Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12



SEPTEMBER 2022



GEOGRAPHY P1

MARKS: **150**

TIME: **3 hours**

This question paper consists of 17 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 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 topographical map (2530BD MBOMBELA) and an orthophoto map of a part of the mapped area are provided.

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.

Copyright reserved

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, example 1.1.9 D.

1.1.1 Mid-latitude cyclones occur throughout the year but affects South Africa mostly in …

A summer.
B winter.
C spring.
D autumn.

1.1.2 The various stages of development of a mid-latitude cyclone are referred to as …

A frictional drag.
B veering.
C cyclogenesis.
D backing.

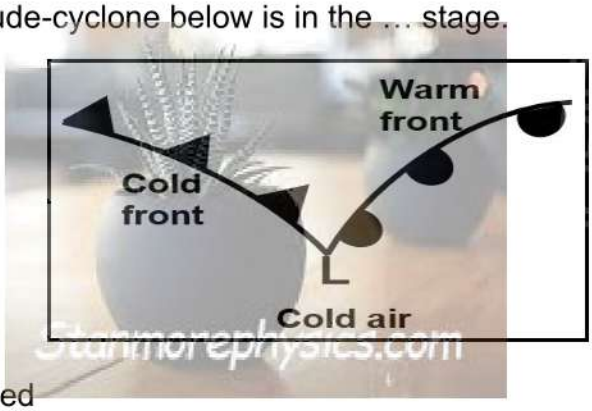
1.1.3 The wind belt that drives the mid-latitude cyclone is referred to as the …

A north east trades.
B south west trades.
C easterlies.
D westerlies.

1.1.4 Cumulonimbus clouds are associated with the … of the mid-latitude cyclone.

A cold sector
B warm sector
C cold front
D warm front

1.1.5 The mid latitude-cyclone below is in the … stage.



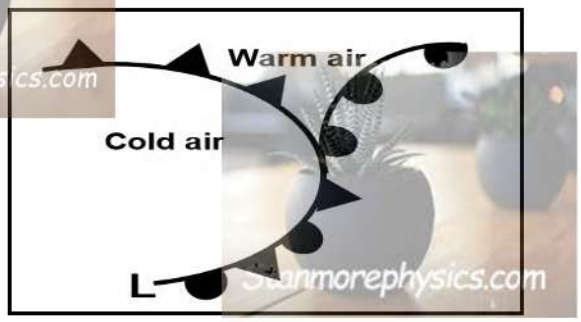
A occluded
B mature
C dissipation
D formative

1.1.6 A characteristic of the dissipating/degeneration stage, shown below, is when the …



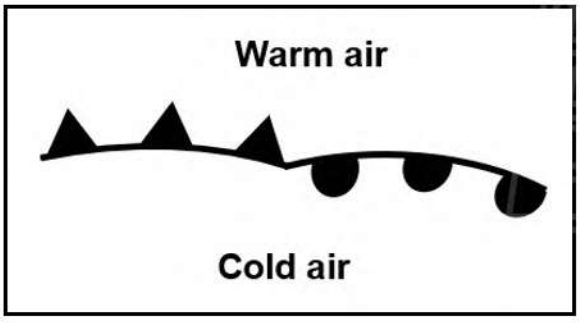
A warm air has been uplifted.
B mid-cyclone has moved over the sea.
C cold air has been uplifted.
D wind is veering.

