KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GRADE 12

NATIONAL SENIOR CERTIFICATE

GEOGRAPHY P1

PREPARATORY EXAMINATION

SEPTEMBER 2024

MARKS: 150

TIME: 3 hours

This question paper consists of 18 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of THREE questions:

   SECTION A

   QUESTION : 1 CLIMATE AND WEATHER (60 MARKS)

   QUESTION : 2 GEOMORPHOLOGY (60 MARKS)

   SECTION B

   QUESTION : 3 GEOGRAPHICAL SKILLS AND CALCULATIONS (30 MARKS)

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. Where applicable illustrate your answers with labelled diagrams.
9. Answer in FULL sentences except where you have to name, identify and 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 clearly and legibly.

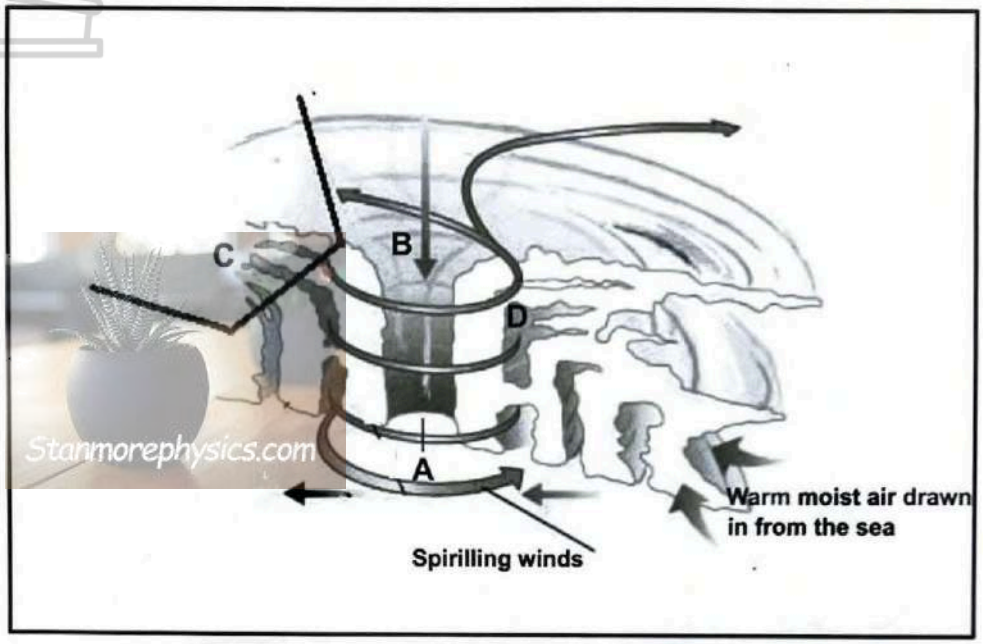
SPECIFIC INSTUCTIONS AND INFORMATION FOR SECTION B

14. A 1 : 50 00 topographical map 3126 DD QUEENSTOWN and a 1 : 10 000 orthophoto map 3126 DD 1 NOOITGEDACHT 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 calculations.
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 below. 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 (1.1.1 to 1.1.7) in the ANSWER BOOK, e.g. 1.1.8 Y.



[Adapted from *Merriam Webster, Inc*, 2006]

COLUMN A		COLUMN B	
1.1.1	The weather system shown in the sketch is a … cyclone.	**Y.**	tropical
		Z.	mid-latitude
1.1.2	The sketch above represents a cyclone in the … hemisphere	**Y.**	southern
		Z.	northern
1.1.3	**A** in the sketch is referred to as the … of the cyclone.	**Y.**	apex
		Z.	eye
1.1.4	The air descending at **B** is …	**Y.**	moist
		Z.	dry
1.1.5	Area **C** in the sketch represents the … of the cyclone.	**Y.**	dangerous semi-circle
		Z.	cold sector
1.1.6	The cloud type found at **D** is …	**Y.**	cumulonimbus
		Z.	stratus
1.1.7	The general movement of this weather system is …	**Y.**	east to west
		Z.	west to east

(7 x 1) (7)

1.2.4 Berg winds occur as a result of the interaction between the … and … pressure systems.

(i) Kalahari high
(ii) Cut-off low
(iii) South Indian high
(iv) Coastal low

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

1.2.5 The two winds responsible for the development of line thunderstorms are the … winds.

A south westerly and north westerly
B north westerly and south easterly
C north easterly and south westerly
D south westerly and north westerly

1.2.6 A zone between two air masses with different water vapour content, resulting in the occurrence of line thunderstorms known as a …

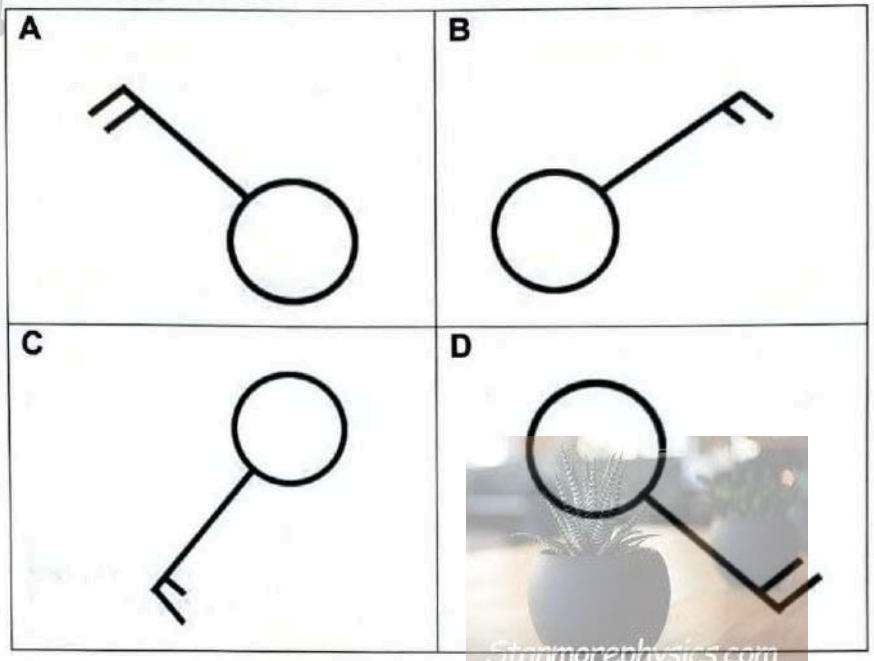
A cold front.
B moisture front.
C warm front.
D polar front.

1.2.7 Line thunderstorms are associated with the following weather conditions:

A torrential rain; snow
B hurricane winds; hail
C light rain; thunder
D torrential rain; gusty winds

1.2 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 (1.2.1 to 1.2.8) in the ANSWER BOOK, example 1.2.9 D.

1.2.1 A south westerly wind of 15 knots is evident in …



1.2.2 Cyclones are associated with … weather conditions and … of air.

(i) unstable
(ii) stable
(iii) divergence
(iv) convergence

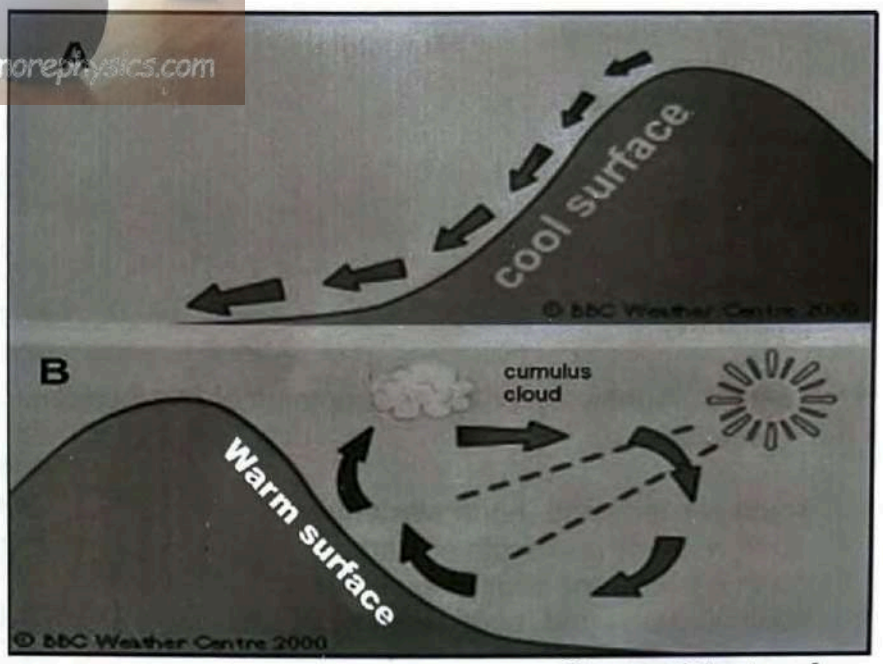
A (i) and (iii)
B (i) and (iv)
C (ii) and (iii)
D (ii) and (iv)

