Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

JUNE 2023

GEOGRAPHY

MARKS: **150**

TIME: **3 hours**

This question paper consists of 21 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO SECTIONS.

   SECTION A:
   QUESTION 1: The Atmosphere (40)
   QUESTION 2: Geomorphology (40)
   QUESTION 3: Settlement (40)

   SECTION B:
   QUESTION 4: Geographical Skills and Techniques (30)

2. Answer all FOUR questions.
3. All diagrams are included in the QUESTION PAPER.
4. Leave a line between subsections of questions answered.
5. Start EACH question at the top of a NEW page.
6. Number the questions 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.

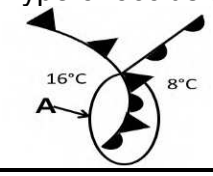
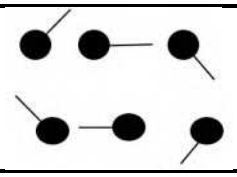
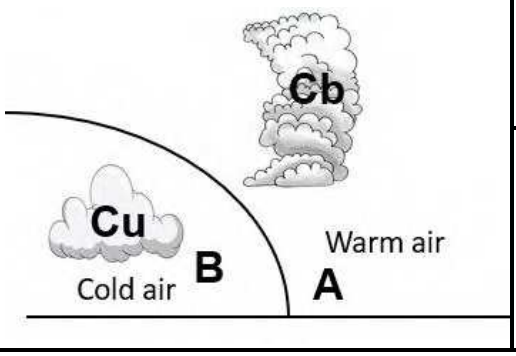
SPECIFIC INSTRUCTIONS AND INFORMATION FOR SECTION B

14. In SECTION B you are provided with a 1 : 50 000 extract of the topographic map (2527 DB/DD HARTBEESPOORT DAM) and an orthophoto map (2527 DB 23 ortho-rectified) of a part of the mapped area.
15. The area demarcated in RED/BLACK on the topographic map represents the area covered by the orthophoto map.
16. Show ALL calculations. Marks will be allocated for this.
17. You must hand in the topographic and the orthophoto map to the invigilator at the end of this examination session.

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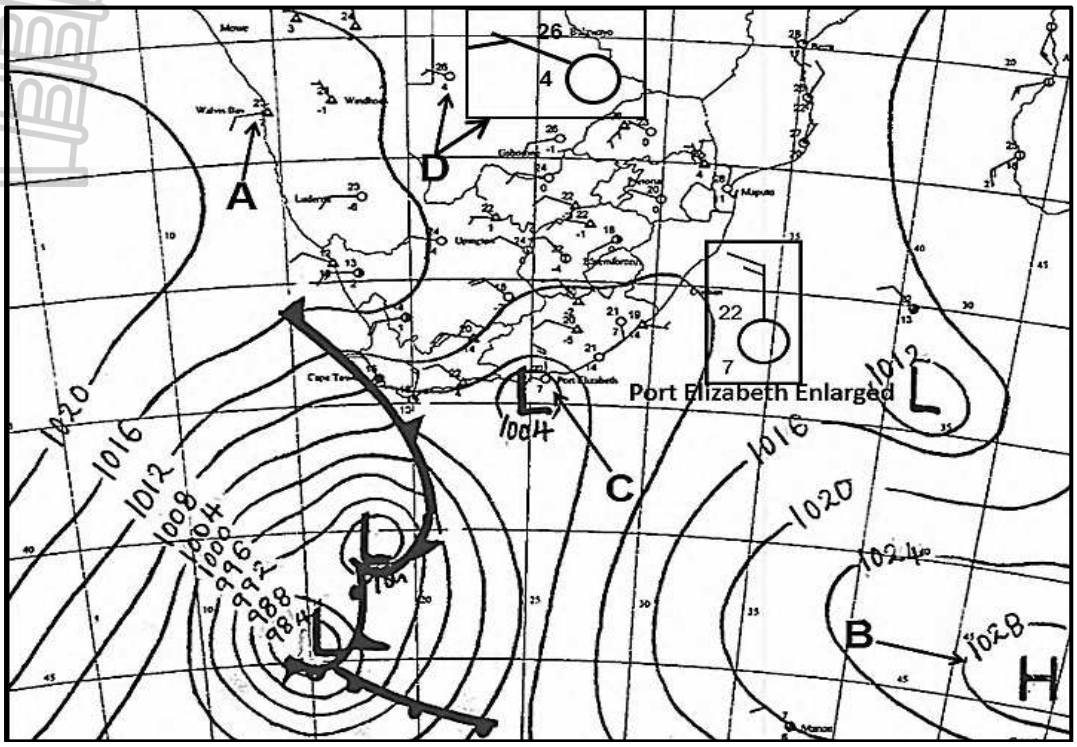
QUESTION 1: WEATHER AND CLIMATOLOGY

1.1 Match the statements in COLUMN A with the options in COLUMN B. Write down only **Y** or **Z** next to the question numbers (1.1.1 to 1.1.5) in the ANSWER BOOK, for example 1.1.6 **Y**.

	COLUMN A		COLUMN B
1.1.1	Winds that cause mid-latitude cyclones to generally move in an easterly direction	**Y** **Z**	Easterlies Westerlies
1.1.2	Causes the development of cumulonimbus clouds in the mid-latitude cyclone	**Y** **Z**	cold dense air that forces the warmer lighter air to rise warmer lighter air that moves slowly over the cold dense air
1.1.3	Type of occlusion indicated at **A** 	**Y** **Z**	warm cold
1.1.4	Weather station indicating backing of the wind in Southern Hemisphere	**Y** **Z**	
1.15	Air pressure from **A** to **B** in the sketch below 	**Y**	Decreases then increases.
		Z	Increases then decreases.

(5 x 1) (5)

1.2 Various options are provided as possible answers to the following questions, based on the synoptic weather map below. Choose the answer and write only the letter (A–D) next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, for example 1.2.6 D.



[Source: https://www.weathersa.co.za/home/synopticcharts. Accessed on 12 February 2023.]

1.2.1 The air pressure at **A** (Walvis Bay) is approximately … hPa.

A 1020
B 1018
C 1016
D 1014

1.2.2 The high pressure at **B** is known as the … high pressure.

A South Atlantic
B Kalahari
C Continental
D South Indian

1.2.3 The synoptic weather map depicts winter conditions due to … descending air and … conditions over the interior of South Africa.

