KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

GEOGRAPHY P1

PREPARATORY EXAMINATION

SEPTEMBER 2023

MARKS: 150

TIME: 3 hours

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, 4ºC, 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
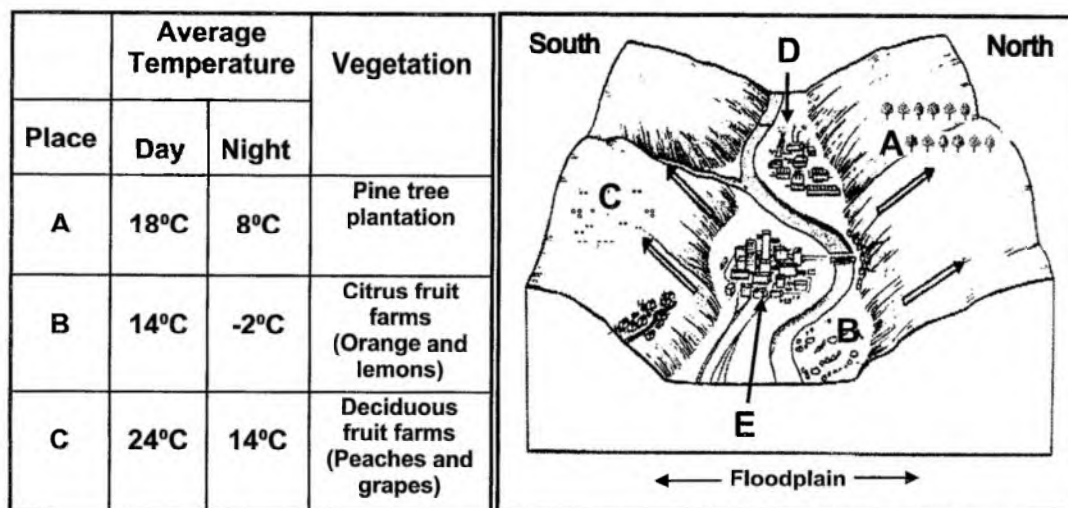
QUESTION 1: CLIMATE AND WEATHER

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.
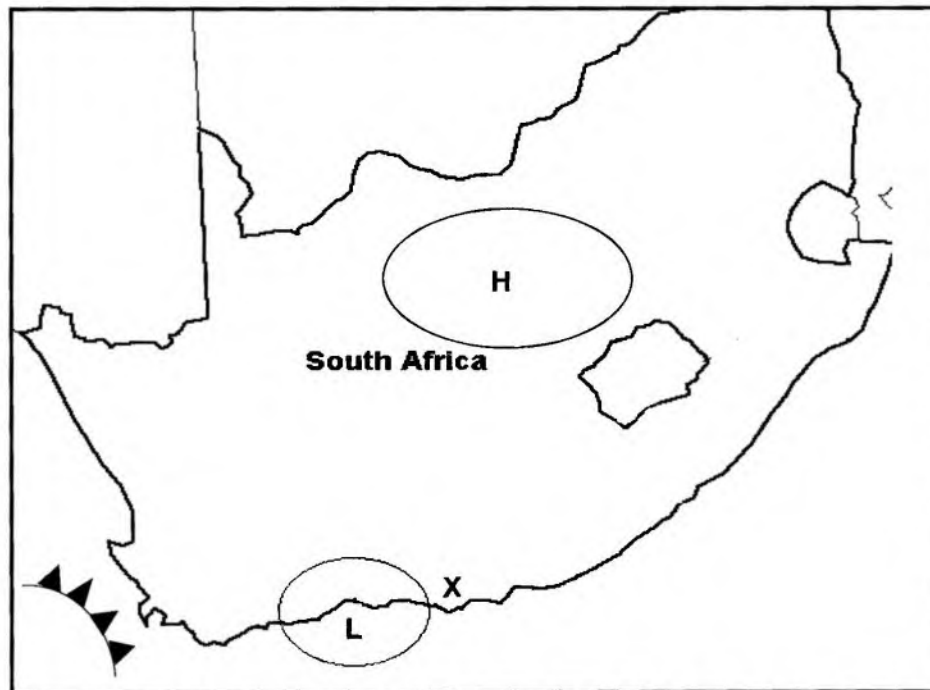
[Source: adapted from South African Weather Patterns]