1.2.3 Berg winds are … and … gusty local winds that blow from the interior of the country to the coast.

(i) hot
(ii) warm
(iii) dry
(iv) moist

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

1.2.8 The micro-climate illustrated in the sketches below, shows … (**A**) and … (**B**) winds respectively.



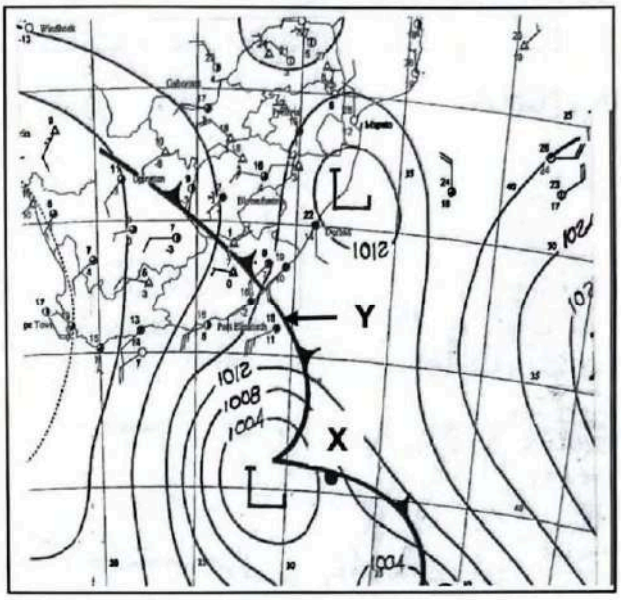
[Source: pintrest.com]

(i) anabatic
(ii) westerlies
(iii) katabatic
(iv) easterlies

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

(8 x 1) (8)

1.3 Refer to the infographic showing a mid-latitude cyclone.



As the cold front moves over the central and south-eastern parts of South Africa today, it has left a trail of heavy falls, very cold conditions, very rough seas and gale force winds over the interior and along the coast. At present the cold front is positioned over the Eastern Cape, bringing heavy rain and very cold temperatures to the province. Snowfalls are expected on the mountains of the Eastern Cape today, as well as in Lesotho, the Drakensberg and the eastern Free State overnight and tomorrow. Sea conditions remain very hazardous, with gale force winds and very rough seas persisting along the southern Cape coast today, spreading towards the Wild Coast and KwaZulu-Natal

Source: Adapted from South African Weather Services]

1.3.1 Provide evidence from the synoptic chart indicating that **X** is a mid-latitude cyclone. (1 x 1) (1)

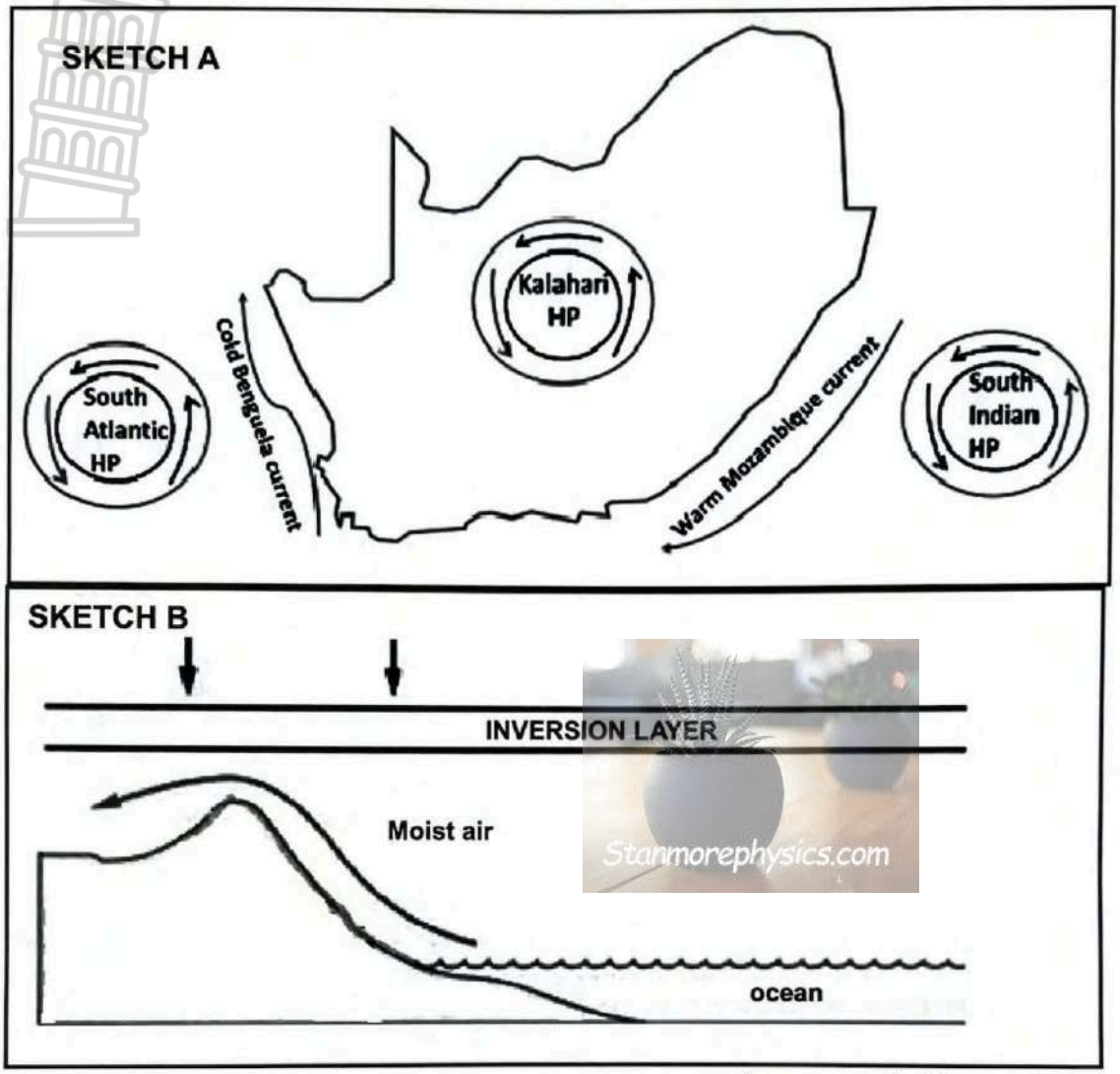
1.3.2 Give evidence from the satellite image and synoptic weather chart indicating that typical winter conditions are shown. (1 x 2) (2)

1.3.3 With reference to the satellite image and synoptic weather chart, explain why the Eastern Cape is experiencing rain and very cold conditions. (1 x 2) (2)

1.3.4 Draw a simple, free-hand cross section through the front labelled **Y**. Clearly indicate the position of the cold and warm air masses, and the main rain-bearing cloud associated with front **Y**. (4 x 1) (4)

1.3.5 With reference to the extract, suggest THREE ways how satellite tracking can assist farmers in the Eastern Cape, to prepare for the weather conditions associated with a mid-latitude cyclone. (3 x 2) (6)

1.4 Refer to **sketch A** and **sketch B** showing factors that influence the weather over South Africa in summer.



[source: mindset learn.com]