(i) weak
(ii) strong
(iii) cloudless
(iv) overcast

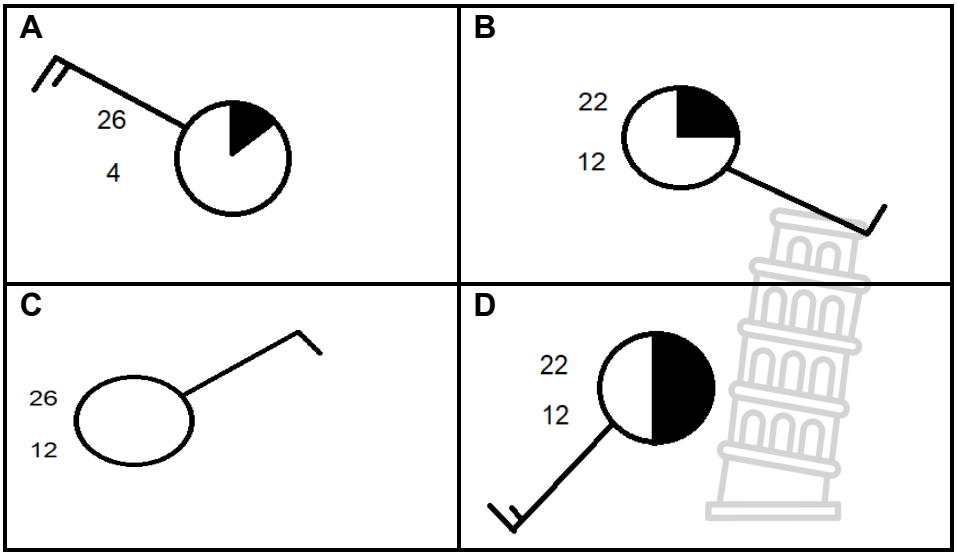
A (i) and (iii)
B (i) and (iv)
C (ii) and (iii)
D (ii) and (iv)

1.2.4 The weather conditions of Port Elizabeth (enlarged) at **C**, is influenced by … winds.

A offshore
B onshore
C adiabatic
D thermal

1.2.5 Weather station… below will represent **D** on the (synoptic weather map) if there are the following weather changes in the area?

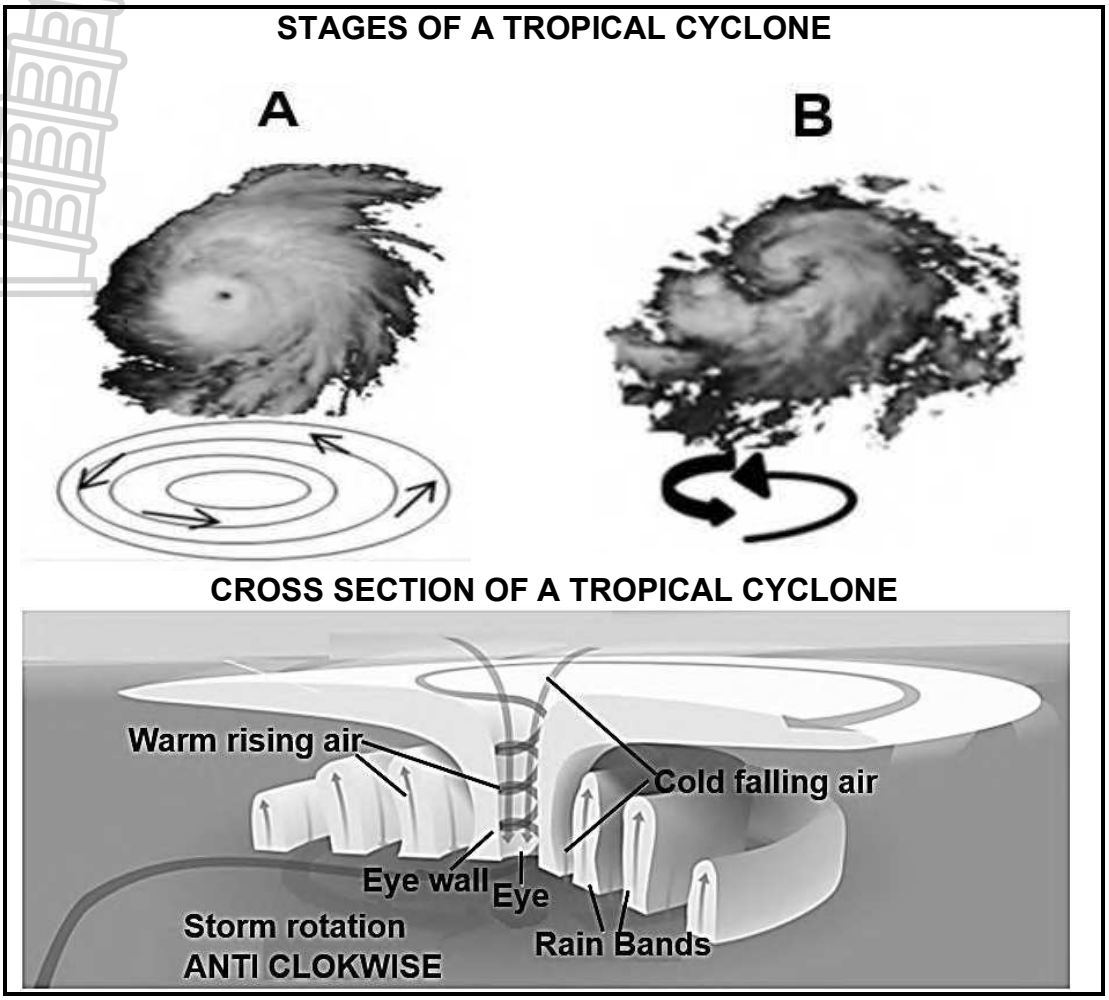
(i) Decrease in temperature of 4 °C
(ii) Increase in dew point temperature of 8 °C
(iii) Wind direction changes to southwest
(iv) Windspeed increases with 10 knots



(5 x 1) (5)

1.3 Refer to the stages and cross section of a tropical cyclone below.

STAGES OF A TROPICAL CYCLONE



[Adapted from https://www.google.com/search?q=cross+section+of+a+tropical+cyclone. Accessed on 12 February 2023.]

1.3.1 In which hemisphere did the tropical cyclone develop? (1 x 1) (1)

1.3.2 Name the stage of development at **A**. (1 x 1) (1)

1.3.3 Which ONE of the stages **A** or **B** is represented by the cross-section of the tropical cyclone? (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 Refer to the **Eye** and **Eye wall** on the cross-section.