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 Day	Average Temperature Night	Vegetation
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.
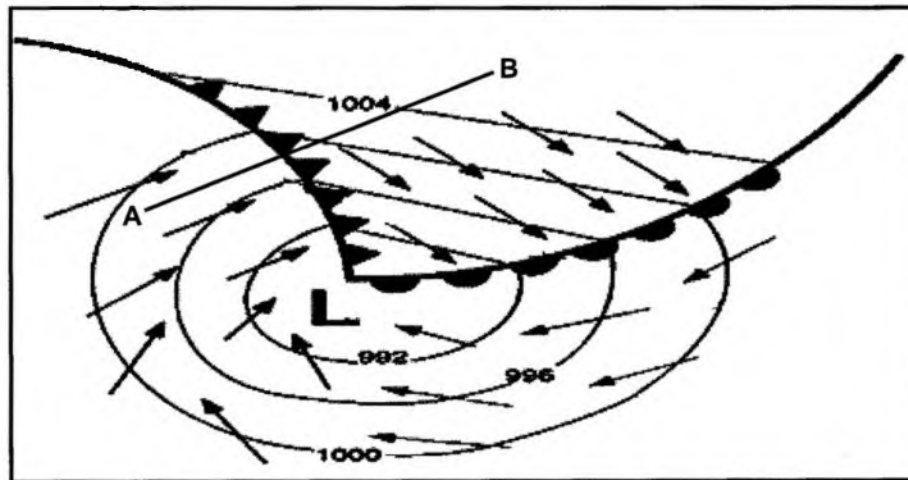
[Source adapted from: www.quora.com/How-do-mid-latitude-cyclones]

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-2023to be impacted.
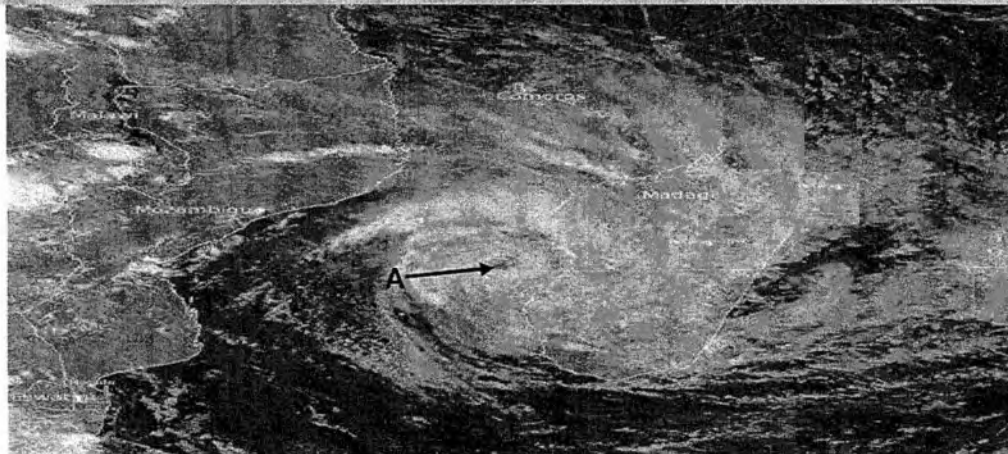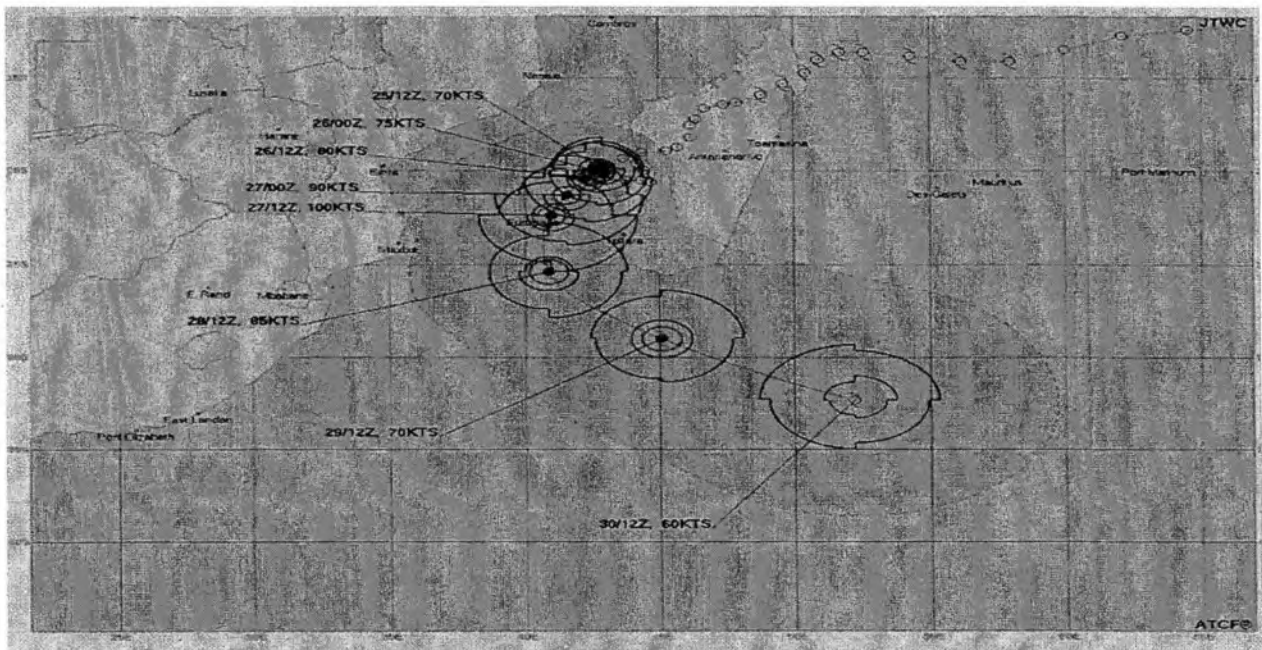
[Source:https://upload.wikimedia.org/Wikipedia.com]