1.4.1 Identify ONE factor in sketch **A** that influences the weather of South Africa. (1 x 1) (1)

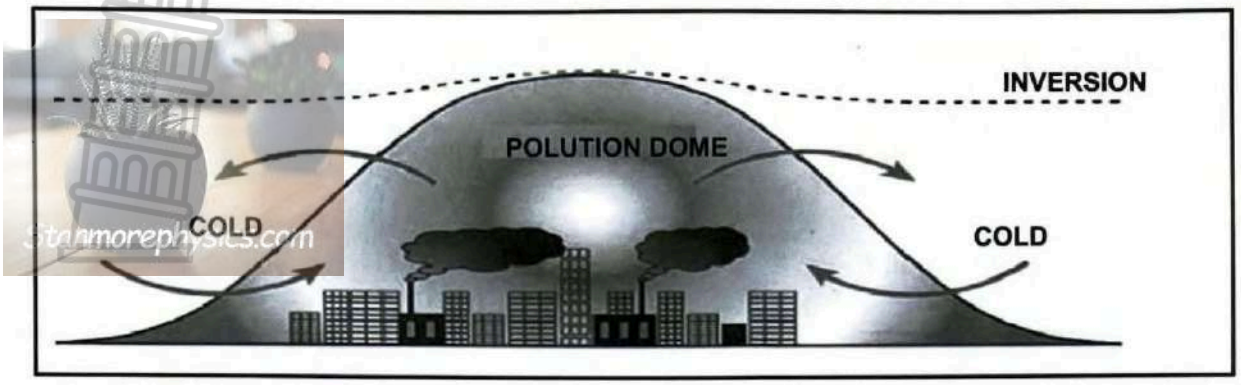
1.4.2 How would the position of the South Indian HP influence the moisture content of the air reaching the east coast of South Africa in summer? (1 x 2) (2)

1.4.3 Why is the Kalahari HP weakly developed over the land in summer? (1 x 2) (2)

1.4.4 How does the weakly developed Kalahari high pressure cell influence the presence of the inversion layer in sketch **B**? (1 x 2) (2)

1.4.5 In a paragraph of approximately EIGHT lines, explain how the position of the inversion layer will bring overcast and unstable weather conditions over the interior of the country in summer. (4 x 2) (8)

1.5 Refer to the sketch showing a pollution dome.



[Source: [http://www.ibgeographypods.org/uploads/7/6/2/2/7622863/ib_dp_geography_microclimates_urban_heat island_worksheet.pdf]

1.5.1 Give TWO reasons why pollution domes are common in most cities. (2 x 1) (2)

1.5.2 Give evidence from the sketch that suggests that this pollution dome is occurring at night. (1 x 1) (1)

1.5.3 Suggest a reason why pollution domes are more concentrated at night. (1 x 2) (2)

1.5.4 How do pollution domes increase temperature in a city? (1 x 2) (2)

1.5.5 Explain why the negative impact of pollution domes on people are greater in winter. (2 x 2) (4)

1.5.6 Provide sustainable strategies that can reduce the occurrence of pollution domes in our cities. (2 x 2) (4)
[60]

QUESTION 2: GEOMORPHOLOGY

2.1 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 (2.1.1 to 2.1.8) in the ANSWER BOOK e.g. 2.1.9 A

2.1.1 The raised banks of a river subjected to repeated flooding and deposition is a/an …

A birdsfoot delta.
B alluvial fan.
C meander scar.
D natural levee.

2.1.2 Flat land on either side of the banks of a river made up of layers of silt is a …

A sand delta.
B natural levee.
C flood plain.
D sand island.

2.1.3 When a river enters the sea and deposit its load it forms a …

A delta.
B braided stream.
C sand island.
D flood plain.

2.1.4 This fluvial landform is popular with tourists who want to do river rafting.

A waterfalls
B valleys
C gorge
D rapids

2.1.5 The outer bank of a meander is called the … slope and has a … shape.

(i) slip-off
(ii) under cut
(iii) convex
(iv) concave

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

2.1.6 When a meander loop becomes separated from the river, it forms a/an … and when it dry up it is referred to as a/an …

(i) Yazoo stream
(ii) Ox-bow lake
(iii) Meander scar
(iv) Flood plain

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

2.1.7 A braided stream forms in the … course of the river when it deposits its load within its channel forming … islands.

(i) Lower
(ii) Upper
(iii) Sand
(iv) Rock

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

2.1.8 Where water plunges over a … cliff, it forms a …

(i) horizontal
(ii) rapid
(iii) vertical
(iv) Waterfall

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

(8x1) (8)

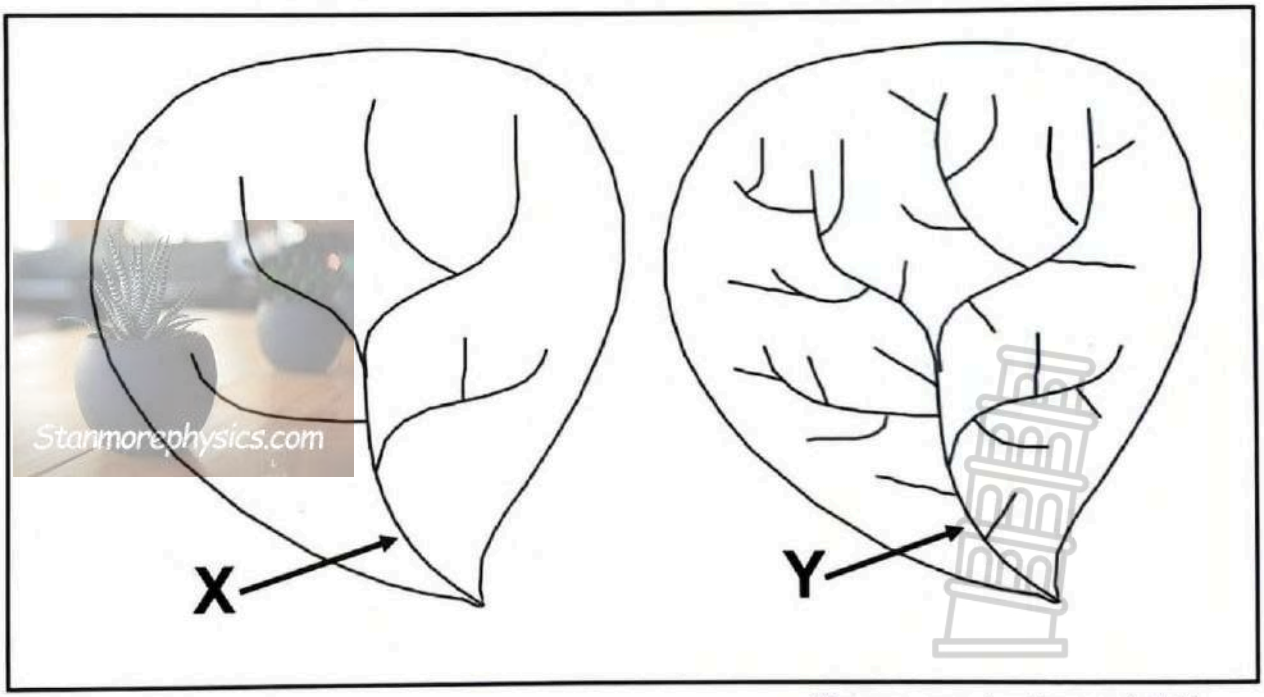
2.2 Complete the statements in COLUMN A with the options in COLUMN B. Write down only **Y** or **Z** next to the question numbers (2.2.1 to 2.2.7) in the ANSWER BOOK, e.g. 2.2.8 Y

COLUMN A	COLUMN B
2.2.1 High-lying areas that separates two drainage basins is known as …	**Y** interfluve **Z** watershed
2.2.2 Point where two or more streams meet is known as…	**Y** confluence **Z** tributary
2.2.3 Point where the river enters the sea is known as …	**Y** mouth **Z** source
2.2.4 The upper limit of ground water is known as …	**Y** base flow **Z** water table
2.2.5 The process whereby water seeps underground is known as …	**Y** run off **Z** infiltration
2.2.6 Area drained by a river and its tributaries is known as …	**Y** drainage basin **Z** drainage pattern
2.2.7 A river that originates in areas of high rainfall but flows through dry area is known as …	**Y** exotic **Z** episodic

(7x1) (7)

2.3 Refer to the drainage density illustrated in sketches **A** and **B** below.

SKETCH A **SKETCH B**



[Source: examiner's own sketch]