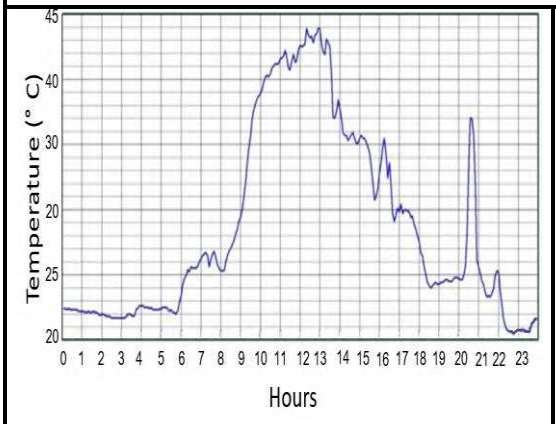
(a) Differentiate between the air movement in the **Eye** and the **Eye wall**. (2 x 1) (2)

(b) In a paragraph of approximately EIGHT lines, explain how the air movement influenced the weather conditions in the **Eye** and **Eye wall**. (4 x 2) (8)

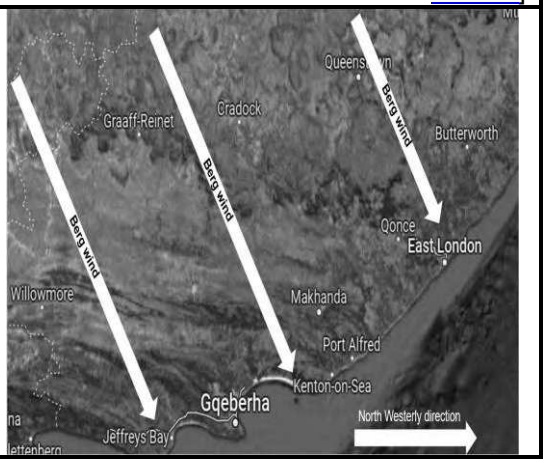
1.4 Refer to the infographic below about berg winds in South Africa.

East London residents were subject to sweltering heat last Saturday after a record-breaking heatwave resulted in a peak temperature of 43,9 ºC.
According to the South African Weather Service (SAWS), the heatwave was a result of berg wind conditions, when hot dry winds blow towards the coast from the country's high central plateau.
"As the air descends it gets warmer and by the time it gets to the coast it is extremely hot.", SAWS spokesperson in Gqeberha (formerly Port Elizabeth) Garth Sampson told the *Daily Dispatch* on Monday.
According to statistics released by SAWS, East London's temperature on Saturday was the second highest in the entire Eastern Cape on the day, below Kenton-on-Sea 44,2 ºC and above the 42,6 ºC recorded in Gqeberha.

[Adapted from https://www.goexpress.co.za/2021/record-breaking-heatwave-hits-east-london/]



[Adapted from: https://www.goexpress.co.za/2021//record-breaking-heatwave-hits-east-london/]



[Adapted from: https://www.google.com/maps/place/]

1.4.1 What according to the extract, was the result of the record-breaking heat wave in East London? (2 x 1) (2)

1.4.2 Why does air get warmer as it descends towards the coastal regions? (1 x 2) (2)

1.4.3 According to the graph, how long did the maximum temperature of 44 °C last? (1 x 2) (2)

1.4.4 Explain the reason for the north westerly direction of the berg wind in the satellite image. (1 x 2) (2)

1.4.5 Draw a weather station of East London that illustrates the wind direction, cloud cover and air temperature at 13h00. (3 x 1) (3)

1.4.6 How will the physical (natural) environment be affected due to the time (answer to QUESTION 1.4.3) that it has been exposed to the 44 °C of the berg wind? (2 x 2) (4)

[40]

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QUESTION 2: GEOMORPHOLOGY

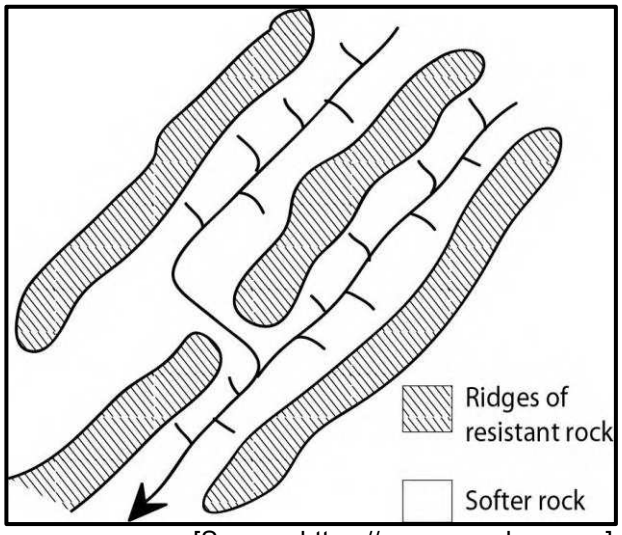
2.1 Match the statements in COLUMN A with the options in COLUMN B. Write down only **Y** or **Z** next to the question numbers (2.1.1 to 2.1.5) in the ANSWER BOOK, for example 2.1.6 **Y**.

	COLUMN A	COLUMN B
2.1.1	An area drained by a river system	**Y**: Catchment basin **Z**: Drainage basin
2.1.2	The letter **A** on the sketch below is the 	**Y**: interfluve **Z**: watershed
2.1.3	Illustrates the source of the river	**Y**:  **Z**: 
2.1.4	The upper layer of the saturated zone of ground water	**Y**: water table **Z**: through flow
2.1.5	The rate of infiltration will be higher in areas where …	**Y**: evaporation is slow **Z**: evaporation is rapid

(5 x 1) (5)

2.2 Various options are provided as possible answers to the following questions, based on drainage patterns. Choose the answer and write only the letter (A–D) next to the question numbers (2.2.1 to 2.2.5) in the ANSWER BOOK, for example 2.2.6 D.

Refer to the drainage pattern below to answer questions 2.2.1 to 2.2.3.



[Source: https://sageography.co.za]

2.2.1 The drainage pattern is known as the … pattern.

A trellis
B centripetal
C parallel
D radial

2.2.2 This pattern develops on the following underlying rock structure:

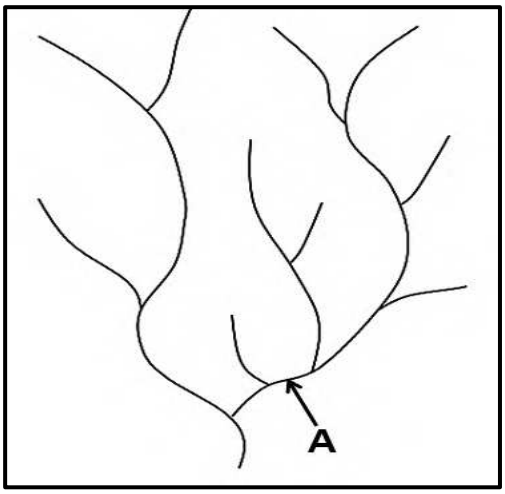
(i) Rock with uniform resistance to erosion
(ii) Folded mountains
(iii) Areas where volcanoes erupted
(iv) Hard and soft rock formations

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

2.2.3 The tributaries join the mainstream at … angles.

A acute
B right
C oblique
D obtuse

Refer to the dendritic drainage pattern to answer questions 2.2.4 and 2.2.5.



