(b).



- 2.4.4 The outer bank of the river gets eroded (2)  
 Deposition takes place on the inner bank (2)  
 Continuous erosion and deposition cause the neck to become narrower (2)  
 Meander loop develops (2)  
 During flooding, the river cuts through the meander neck (2)  
 Deposition occurs at the neck of the meander loop (2)  
 The meander loop is now separated from the main stream forming an oxbow lake (2)  
**[ANY FOUR]** (4 x 2) (8)
- 2.5 2.5.1 Department of Water Affairs (1) (1 x 1) (1)
- 2.5.2 Sewage facilities (1)  
 Mining areas (1)  
 Informal settlements (1)  
**[ANY TWO]** (2 x 1) (2)
- 2.5.3 Test / monitor the water quality (2) (accept examples)  
 Identify the origin of the water pollution (2)  
 Check the level of water pollution (2)  
 Ensure that the ecosystem remains healthy (2)  
 Ensure that the ecosystem remains in balance (2)  
 Preserve the biodiversity (2)  
 To do ongoing research and predictions (2)  
 To ensure water is safe for people to use (2)  
 To assist with proper water management (2)  
 To avoid people getting (waterborne) diseases (2) (accept examples)  
**[ANY ONE]** (1 x 2) (2)
- 2.5.4 The pesticides/herbicides end up in the rivers (2) (accept examples)  
 The cattle droppings/waste is washed into rivers (2)  
 Fertilizers end up in the rivers (2)  
 Poor farming methods cause soil erosion (2) (accept examples)  
 Removing of vegetation increases run-off of more polluted material in water (2)  
 Irrigation/farming pollute the water (2)  
**[ANY TWO]** (2 x 2) (4)



2.5.5

SUGGEST  
THREE  
SUSTAINABLE  
STRATEGIES  
THAT CAN BE  
IMPLEMENTED  
IN ORDER TO  
MAINTAIN THE  
QUALITY OF  
WATER IN THE  
MOOI RIVER  
CATCHMENT  
AREA.

- Decrease the use of pesticides/herbicides (2)
- Buffering of the Mooi River catchment area (2)
- Practice green agriculture (accept examples) (2)
- Close the mines along the banks (2)
- Manage dumping of industrial waste (accept examples) (2)
- Reduce deforestation (2)
- Reduce pollution of (ground) water (2)
- Implement legislation (accept examples) (2)
- Provide incentives (accept examples) (2)
- Create awareness (accept examples) (2)
- Implement wastewater treatment (2)
- Ensure stormwater management (2)
- Ensure conservation of wetlands (2)
- Proper land use planning (accept examples) (2)
- Regular testing (accept examples) (2)
- Improve infrastructure in informal settlements (accept examples) (2)
- Maintain water purifying plants (2)
- Regular environmental impact assessment studies (2)
- Afforestation / Recover the flood plain/riparian zone (2)

**[ANY THREE]**

(3 x 2)

(6)  
**[60]**

**TOTAL SECTION A: 120**



**SECTION B**

**QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES**

3.1 3.1.1 B (1) (1 x 1) (1)

3.1.2 A (1) (1 x 1) (1)

3.1.3 Distance = **Map distance x Map scale**  
 = 9 (1) cm x 100 (Range 8.9 to 9.1)  
 = 900 m (1) (Range 890 m to 910 m) (2 x 1) (2)

3.1.4 **DRAW A FREEHAND CROSS-SECTION FROM THE RECREATION FACILITY AT POINT F IN BLOCK D2 TO POINT G IN BLOCK D3. INDICATE F AND G ON YOUR CROSS-SECTION.**  (1) **[AWARD 1 MARK FOR CORRECT SHAPE WITHOUT LABELS]** (2 x 1) (2)

3.1.5 Yes (1) (1 x 1) (1)

3.1.6 **CALCULATE THE MAGNETIC DECLINATION FOR 2022. THE DIFFERENCE IN YEARS IS 6 YEARS AND THE ANNUAL CHANGE IS 9' WESTWARDS.** Total change: 9' x 6 years = 54' (1)  
 Magnetic declination for 2022: 24° 42'  
 + (1) 54'  
24° 96'  
 25° 36' west of true north (1) (3 x 1) (3)

3.2 3.2.1 C (1) (1 x 1) (1)

3.2.2 (a) morning (1) (1 x 1) (1)

(b) The shadows fall in a south-westerly direction (2) (1 x 2) (2)

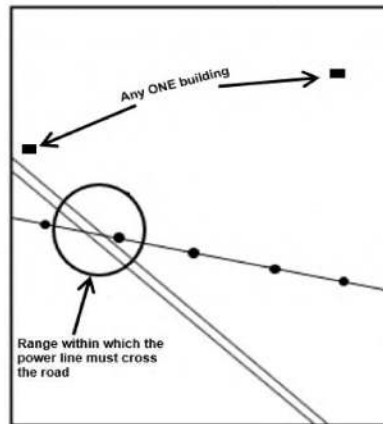
3.2.3 Rainfall is seasonal (2) (1 x 2) (2)

3.2.4 (a) The river flows towards the dam (1)  
 The V-shape contour lines point in a south-westerly direction (1)  
 Height decreases in a northerly direction (1)  
**[ANY ONE]** (1 x 1) (1)

**GIVE EVIDENCE WHY THE TYPE OF FLOW OF RIVER H IS ASSOCIATED WITH LAMINAR FLOW** (b) Flat/Gently sloping (2)  
 Widely spaced contour lines (2)  
**[ANY ONE]** (1 x 2) (2)



- 3.2.5 B (1) (1 x 1) (1)
- 3.2.6 Uniform/homogenous resistance (2)  
 Horizontally layered (2)  
**[ANY ONE]** (1 x 2) (2)
- 3.3 3.3.1 D (1) (1 x 1) (1)
- 3.3.2 primary (1) (1 x 1) (1)
- 3.3.3 Higher number of pixels was used (1)  
 The pixels are smaller (1)  
 Close up view (1)  
 Better quality camera or lens used (1)  
**[ANY ONE]** (1 x 1) (1)
- 3.3.4 Features are clearly visible (accept examples) (2) (1 x 2) (2)
- 3.3.5 Power line (1)  
 Buildings (1)  
**[ANY ONE]** (1 x 1) (1)
- 3.3.6 Infrastructure data layer



1 mark for correct reference symbol (relating to QUESTION 3.3.5).  
 1 mark for redrawing the power line crossing the road /1 mark for the correct position of the building (2 x 1) (2)

**TOTAL SECTION B: 30**  
**GRAND TOTAL: 150**