2.3.1 Explain the concept *drainage density*. (1x2) (2)

2.3.2 What evidence indicates that sketch **B** has a higher drainage density than sketch **A**? (1x2) (2)

2.3.3 Determine the stream order at **X** in the sketch **A**. (1x2) (2)

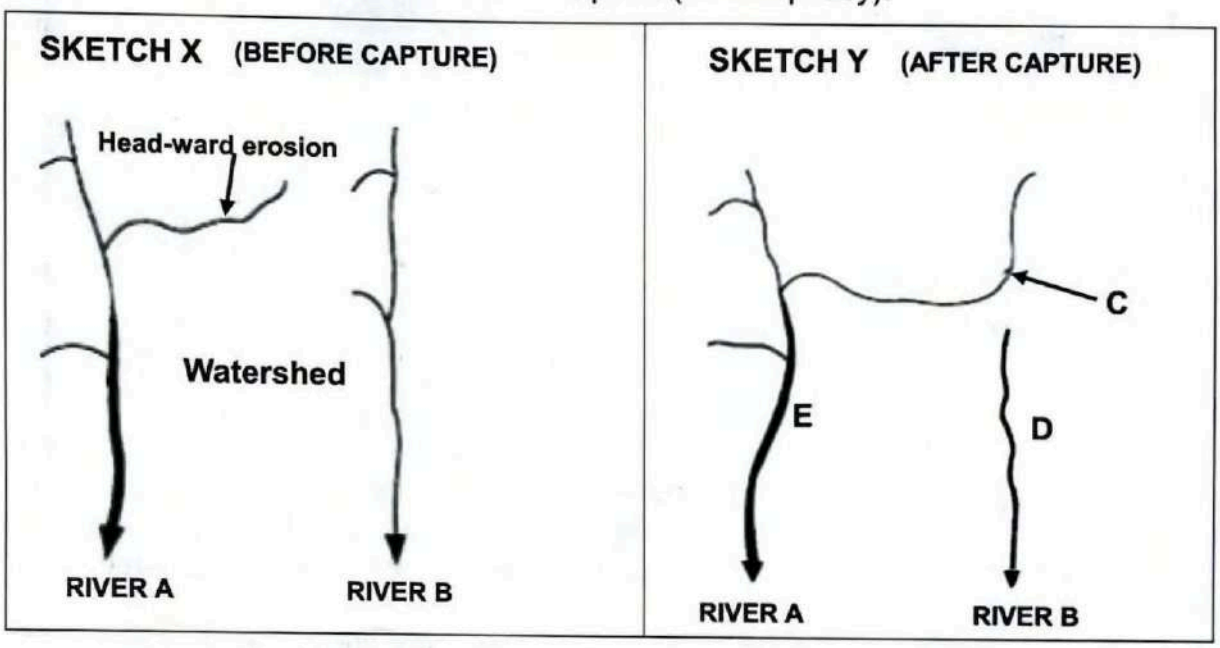
2.3.4 Why will the stream order be higher at point **Y** than point **X**? (1x2) (2)

2.3.5 Explain the influence of gradient (slope) on drainage density. (2x2) (4)

2.3.6 Identify the drainage pattern in sketch **B**? (1x1) (1)

2.3.7 Give a reason for your answer to QUESTION 2.3.6. (1x2) (2)

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



[Source: Adapted from https://www.ecurriculum.co.za/FET%20vanaf%20June%2020/12/5%20-Geography%20Grade%2012%20River%cap-ture%20PPT%27.pdf]

2.4.1 What evidence in sketch **X** indicates that river capture is likely to take place? (1x1) (1)

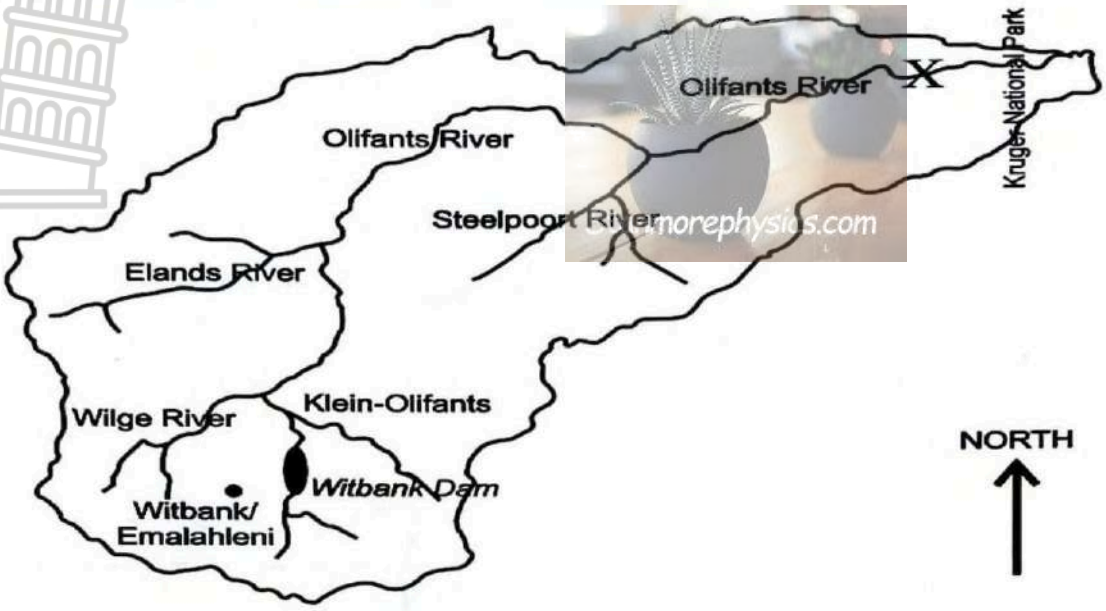
2.4.2 What could have caused the captor stream to erode through the watershed? (2x1) (2)

2.4.3 Identity features **C** and **D** of river capture in sketch **Y**. (2x1) (2)

2.4.4 Explain the process that resulted in the formation of feature **D**. (1x2) (2)

2.4.5 In a paragraph of approximately EIGHT lines, describe how the increased volume of water will positively impact on the farming community at **E** in sketch **Y**. (4x2) (8)

2.5 Refer to the map and fact file below, on the Oliphant's River Catchment Region in Mpumalanga and Limpopo province.



Total mean annual surface runoff of catchment area is approximately 2400 millioncubic meters per year. A minimum of 200 million cubic meters of water is required to keep the Oliphant's River flowing as it reaches the Kruger National Park in its lower course. In recent years the lower course of Olifants River has dried up for months at a time impacting upon the Kruger Park's wildlife and river ecosystem.
Due to the flat topography of the Highveld grasslands, there are many important wetlands systems within this catchment. The upper course of the catchment is characterized by mining, agricultural and conservation activities. Over-grazing and highly erodible soils result in severe erosion in this catchment. Thirty large dams occur in the Olifants River catchment, the Witbank Dam being one of them.

[Adapted from CSIR, River Health Programme]

2.5.1 With reference to the map, name TWO tributaries of the Oliphant's River. (2x1) (2)

2.5.2 Name ONE province across which the Olifants River catchment region spans (spreads). (1x1) (1)

2.5.3 Suggest a reason why the Olifants River dries up for months at a time. (1x2) (2)

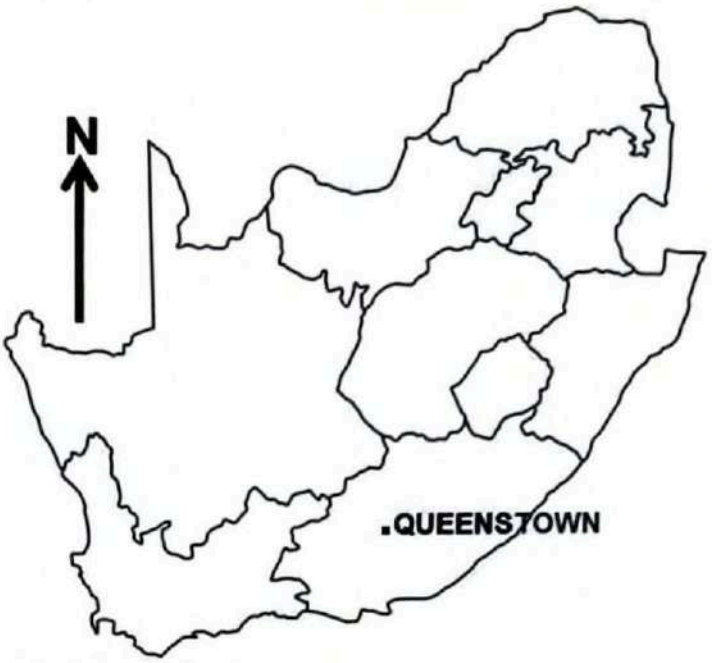
2.5.4 Identify and explain THREE ways in which people have negatively impacted on the Oliphant's drainage basin. (3x2) (6)

2.5.5 Suggest TWO strategies that can be put in place to ensure the river discharge remains above 200 million cubic meters to enable the lower stages of the Oliphant's River to support life in the Kruger Park. (2x2) (4)

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

GENERAL INFORMATION ON QUEENSTOWN



Coordinates:31°54'S;26°53'E

Queenstown (officially known as Komani) is a town in the Eastern Cape in South Africa. The town lies on the banks of Komani River which forms part of the great Kei river system and has a refreshing climate and an abundant water supply from the surrounding rugged mountains.