[Source: https://sageography.co.za]

2.2.4 The stream order at **A** is …

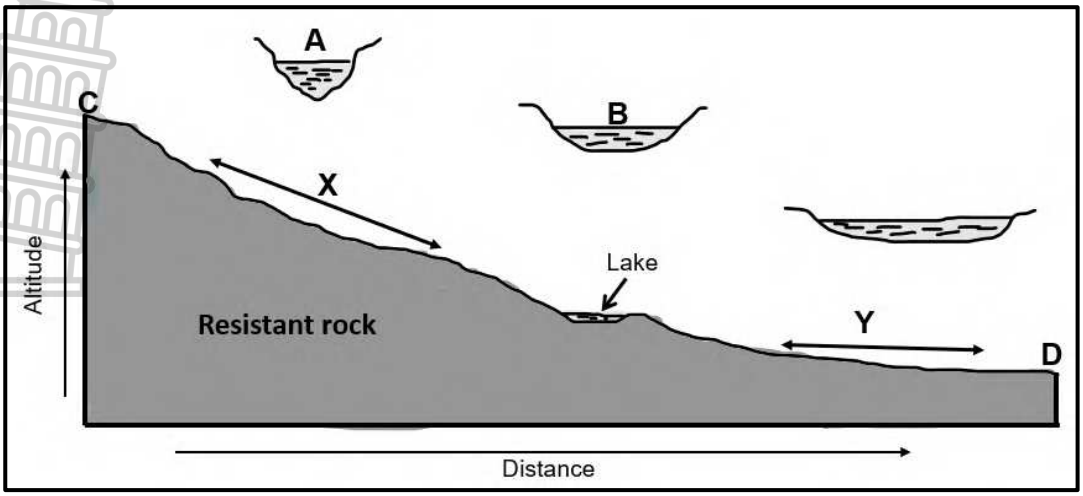
A 1.
B 2.
C 3.
D 4.

2.2.5 This drainage pattern usually flows on … slopes and in … valleys.

(i) gentle
(ii) steep
(iii) V-shaped
(iv) U-shaped

A (i) and (iii)
B (i) and (iv)
C (ii) and (iii)
D (ii) and (iv) (5 x 1) (5)

2.3 Refer to the river profiles below.



[Source: Examiner's own sketch]

2.3.1 Identify the TWO types of river profiles indicated in the sketch. (2 x 1) (2)

2.3.2 Differentiate between the shapes of profiles **A** and **B**. (2 x 1) (2)

2.3.3 Explain why there is a difference between the shapes of profiles **A** and **B**. (2 x 1) (2)

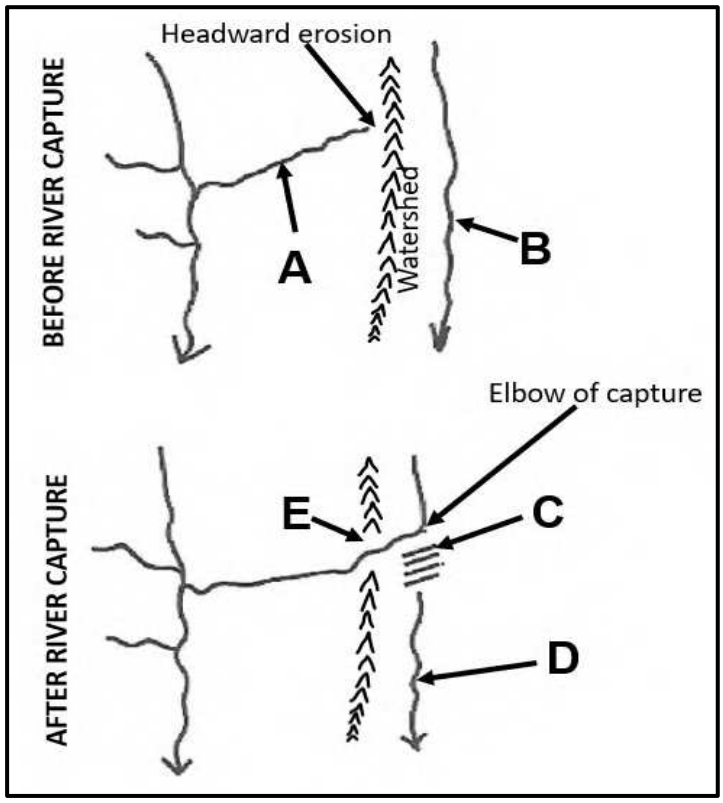
2.3.4 Refer to the river profile **C–D**.

(a) Is the profile graded or ungraded? (1 x 1) (1)

(b) Why is the lake regarded as a temporary base level of erosion? (1 x 2) (2)

(c) Explain why the river grading differs at **X** and **Y**. (2 x 2) (4)

2.4 Refer to the sketch below showing river capture.



[Adapted from https://www.easyelimu.com/qa/843/with-well-labelled-diagrams-describe-how river-capture-occurs]

2.4.1 What is *river capture*? (1 x 2) (2)

2.4.2 Which letters represent the following features of river capture?

(a) Captor stream

(b) Misfit stream (2 x 1) (2)

2.4.3 Name a fluvial landform that might occur at the elbow of capture. (1 x 1) (1)

2.4.4 What is the economic importance of the landform caused by headward erosion at **E**? (1 x 2) (2)

2.4.5 In a paragraph of approximately EIGHT lines, explain the processes of river capture. (4 x 2) (8)

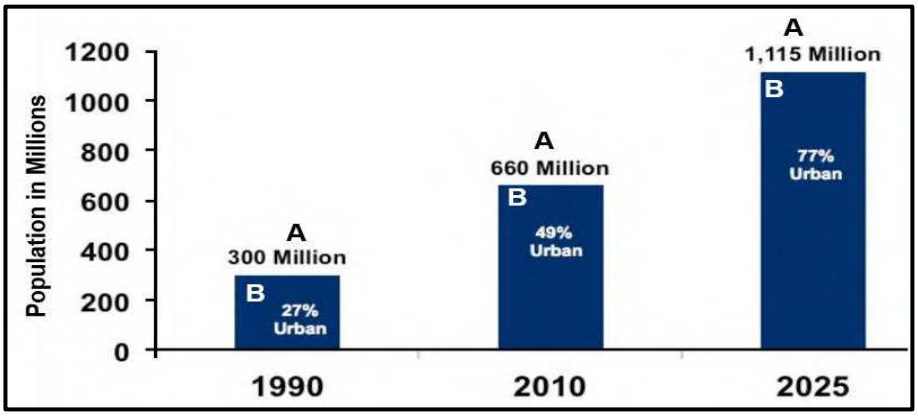
[40]

QUESTION 3: RURAL AND URBAN SETTLEMENTS

3.1 Choose the correct concept/word/process between brackets.

3.1.1 The movement of people away from cities to rural areas is called (rural-urban migration/counter urbanisation).

Refer to the bar graph, showing the urban population of a country, and answer questions 3.1.2 and 3.1.3.