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)
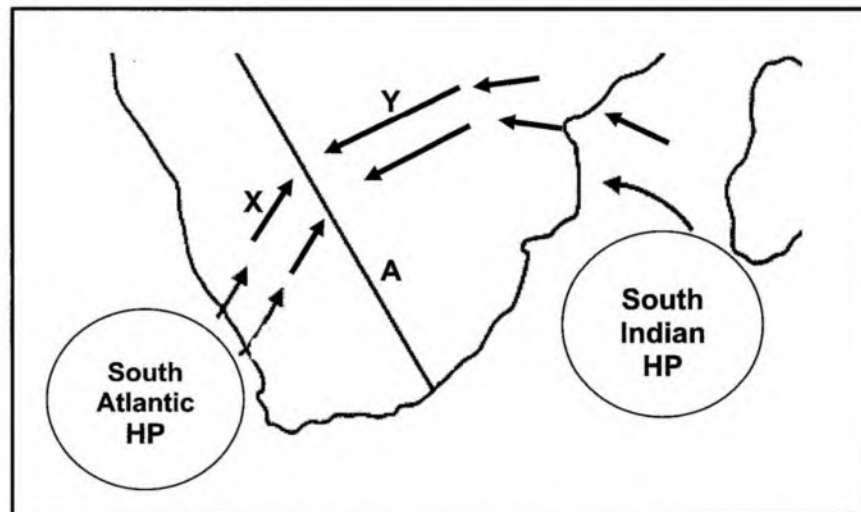
    (b)   Give ONE reason why the eye of the cyclone is:

      (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** refered 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	**Y.** **Z.**	Source Mouth
2.1.2 Point where two or more streams join	**Y.** **Z.**	Catchment Confluence
2.1.3 High-lying area that separates two streams in the same river system	**Y.** **Z.**	Watershed Interfluve
2.1.4 Water that flows in complex circular movements	**Y.** **Z.**	Laminar Turbulent
2.1.5 Upper level of ground water	**Y.** **Z.**	Water table Aquifer
2.1.6 Water found below the surface	**Y.** **Z.**	Groundwater Lake
2.1.7 A river that is younger than the underlying rock structure over which its flows	**Y.** **Z.**	Superimposed Antecedent
2.1.8 A river profile that has many obstacles along its course	**Y.** **Z.**	Graded 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
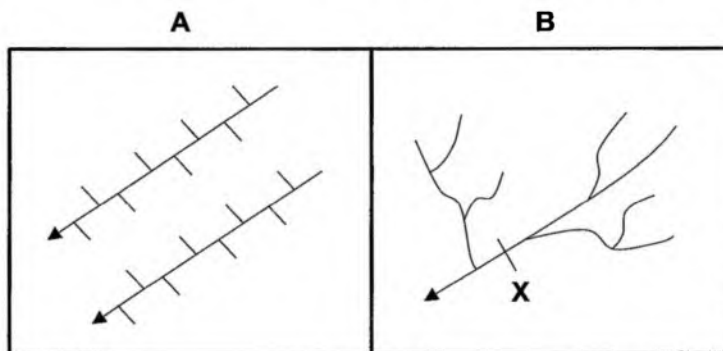
[Source: Examiner's own sketch]

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)

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

[Source: https://www.geographypods.com/21-river-festures.html]
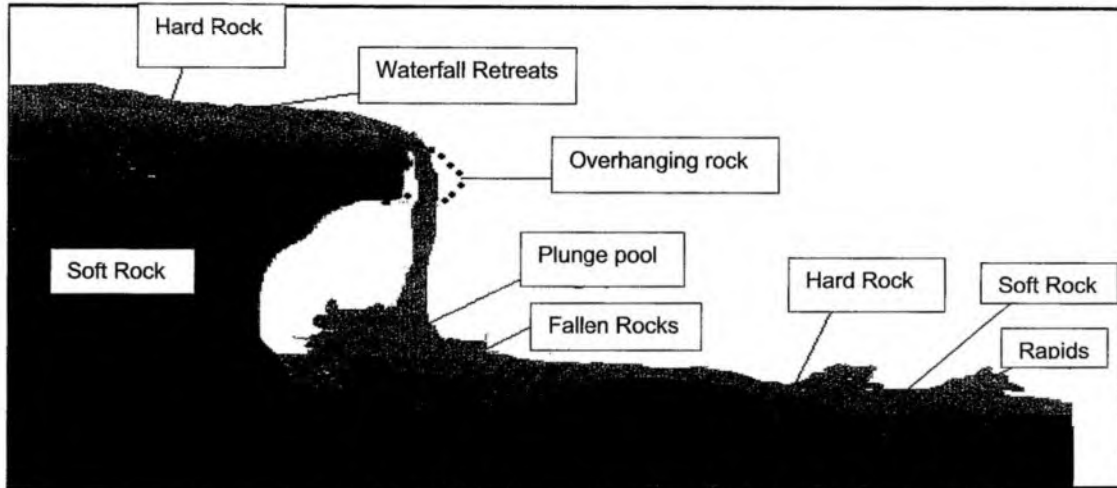
2.3.1   In which course of a river are waterfalls and rapids usually found?   (1 x 1)(1)

2.3.2   Explain how the plunge pool forms at the base of a waterfall.   (2 x 2)(4)
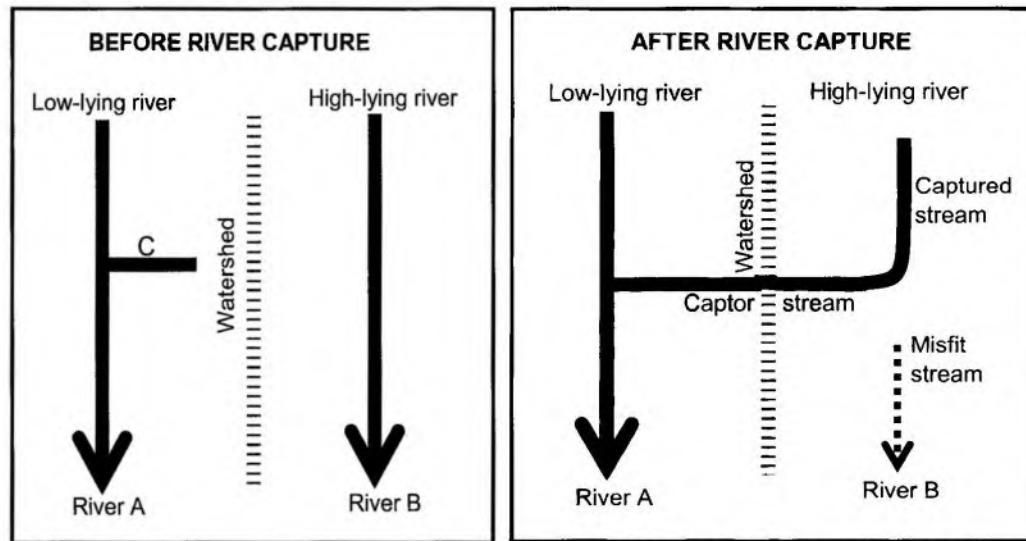
2.3.3   Give TWO positive impacts of waterfalls for people.   (2 x 2)(4)