The area's annual average temperature is 18.29°C which is 2.93% lower than the average for South Africa. Queenstown generally receives approximately 90.83 millimetres of precipitation and has 134 rainy days annually.

Winters are short, cold, dry and windy; it is mostly clear year-round.

[Adapted from https://en.wikipedia.org/wiki/Queenstown]

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

ENGLISH	AFRIKAANS
Diggings	Uitgrawings
River	Rivier

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 The difference in altitude between the trigonometrical beacon 270 in block **B2** and spot height 1756 in block **A4** is … metres.

A. 3562.2
B. 1486
C. 50.2
D. 5.2 (1 x 1) (1)

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

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

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

3.1.3 The physical feature located north east of the reservoir **D4** is a/an …

A escarpment
B mesa
C plateau
D hill (1 x 1) (1)

3.1.4 Calculate the straight-line distance between point **7 (D2)** and point **6 (D4)** on the orthophoto map in km.

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

3.1.5 The true bearing from spot height 1493, in block **C4**, to spot height 1313, in block **D2**, on the topographical map is ... (1 x 1) (1)

3.1.6 Calculate the magnetic declination of Queenstown for 2024. Use the information and steps given below.

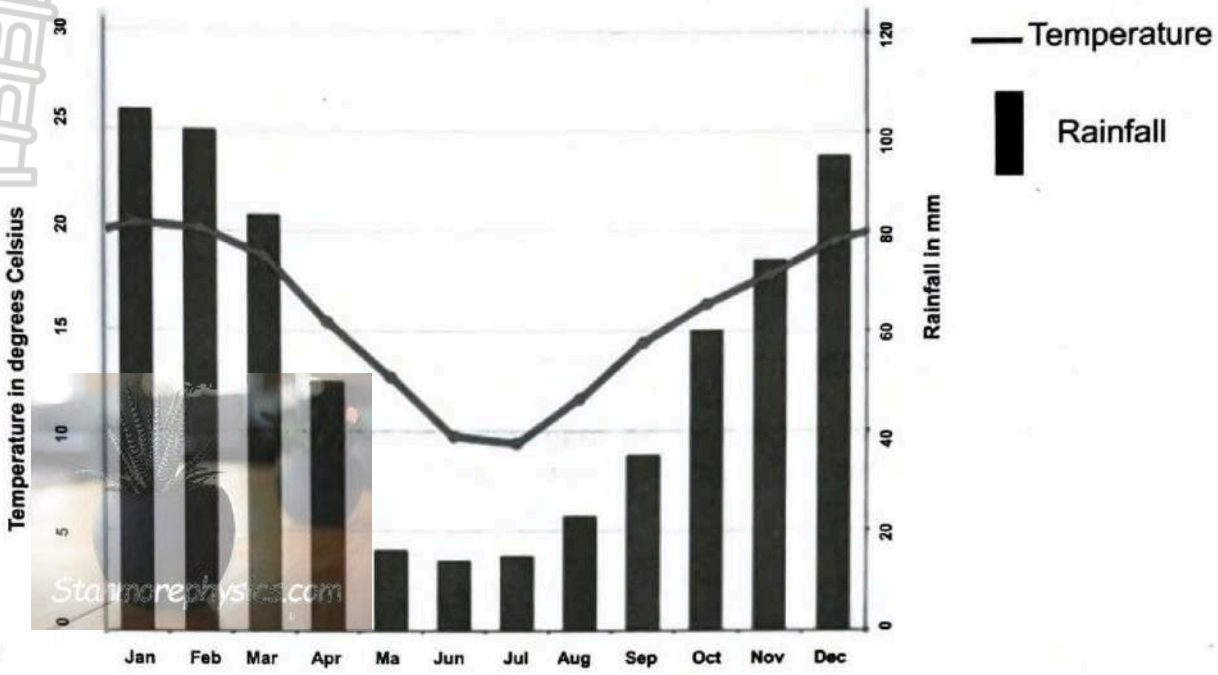
Difference in years : 7 years
Mean annual change : 10' Westwards
Total Change :
Magnetic Declination for 2024 : (3 x 1) (3)

3.1.7 Use the answer to QUESTIONS 3.1.5 and 3.1.6 above to calculate the magnetic bearing for 2024.

Formular: **Magnetic bearing = True bearing + magnetic declination** (1 x 1) (1)

3.2 MAP INTERPRETATION

Refer to the seasonal rainfall graph and the temperature graph and the topographic map of Queenstown.



[source:https://www.google.co.za/search?client=safari&sca_esv=df95c88c09499125&channel=iphone_bm&q=rainfall+graph+of+queenstown&tbm=isch&source=lnms&prmd=invsmbtz&sa=X&ved=2ahUKEwja_LrR48OEAxV4R0EAHTQaCSUQ0pQJegQICRAB&biw=430&bih=739&dpr=3#imgrc=-4Q_W0VWGNWYXM]

3.2.1 (a) In which season is the lowest rainfall experienced in Queenstown? (1 x 1) (1)

(b) Identity the type of river which indicates that Queenstown receives seasonal rainfall. (1x1) (1)

(c) Explain ONE strategy in block B4 that has been implemented to overcome water shortages. (1x 2) (2)

(d) Which month receives the lowest temperature in Queenstown? (1x1) (1)

(e) Explain the relationship between temperature and rainfall for the month of June and July in Queenstown. (1x2) (2)

3.2.2 Identify the environmental problem evident (shown) in block **C1** on the topographical map. (1x1) (1)

3.2.3 What strategies can be implemented by relevant authorities to overcome this problem? (2x2) (4)

3.3 GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Refer to the spatial object in blocks **D1** and **E2** on the topographic map.

3.3.1 Give an example of the following:

(a) A natural line feature in block **D1**. (1x1) (1)

(b) A human-made polygon feature in block **E2.** (1x1) (1)

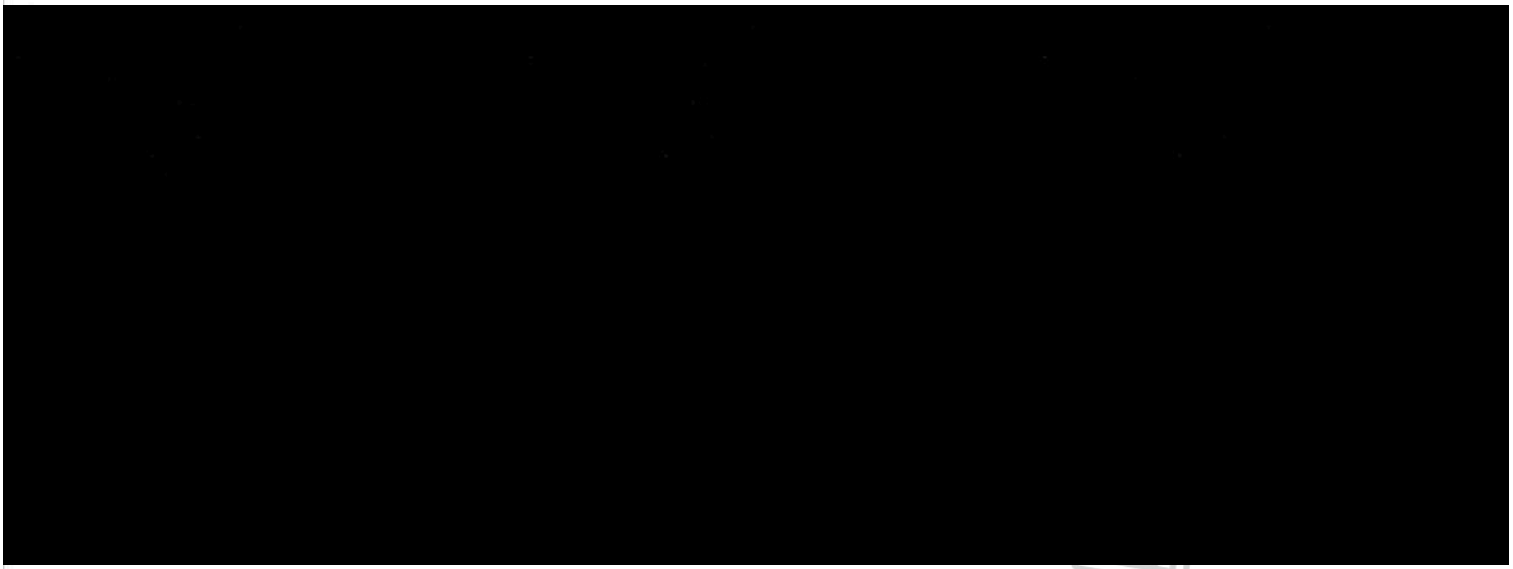
3.3.2 State TWO attributes of the polygon feature identified in QUESTION 3.3.1. (b) (2x1) (2)