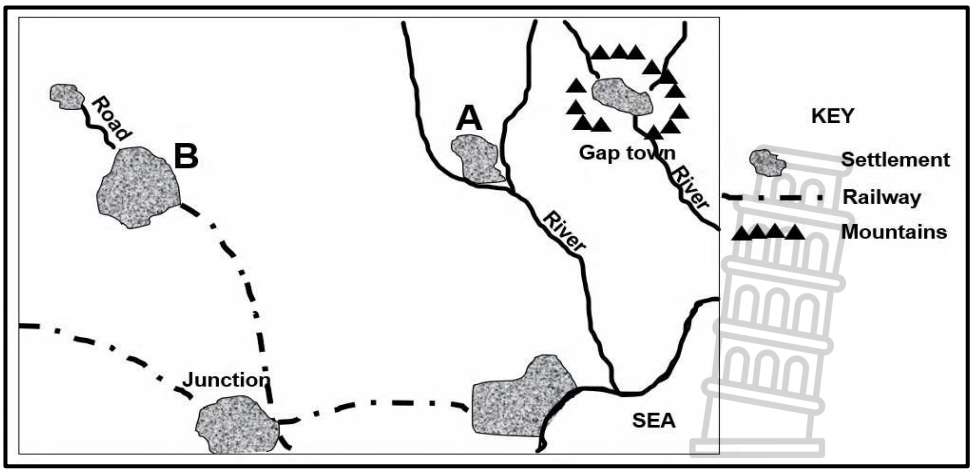


[Source: https://www.forbes.com/sites/judeclemente/urbanization-reducing-poverty-and-helping-the-environment/?]

3.1.2 The value at **A** indicates urban (growth/expansion).

3.1.3 The percentage at **B** shows the (rate/level) of urbanisation.

Refer to the types of towns below to answer questions 3.1.4 and 3.1.5.



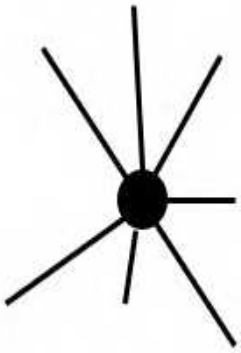
[Adapted from google sources]

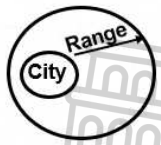
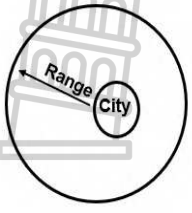
3.1.4 (Junction/Gap) town develops at the intersection of two major transport routes.

3.1.5 The letter (**A**/**B**) represents a break-of-bulk point. (5 x 1) (5)

3.2 Complete the statements in COLUMN A with the options in COLUMN B. Write down only **Y** or **Z** next to the question numbers (3.2.1 to 3.2.5) in the ANSWER BOOK, for example 3.2.6 **Y**.

Refer to the sketches below based on central place theory.

Food stores	**Motor vehicle dealers**
	

	COLUMN A	**COLUMN B**
3.2.1	The ranking of urban areas according to size, function, and degree of specialisation.	**Y:** settlements **Z:** hierarchy
3.2.2	The range of the food stores are shorter than that of the vehicle dealers because …	**Y**: there are more food stores. **Z**: there are more motor vehicle dealers.
3.2.3	The threshold population of the motor vehicle shops is/are … than that of the food stores.	**Y**: more **Z**: less
3.2.4	Illustrates the sphere of influence of the food stores	**Y**:  **Z**: 
3.2.5	Type of goods found when there are fewer urban centres	**Y**: lower **Z**: higher

(5 x 1) (5)

3.3 Refer to the extract below on land.

LAND REFORM: PLAN FOR GROWTH

Redistribution of farmland is a key catalyst for agricultural transformation and growth in South Africa.

But what reforms and interventions are necessary to accomplish this?
The outcome for land reform from a social justice point of view and for a more equitable distribution of productive farmland presents an important growth opportunity if carried out appropriately.

Increased private sector participation in land redistribution, supported by enabling policies, incentives and monitoring mechanisms of the state, is a critical way to boost agricultural growth.

If done together with a series of interventions, it is likely that the real agricultural gross value added could increase substantially by 2030. It is clear that the provision of land alone (through land reform) is unlikely to achieve the growth anticipated.

To improve agricultural growth, the land reform process should be carried out by a central agency and, once the land is redistributed, financial and technical support as well as offtake agreements or contracts should be provided to beneficiaries.

[Source: https://www.news24.com/citypress/voices/johan-kirsten-land-reform-plan-for-growth-20230129]

3.3.1 What is *land redistribution*? (1 x 2) (2)

3.3.2 Name ONE other policy (pillar), not mentioned in the extract, that forms part of South Africa's land reform outlook. (1 x 1) (1)