        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]

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 eThekwini 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
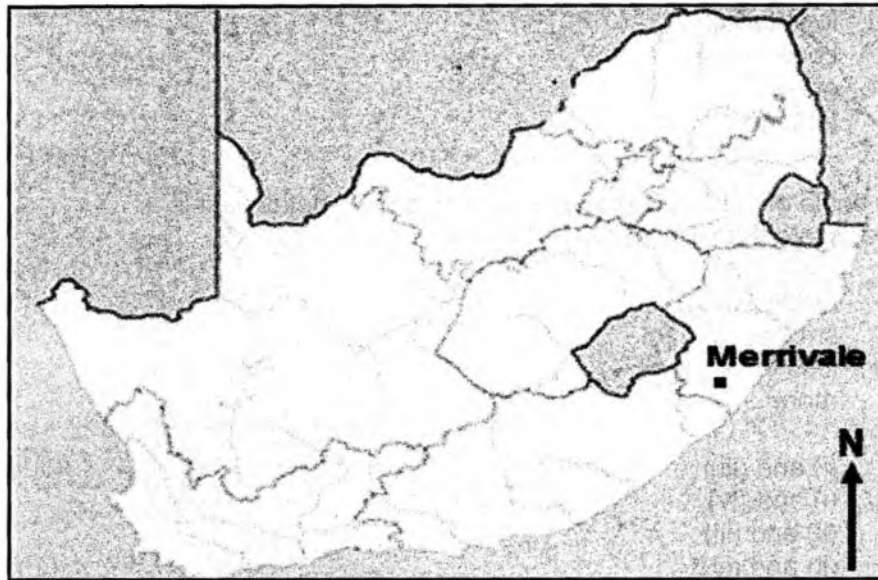
Coordinates: 29°31'S; 30°14'E

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	**AFRIKAANS**
Diggings	Delwery
Mooi River	Mooirivier
Sewerage works	Rioolwerke
Nature Reserve	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]
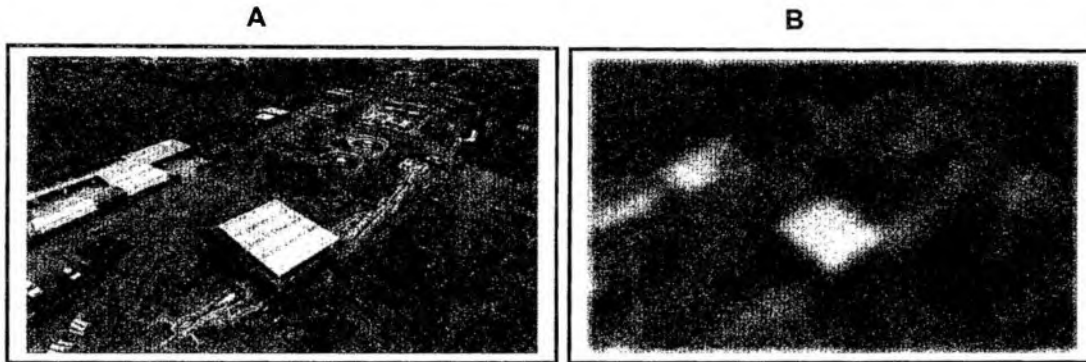
      (a) Image **A** and **B** are representations of (vector/raster) data.   (1 x 1)(1)

      (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