3.3.3 Define the concept *remote sensing.* (1x2) (2)

3.3.4 Explain how remote sensing images can be more effective in assessing the environmental issue in block **C1** than the topographic map. (1x2) (2)

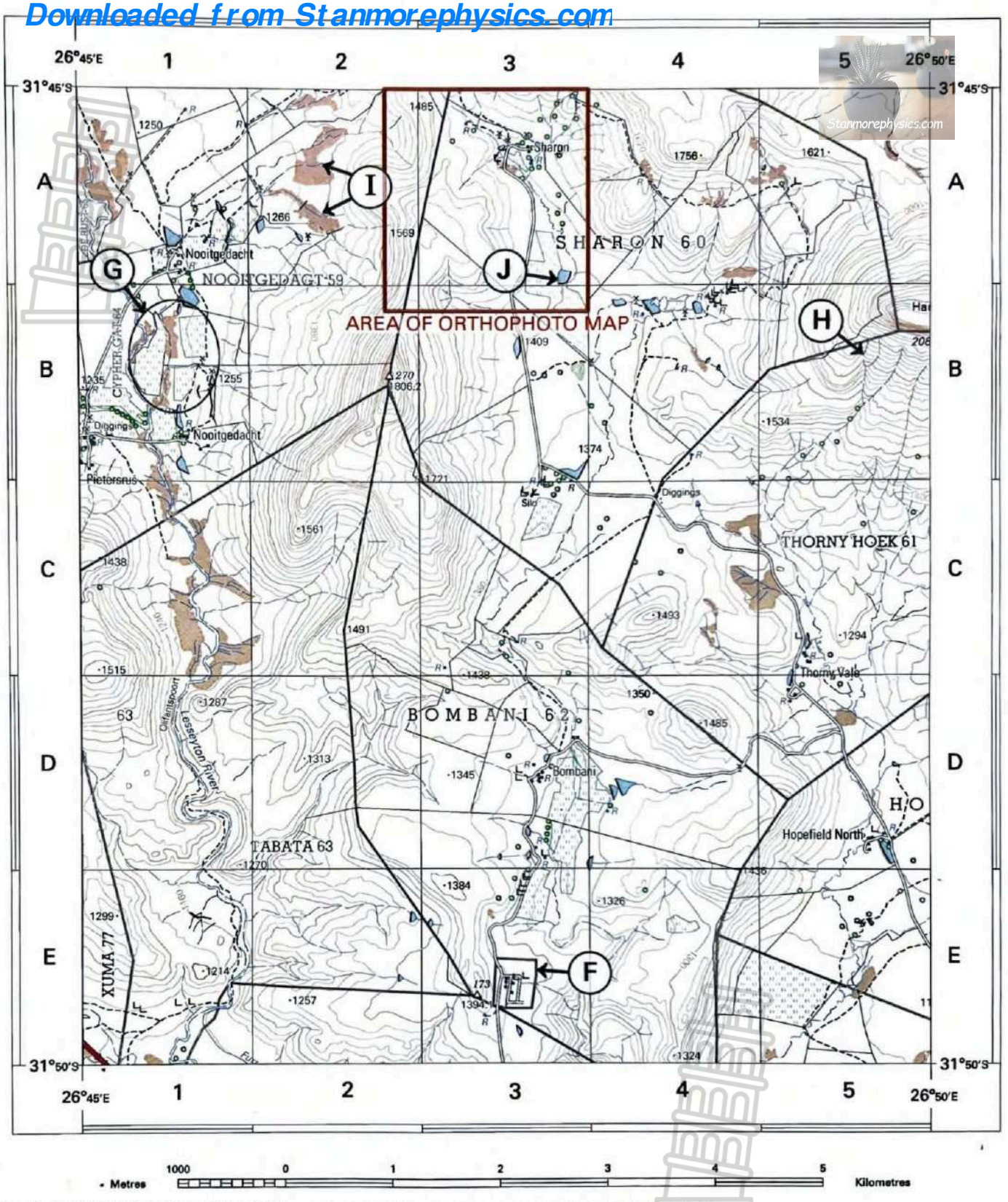
[30]

GRAND TOTAL: 150



EXTRACT FROM 3126DD QUEENSTOWN

1:50 000



Gemiddelde magnetiese deklinasie 26°25' Wes van Ware Noord (Maart 2017).
Gemiddelde jaarlikse verandering 10' Weswaarts (Maart 2017 - Feb. 2018).
Verkry vanaf "NOAA National Geophysical Data Center".

Mean magnetic declination 26°25' West of True North (March 2017).
Mean annual change 10' Westwards (Maart 2017 - Feb. 2018).
Sourced from "NOAA National Geophysical Data Center".