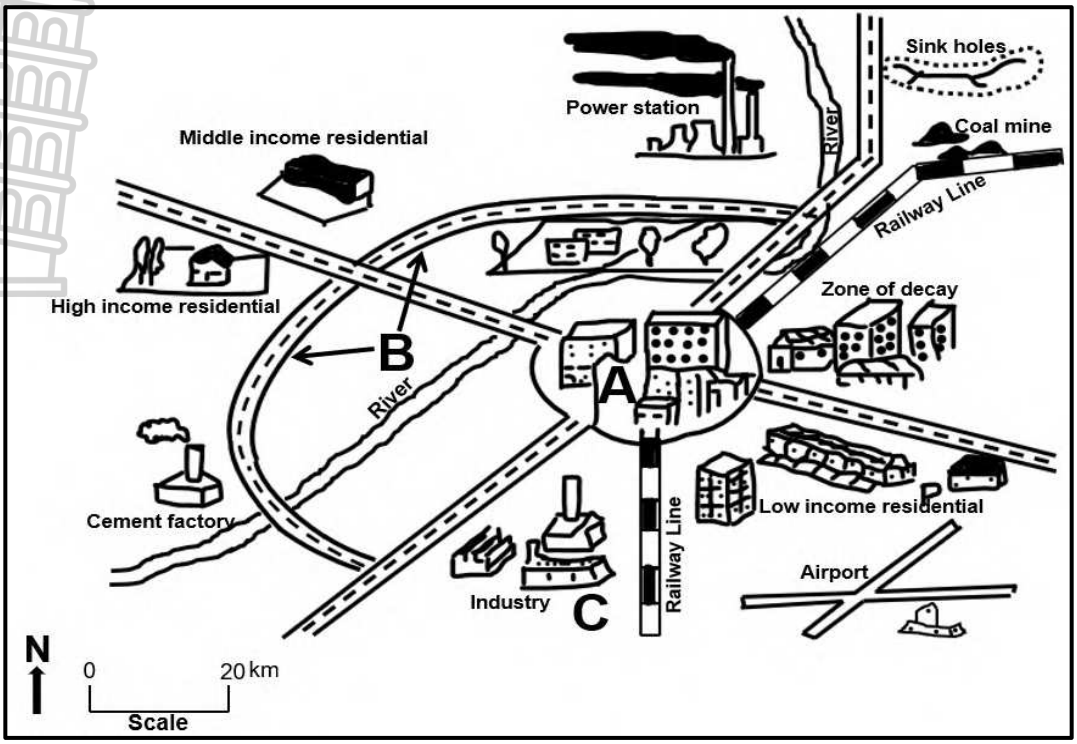
3.3.3 According to the extract, state TWO ways to boost agricultural growth after land redistribution. (2 x 1) (2)

3.3.4 Why is technical support important after land has been redistributed? (1 x 2) (2)

3.3.5 In a paragraph of approximately EIGHT lines, explain why has the implementation of land reform been seen as a social justice issue in South Africa. (4 x 2) (8)

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3.4 Refer to the sketch below illustrating land use zones.



[Adapted from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https]

3.4.1 Identify land use zone **A**. (1 x 1) (1)

3.4.2 Name TWO characteristics of land use zone **A**. (2 x 1) (2)

3.4.3 How does the road at **B** alleviate (ease) traffic congestion at land-use zone **A**? (1 x 2) (2)

3.4.4 Describe the physical appearance of buildings in the zone of decay. (1 x 2) (2)

3.4.5 Explain the contrast between the land values and the physical appearance of buildings in the zone of decay. (1 x 2) (2)

3.4.6 Why is the location of the power station suitable (ideal)? (3 x 2) (6)

[40]

QUESTION 4: GEOGRAPHICAL SKILLS AND TECHNIQUES

BACKGROUND INFORMATION ON HARTBEESPOORT DAM



Co-ordinates: 25°43′32″S 27°50′54″E

Hartbeespoort Dam (also known as *Harties*) is an arch type dam situated in the North West Province of South Africa. It lies in a valley to the south of the Magaliesberg mountain range and north of the Witwatersberg Mountain Range, about 35 kilometres north west of Johannesburg and 20 kilometres west of Pretoria. The name of the dam means "dam at the gorge of the hartebeest". Mismanagement of wastewater treatment from urban zones within the Hartbeespoort Dam catchment area is largely to blame for the poor condition of the water.

[Source: https://en.wikipedia.org/wiki/ Hartbeespoort_Dam]

The following English terms and their Afrikaans translations are shown on the topographic and orthophoto maps:

ENGLISH	**AFRIKAANS**
Agricultural holdings	Landbouhoewes
Archaeological site	Argeologiese terrein
Diggings	Delwery
Estate	Landgoed
Sewerage works	Rioolwerke

4.1 MAP SKILLS AND CALCULATIONS

4.1.1 The map index sheet south east of 2527 DB/DD is …

A 2527 CC.
B 2528 CC.
C 2725 CC.
D 2825 CC. (1 x 1) (1)

4.1.2 Determine the following from the archaeological site **F** in block **A5** to the shop at **G** in block **B5**.

(a) True bearing (TB) (1 x 2) (2)

(b) The magnetic bearing (MB) if the magnetic declination (MD) is 24°36' west of true north.

Formula: MB = TB + MD (2 x 1) (2)

(c) Give ONE reason why it is important to use the magnetic bearing rather than the true bearing to find your way from the archaeological site. (1 x 1) (1)

4.1.3 The average gradient from **1** to **2** on the orthophoto map is 1 : 2,56. Give the following:

(a) Vertical interval (**VI**) (1 x 1) (1)

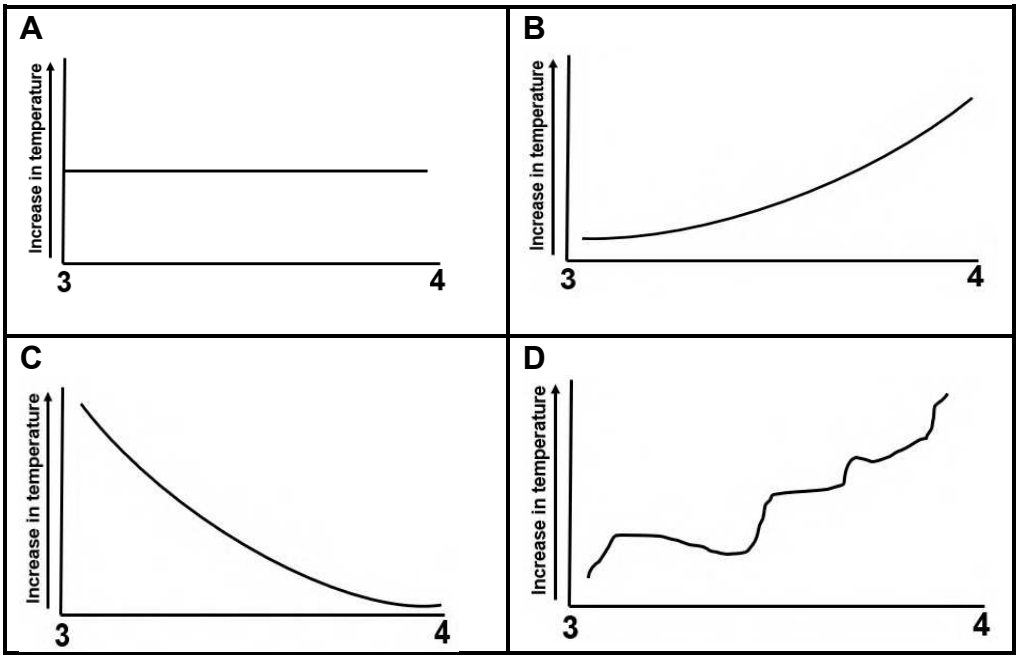
(b) Horizontal Equivalent (**HE**) (2 x 1) (2)

(c) How does the orthophoto map indicate that the gradient is not favourable to construct a road? (1 x 1) (1)

4.2 MAP INTERPRETATION

Various options are provided as possible answers to the following questions, based on the topographic and orthophoto maps. Choose the answer and write only the letter (A–D) next to the question numbers (4.2.1 to 4.2.3) in the ANSWER BOOK, for example 4.2.4 D.

4.2.1 The graph that illustrates the general temperature change from **3** to **4** on the orthophoto map is …



(1 x 1) (1)

4.2.2 The general northwest direction of flow of the non-perennial river in block **B3**, at **J**,on the topographical map is indicated by … and …

(i) tributaries joining from the northwest and northeast
(ii) tributaries joining from the southwest and southeast
(iii) the bending of the contour lines in a north easterly and north westerly direction
(iv) The bending of the contour lines in a south easterly and south westerly direction

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

4.2.3 The settlement at **L** in block **A1** is … and …

(i) nucleated
(ii) dispersed
(iii) uni-functional
(iv) multi-functional

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

Refer to the settlement at **H** in block **E4** on the topographic map.

4.2.4 (a) Name the climatic factor that influenced the location of the settlement at **H** (block **E4**), which is situated on the slopes of the valley. (1 x 1) (1)

(b) What is the climatic importance of the location of the settlement at **H**, for the people living in the area? (1 x 2) (2)

Refer to the encircled area at **K** in blocks **B2**/**C2** on the topographic map.

4.2.5 (a) Identify the stage of the river in the encircled area at **K** in blocks **B2**/**C2**. (1 x 1) (1)

(b) Give evidence to support your answer to QUESTION 4.2.5(a). (1 x 1) (1)

Refer to the town Melodie in block **C5** on the topographic map.

4.2.6 (a) Is the street plan (pattern) in Melodie a grid (rectangular) or irregular plan (pattern)? (1 x 1) (1)

(b) Name ONE advantage of the street plan(pattern) in Melodie(answer to QUESTION) 4.2.6(a)? (1 x 1) (1)

(c) Why was it easy to plan and construct this (answer to QUESTION 4.2.6(a) street plan (pattern) in Melodie? (1 x 2) (2)

4.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.3.1 Is the topographical or the orthophoto map a primary source? (1 x 1) (1)

4.3.2 Give a reason for your answer to QUESTION 4.3.1. (1 x 1) (1)

4.3.3 Refer to **M** in block **E1**, on the topographical map.

(a) Name the environmental injustice evident. (1 x 1) (1)

(b) Identify the type of vector data that was used to illustrate the environmental injustice. (1 x 1) (1)

(c) What is the importance of using the vector data mentioned in QUESTION 4.3.3(b)? (1 x 2) (2)

(d) How can buffering help to reduce the environmental injustice at **M**? (1 x 2) (2)

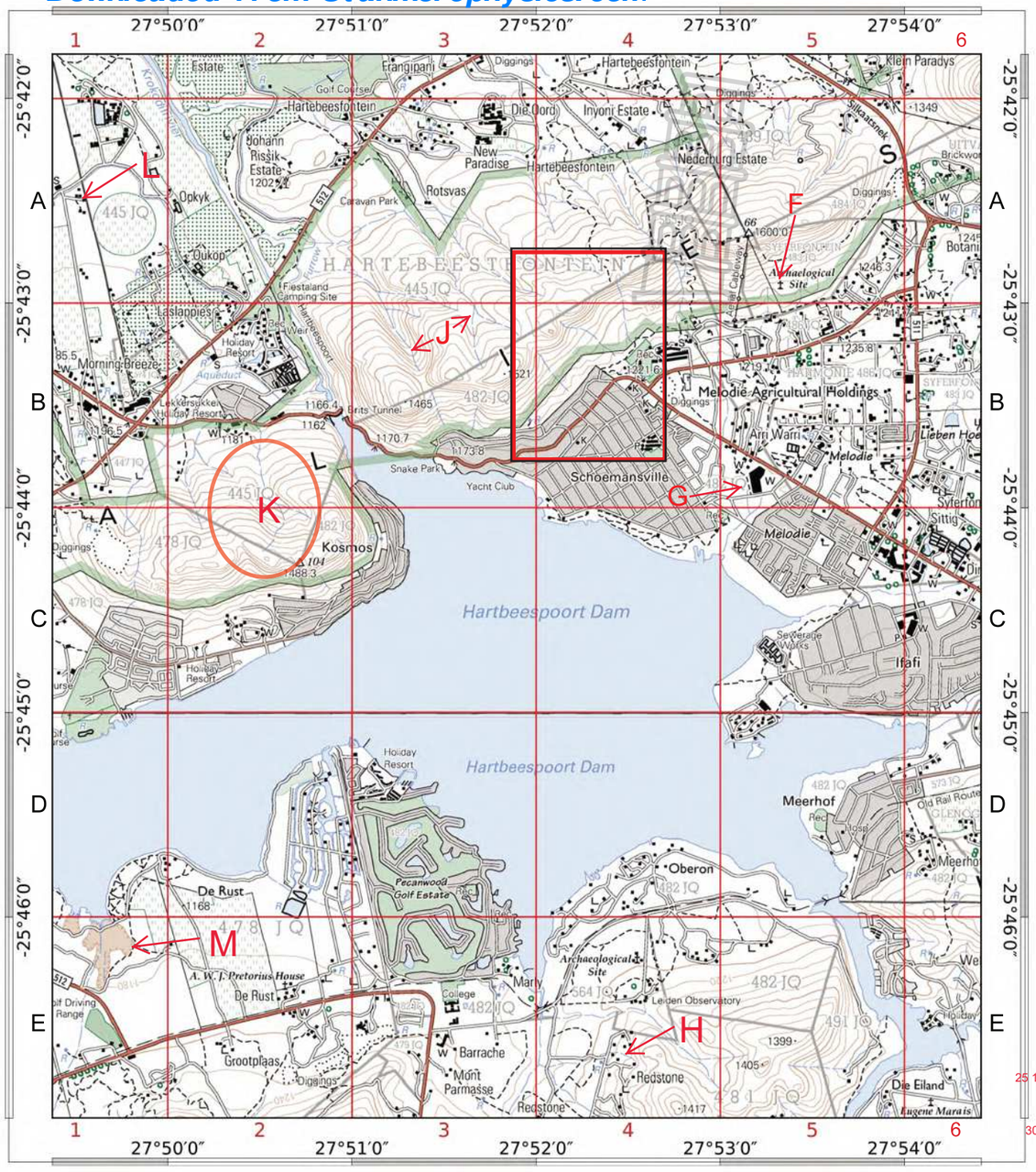
[30]