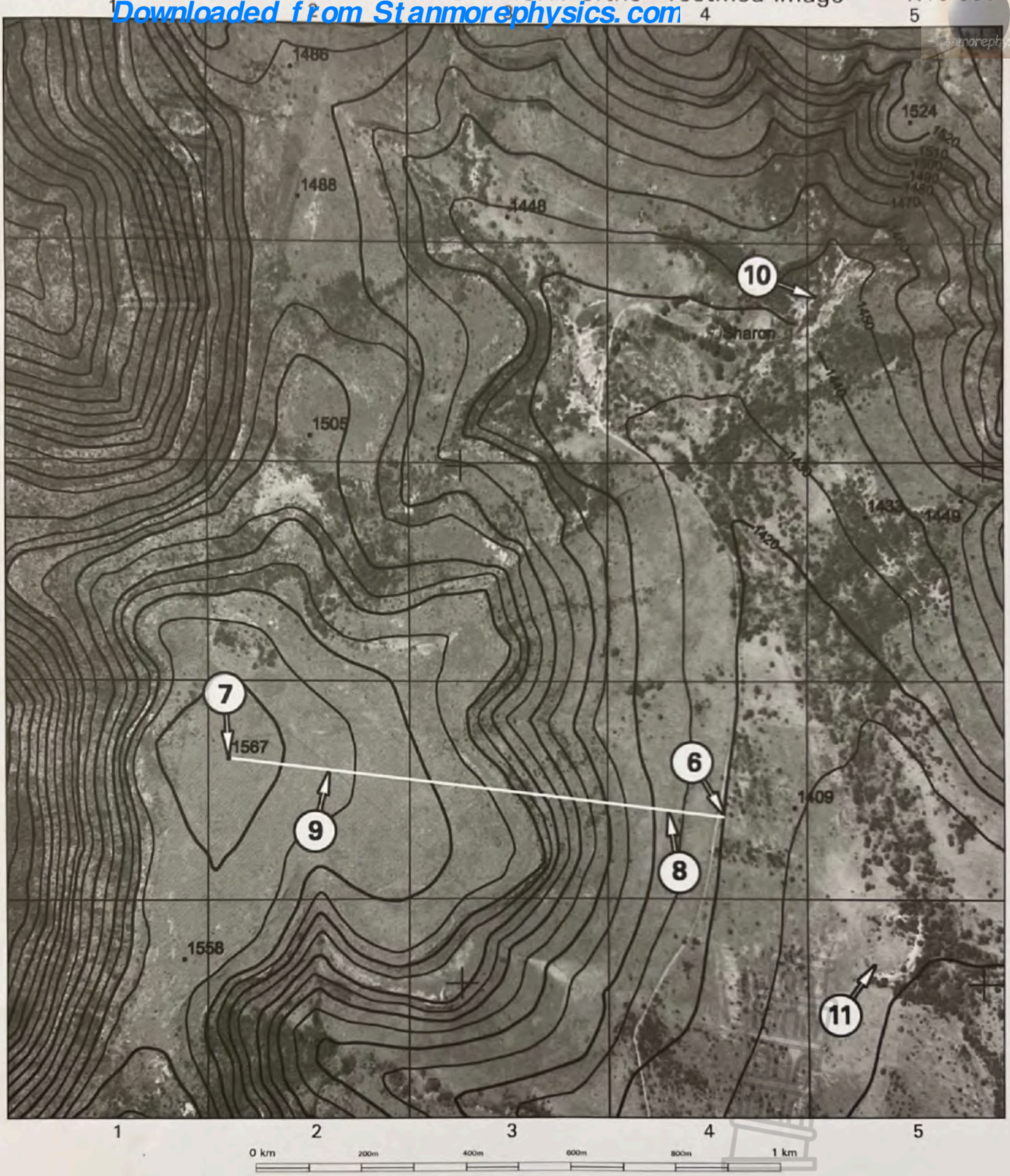
Metres 1000 0 1 2 3 4 5 Kilometres

CONTOUR INTERVAL 20 METRES / KONTOERTUSSENRUIMTE 20 METER

REFERENCE

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

EXTRACT FROM 3126 DD 1 NOOITGEDACHT ortho - rectified image 1:10 000



CONTOUR INTERVAL 10 METRES - KONTOERTUSSENRUIMTE 10 METER

VERKLARING

Nasionale Deurpad; Nasionale Roete
Hoofverkeersroete
Hoofpad
Sekondêre Pad; Hoogtemerk
Ander Pad; Brug
Dowwe Pad en Voetslaanpad
Spoorweg; Stasie of Sylyn
Ander Spoorweg; Tonnel
Opvulling; Deurgrawing
Kraglyn
Beboude Gebied (Hoë, Lae Digtheid)
Geboue; Murasie
Poskantoor; Polisiestasie; Winkel
Plek van Aanbidding; Skool; Hotel

Internasionale Grens en Baken
Provinsiale Grens
Bewarings Gebied
Standhoudende Rivier
Standhoudende Water
Nie-standhoudende Rivier
Nie-standhoudende Water
Droë Loop
Droë Pan
Moeras en Vlei
Pyplyn (bo die grond)
Watertoring; Reservoir; Waterpunt
Kuslynrotse
Prominente Klipbank

Draadheining; Muur
Windpomp; Monument
Kommunikasietoring
Mynhoop; Uitgrawing
Peilbaken; Seevaartbaken
Vuurtoring en Seevaartlig
Begraafplaas; Graf
Erosie; Sand
Beboste Gebied
Bewerkte Land
Boord of Wingerd
Ontspanningsterrein
Rye Bome
Oorspronklike Plase

FINAL

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P1

MARKING GUIDELINES

PREPARATORY EXAMINATION

SEPTEMBER 2024

MARKS: 150

N.B. This marking guideline consists of 9 pages.

1.1 1.1.1 Y✓ - (tropical)
1.1.2 Z✓ - (northern)
1.1.3 Z✓ - (eye)
1.1.4 Z✓ - (dry)
1.1.5 Y✓ - (dangerous semi-circle)
1.1.6 Y✓ - (cumulonimbus)
1.1.7 Y✓ - (east to west) (7 x 1) (7)

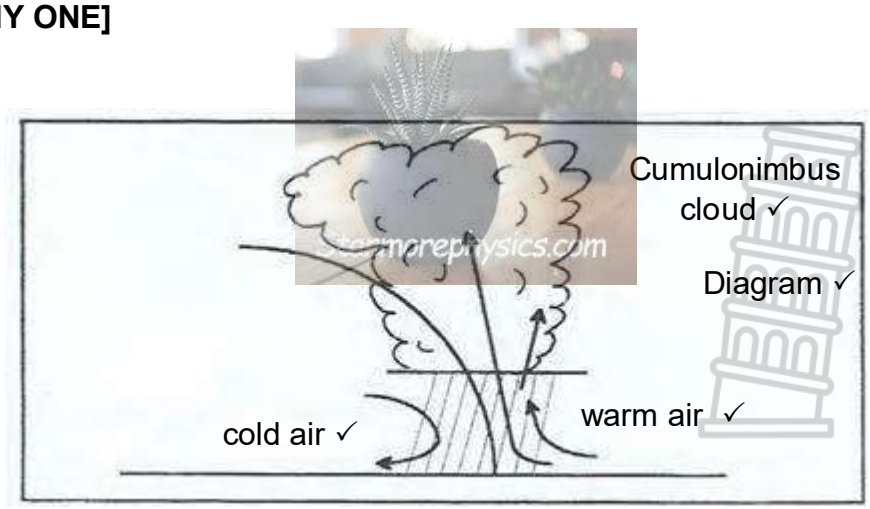
1.2 1.2.1 C✓
1.2.2 B✓
1.2.3 A✓
1.2.4 B✓
1.2.5 C✓
1.2.6 B✓
1.2.7 D✓
1.2.8 D✓ (8 x 1) (8)

1.3 1.3.1 Presence of cold front/ fronts✓ (1 x 1) (1)

1.3.2 The cold front is moving further north over the country✓✓
Low temperatures are dominating the interior of the country✓✓
ANY ONE (1 x 2) (2)

1.3.3 A strong cold front is currently positioned over the Eastern Cape✓✓
As the cold front moves across the Eastern Cape it forces the warm air to rise and form cumulonimbus clouds✓✓
The passing of the cold front leaves behind the cold temperature/ conditions✓✓
Station model shows a small difference between air temperature and dew point temperature ✓✓
[ANY ONE] (1 x 2) (2)

1.3.4



NB: No mark mark to be awarded for the complete cross section of the mid-latitude cyclone (4 x 1) (4)

1.3.5 Can warn farmers in advance of the approaching mid- latitude cyclone✓✓
Farmers can be warned about the severity of the cyclone✓✓
Necessary precautions can be taken to prevent the loss of animals and crops (accept examples) ✓✓
store food for livestock ✓✓
[ANY THREE] (3 x 2) (6)

1.4

1.4.1 Anticyclones (Accept ONE example from the sketch) ✓
Ocean currents (Accept ONE example from the sketch) ✓
Plateau (Accept escarpment) ✓ (1 x 1) (1)
[ANY ONE]

1.4.2 The South Indian High is located further from the land in summer, thus the winds leaving the SIH have a larger sea track (fetch) and gain lots of moisture from the warm ocean✓✓/ It will bring more moisture as the South Indian High is further from the land ✓✓
[ANY ONE] (1 x 2) (2)

1.4.3 Stronger convection currents/ rising of warm air on the surface forces the descending air from the Kalahari high upward ✓✓
It is part of the subtropical anticyclonic system that changes position with the revolution of the earth ✓✓ /
Accept other correct explanations of the migration shift of the ITCZ (1 x 2) (2)
[ANY ONE]

1.4.4 The inversion layer in sketch **B** develops far above the escarpment✓✓ (1 x 2) (2)

1.4.5 There is weak subsidence of air over the plateau✓✓
The land heats up excessively over the central interior✓✓
Warm moist air from warm Mozambique current ridges from the South Indian high up the escarpment✓✓
The warm moist air reaches the interior of the country because the inversion layer is above the plateau ✓✓
There is lots of cloud formation✓✓
Widespread rainfall in summer✓✓ (4 x 2) (8)
[ANY FOUR]

1.5

1.5.1 High amounts of air pollution due to heat-generating activities (accept examples) ✓
Influx of motor vehicles in the city/exhaust fumes from the motor vehicles✓
Industrial activity in cities emit large amounts of air pollution✓
Construction activities causes dust particles✓
[Any TWO] (2 x 1) (2)

1.5.2 It is compressed✓
Well defined/dome shaped over the city✓
Cooler temperatures/ temperatures are relatively low at night✓
The pollution dome is below the inversion layer
[Any ONE] (1 x 1) (1)

1.5.3 There are no convection currents to disperse the pollutants vertically✓✓
Descending air is stronger at night✓✓
[Any ONE] (1 x 2) (2)