GRAND TOTAL: 150

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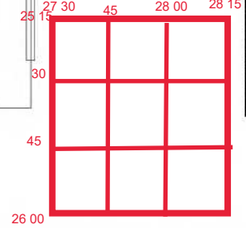
EXTRACT FROM 2527 DB HARTBEESPOORT DAM 1:50 000

Downloaded from Stanmorephysics.com

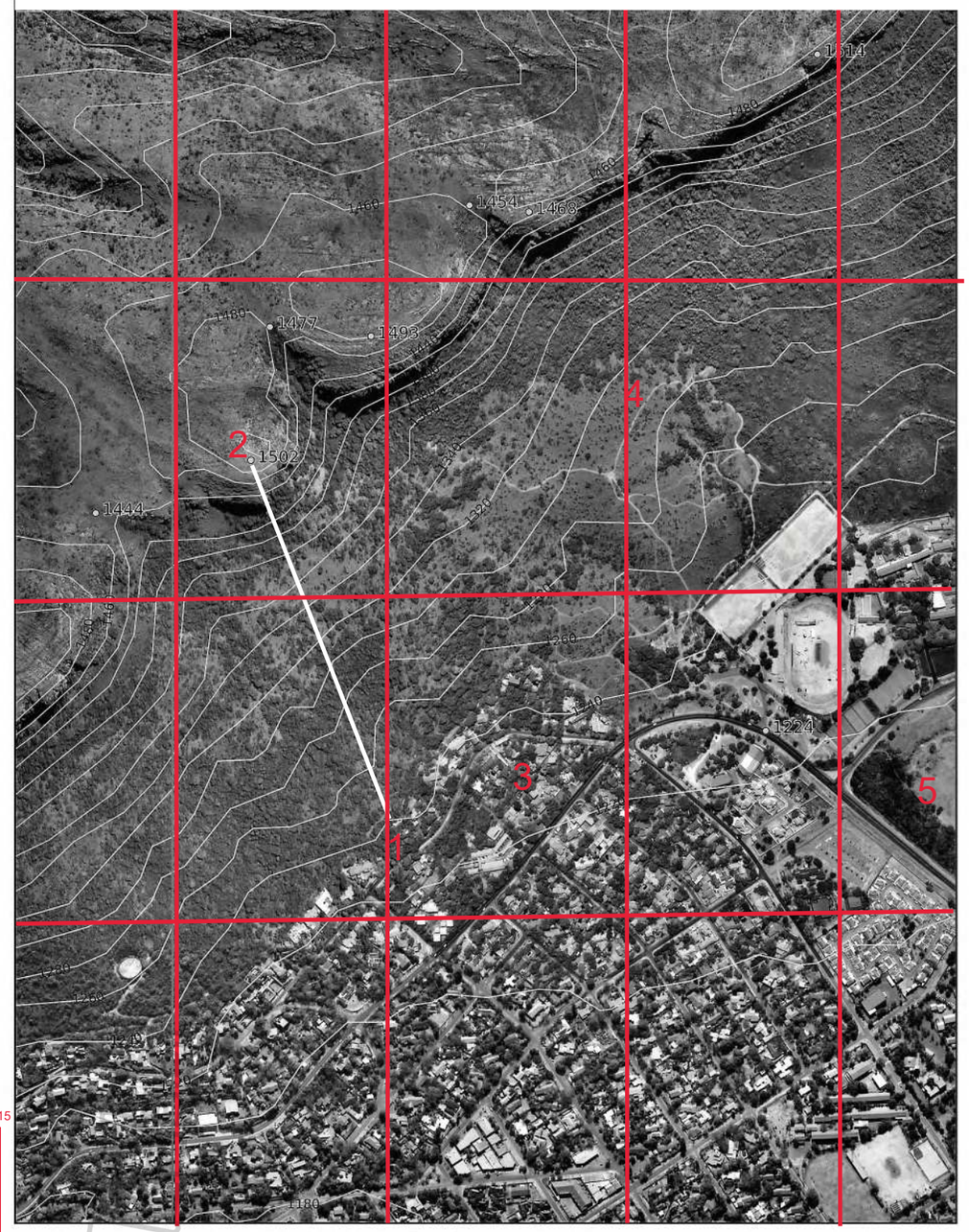


Mean magnetic declination 23°50′ West of True North (July 2017).
Mean annual change 8′ westwards (July 2017 - June 2018).

REFERENCE



2725 DB 23 ortho-rectified 1: 10 000



VERKLARING

Nasionale Deurpad; Nasionale Roete	Internasionale Grens en Baken	Draadheining; Muur	Fence; Wall
Hoofverkeersroete	Provinsiale Grens	Windpomp; Monument	Windpump; Monument
Hoofpad	Bewarings Gebied	Kommunikasietoring	Communication Tower
Sekondêre Pad; Hoogtemerk	Standhoudende Rivier	Mynhoop; Uitgrawing	Mine Dump; Excavation
Ander Pad; Brug	Standhoudende Water	Peilbaken; Seevaartbaken	Trigonometrical Station; Marine Beacon
Dowwe Pad en Voetslaanpad	Nie–standhoudende Rivier	Vuurtoring en Seevaartlig	Lighthouse and Marine Light
Spoorweg; Stasie of Sylyn	Nie–standhoudende Water	Begraafplaas; Graf	Cemetery; Grave
Ander Spoorweg; Tonnel	Droë Loop	Erosie; Sand	Erosion; Sand
Opvulling; Deurgrawing	Droë Pan	Beboste Gebied	Woodland
Kraglyn	Moeras en Vlei	Bewerkte Land	Cultivated Land
Beboude Gebied (Hoë, Lae Digtheid)	Pylpyn (bo die grond)	Boord of Wingerd	Orchard or Vineyard
Geboue; Murasie	Watertoring; Reservoir; Waterpunt	Ontspanningsterrein	Recreation Ground
Poskantoor; Polisiestasie; Winkel	Kuslynrotse	Rye Bome	Row of Trees
Plek van Aanbidding; Skool; Hotel	Prominente Klipbank	Oorspronklike Plase	Original Farms

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	