1.5.4 Greenhouse effect is generated by pollutants that are trapped✓✓
Pollutants in the city forms artificial clouds and traps the terrestrial radiation causing a greenhouse effect✓✓
[Any ONE] (1 x 2) (2)

1.5.5 It is more dominant in winter due to subsiding colder air✓ that produces inversion conditions ✓
Pollutants trapped over the city affects air quality✓ that is in direct contact with people✓
Less convection currents✓ that remove pollutants into the upper atmosphere ✓

NB: FOR TWO MARKS ALLOCATION, A FACTOR AND A QUALIFYER IS NEEDED
[Any TWO] (2 x 2) (4)

1.5.6 Reduce the number of private vehicles on our roads (accept examples) ✓✓
Decentralisation of industries from the city to the surrounding countryside ✓✓
Create more parks/greenbelts in the city/plant more trees to absorb more carbon dioxide ✓✓
Green policy to be included in all legislation (accept examples) ✓✓
Awareness/education campaigns on green policies ✓✓
Household activities (accept examples) ✓✓
Roof top gardens ✓✓
[Any TWO] (2 x 2) (4)

[60]

QUESTION 2 GEOMORPHOLOGY

2.1

2.1.1 D✓
2.1.2 C✓
2.1.3 A✓
2.1.4 D✓
2.1.5 B✓
2.1.6 D✓
2.1.7 C✓
2.1.8 A✓ (8x1) (8)

2.2

2.2.1 Z✓
2.2.2 Y✓
2.2.3 Y✓
2.2.4 Z✓
2.2.5 Z✓
2.2.6 Y✓
2.2.7 Y✓ (7x1) (7)

2.3

2.3.1 Drainage density is the total length of streams in a drainage basin divided by the total area of the drainage basin. ✓✓
[Concept] (1x2) (2)

2.3.2 B has more tributaries. ✓✓
The total length of the streams at B is longer than for A. ✓✓
There are many first order streams in B. ✓✓
[Any ONE] (1x2) (2)

2.3.3 3rd order ✓✓ (1x2) (2)

2.3.4 There are more fingertip streams which join, increasing the drainage density further downstream. ✓✓ (1x2) (2)

2.3.5 Gentle gradient (slope) increases the amount of infiltration into the ground thus resulting in the lower density. ✓✓
Steeper gradient (slope) increase the amount of runoff into streams causing high density. ✓✓ (2x2) (4)

2.3.6 dendritic✓ (1x1) (1)

2.3.7 Tributaries resembles the branches of a tree✓✓
Tributaries join the main river at acute angles. ✓✓
[Any ONE] (1x2) (2)

2.4

2.4.1 Headward erosion is taking place. ✓
Tributary of river A is cutting through the watershed. ✓
[Any ONE] (1x1) (1)

2.4.2 Flowing over a steeper gradient. ✓
Flowing over softer rocks. ✓
Increase in the volume of water/ increase in rainfall. ✓
[Any TWO] (2x1) (2)

2.4.3 C – elbow of capture✓
D – misfit stream✓ (2x1) (2)

2.4.4 Headwaters of the misfit stream was cut off by the captor stream. ✓✓
It continued to flow (after the wind gap) with reduced supply of water. ✓✓
[Any ONE] (1x2) (2)

2.4.5 More water for the irrigation of crops. ✓✓
More water for livestock✓✓
Increased yields due to the abundance of water. ✓✓
Decrease in costs to obtain sufficient water for irrigation. ✓✓
Increased flooding increases natural fertilization of soil. ✓✓
Input costs to farm decreases. ✓✓
Farming now is economically viable. ✓✓
More jobs are created as more areas are put under cultivation. ✓✓
Increase in income as farming yields increase. ✓✓
Increase in domestic water. ✓✓
Increase in recreational activities. ✓✓
Food security is secured since there is more access to food. ✓✓
More water for aquaculture✓✓
[Any FOUR] (4x2) (8)

2.5

2.5.1 Elands river✓
Wilge river✓
Klein – Olifants river✓
Steelpoort river✓
[Any TWO] (2x1) (2)

2.5.2 Mpumalanga✓
Limpopo✓
[Any ONE] (1x1) (1)

2.5.3 Rainfall in South Africa is low and unreliable. ✓✓
Mining and agricultural activities use up a lot of water✓✓
Poor drainage basin management policies (accept examples) ✓✓
The Kalahari high pressure dominated the area in winter resulting in little or no rainfall. ✓✓
The inversion layer prevents moist air from penetrating into the plateau leading to little or no rainfall. ✓✓
[Any ONE] (1x2) (2)

2.5.4 Mining and agriculture – pollution of water through harmful chemicals, toxic waste and pesticides. ✓✓
Acid mine drainage. ✓✓
Overgrazing and hence soil erosion – increased deposition and impact on river silt content. ✓✓
Due to agriculture and mining, likely that natural wetlands system may have been drained, canalized and most certainly heavily polluted by these activities. ✓✓
Construction of dams – over 30 in the catchment area- impact upon natural flow characteristics of the river. ✓✓
Pollution of the dams through various activities. ✓✓
[Any THREE] (3x2) (6)

2.5.5 Wetlands restoration and health programs – wetlands provide a useful water storage and release system. ✓✓
Restriction in number of future dams built in this catchment. ✓✓
Regular release of water from dams in the rainy season. ✓✓
Reduction in water usage for industry and agriculture – better water management and reticulation systems need to be put in place. ✓✓
GM crops that have been modified for drier conditions, planting water wise / indigenous vegetation. ✓✓
[ANY TWO] (2x2) (4)

SECTION B

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 C (50.2) ✓ (1 x 1) (1)

3.1.2 D (ii and iv) ✓ (1 x 1) (1)

3.1.3 D (Hill) ✓ (1 x 1) (1)

3.1.4 Actual Distance = Map distance x Map scale
= 9.6 ✓cm x 0.1 (Range 9.5 cm to 9.7 cm)
= 0.96 km ✓ (Range 0.95 km to 0.97 km) (2 x 1) (2)

3.1.5 180° +67° = 247°✓ (Range 246° to 248°) (1 x 1) (1)

3.1.6 Total change = 7 x 10' = 70'✓
Magnetic declination for 2024 = 26°25' +✓ 70'
= 27°35' West of True North ✓ (3 x 1) (3)

3.1.7 MB = TB + MD
= 247° + 27°35'
= 274°35' ✓ (RANGE 273°35'- 275°35') (1 x 1) (1)

3.2 MAP INTERPRETATION

3.2.1 (a) Winter ✓ (1 x 1) (1)
(b) Non-perennial river✓ (1 x 1) (1)
(c) Reservoirs have been built to store purified water✓✓
Dams have been built to store water from rivers ✓✓
Wind Pumps to extract ground water✓✓
[Any ONE] (1 x 2) (2)

(d) July✓ (1 x 1) (1)
(e) Low temperature decreases the probability (chances) of rainfall. ✓✓ (1 x 2) (2)

3.2.2 Soil erosion✓ (1 x 1) (1)

3.2.3 Afforestation on steep slopes✓✓
Terracing of steep slopes✓✓
Contour ploughing✓✓
Strip cultivating with alternate crops in the same area✓✓
Plant trees and resistant bush to act as wind breaker and shelter belts to reduce erosion✓✓
Stone/ gabian walls to trap water runoff and soil. ✓✓
[Any TWO] (2 x 2) (4)

3.3 GEOGRAPHIC INFORMATION SYSTEM (GIS)

3.3.1 (a) River✓ (1 x 1) (1)
(b) Dam✓ (1 x 1) (1)

3.3.2 Size (surface area) of the dam✓
Depth of the dam✓
Quality of water stored✓
[**Any TWO]** (2 x 1) (2)

3.3.3 Remote sensing is obtaining information of the earth from a distance / without touching or making physical contact. ✓✓ (1 x 2) (2)
[Concept]

3.3.4 Images taken by remote sensing can be taken regularly to get updated information. ✓✓
Series of images allows for tracking the impact over a period of time✓✓
Images can be taken by drone technology which is less costly✓✓
Images can be updated more regularly than topographical maps✓✓
It is an actual image of the soil erosion and not map symbols✓✓
Image is clear or has a high resolution. ✓✓ (1 x 2) (2)
[Any ONE]

GRAND TOTAL: 150