1.1.7 The occlusion below can be identified as a warm front occlusion because …



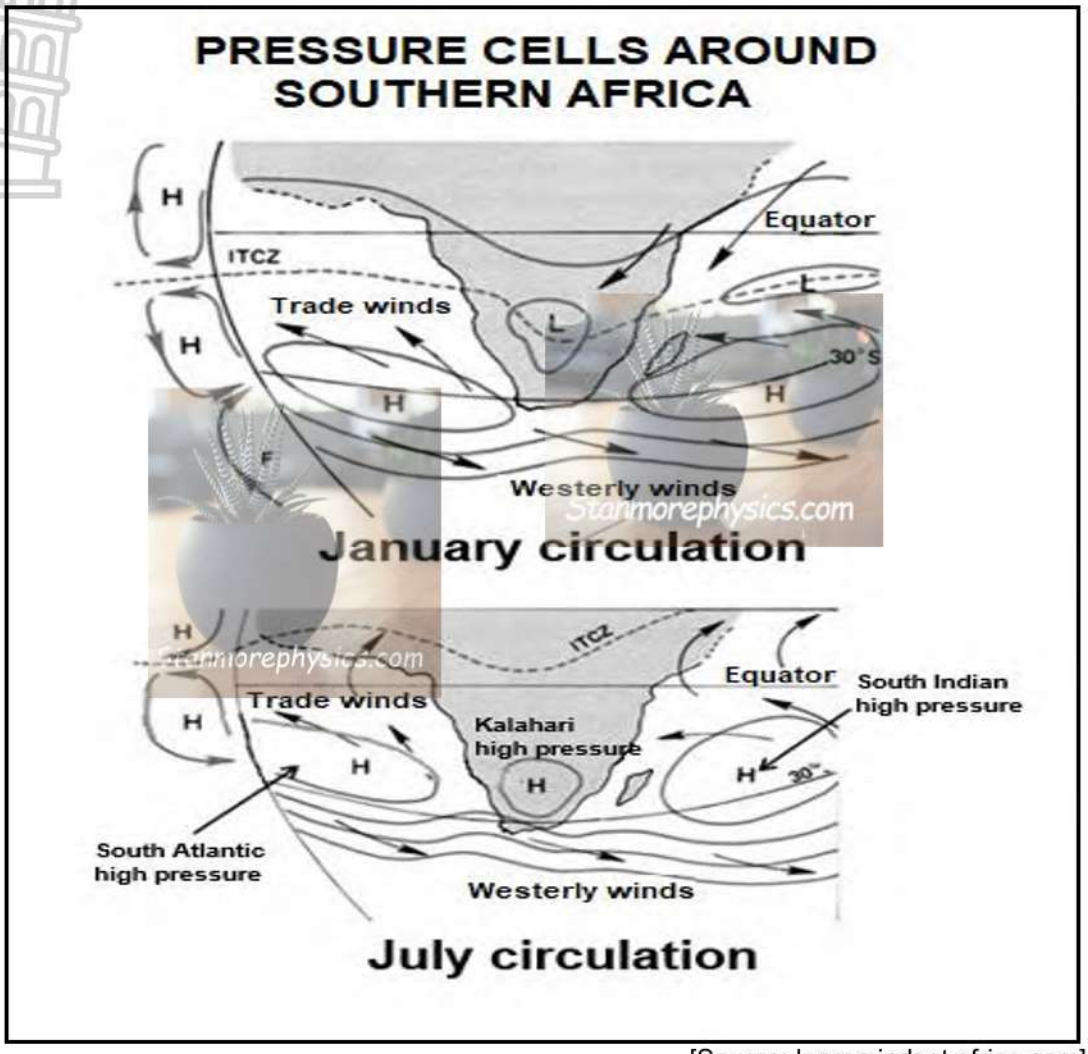
A the cold front has caught up with the warm front.
B the coldest air is found behind the cold front.
C all the warm air has been uplifted.
D of the symbol closest to the apex.

1.1.8 The wave stage below develops because of/a …



A cold front that undercuts a warm front.
B warm air that moves over cold air.
C frictional drag.
D wind shear. (8 x 1) (8)

1.2 Refer to the map showing pressure cells around Southern Africa in January and July. Choose the correct word(s) from those given in brackets. Write only the word(s) next to the question numbers (1.2.1 to 1.2.7) in the ANSWER BOOK.



[Source: learnmindset.africa.com]

1.2.1 The high-pressure cell change position in January and July because of the movement of the (ITCZ/tropic of cancer).

1.2.2 A (coastal/heat) low is located over the land in January.

1.2.3 The high-pressure cells move more (south/north) in July.

1.2.4 The Indian Ocean high-pressure cell carries more moisture to the east coast in (July/January).

1.2.5 Berg winds would be a common occurrence in (January/July).

1.2.6 In January the (South Indian/South Atlantic) high pressure cell ridges over the south-east coast of South Africa.

1.2.7 Less subsidence over the interior in (July/January) causes the inversion layer to develop above the escarpment. (7 x 1) (7)

1.3 Refer to the extract on Tropical Cyclone Ana.

MODERATE TROPICAL STORM ANA DOES NOT POST ANY DIRECT THREAT TO SOUTH AFRICA

This weekend saw the first tropical system of the 2021/22 tropical cyclone season for the Southwest Indian Ocean Basin.

Towards the end of last week, a tropical low began rapidly intensifying over the open ocean to the northeast of Madagascar, northwards of Mauritius and Reunion islands.

'Over the weekend, the system turned gradually from east to west over central and northern Madagascar, temporarily losing intensity due to surface friction with the landmass, as well as the absence of the release of latent heat energy from the ocean surface (the main energy driver for tropical cyclones).

'Overnight, the system continued to intensify, reaching Moderate Tropical Storm intensity in the early hours of Monday morning, leading to its official naming of 'Ana'.

'The system tracked westwards and by local sunrise on Monday morning, was lying just off the northern Mozambican coastline between Angoche and Mogincual. The system then tracked in an easterly direction.

[Adapted from zululandobserver.co.za]

1.3.1 How does the name of the tropical cyclone suggest that it was the first of the 2021/22 tropical cyclone season? (1 x 1) (1)

1.3.2 State ONE island listed in the article that would be affected by the tropical cyclone. (1 x 1) (1)

1.3.3 Why are these islands effected by a tropical cyclone? (1 x 1) (1)

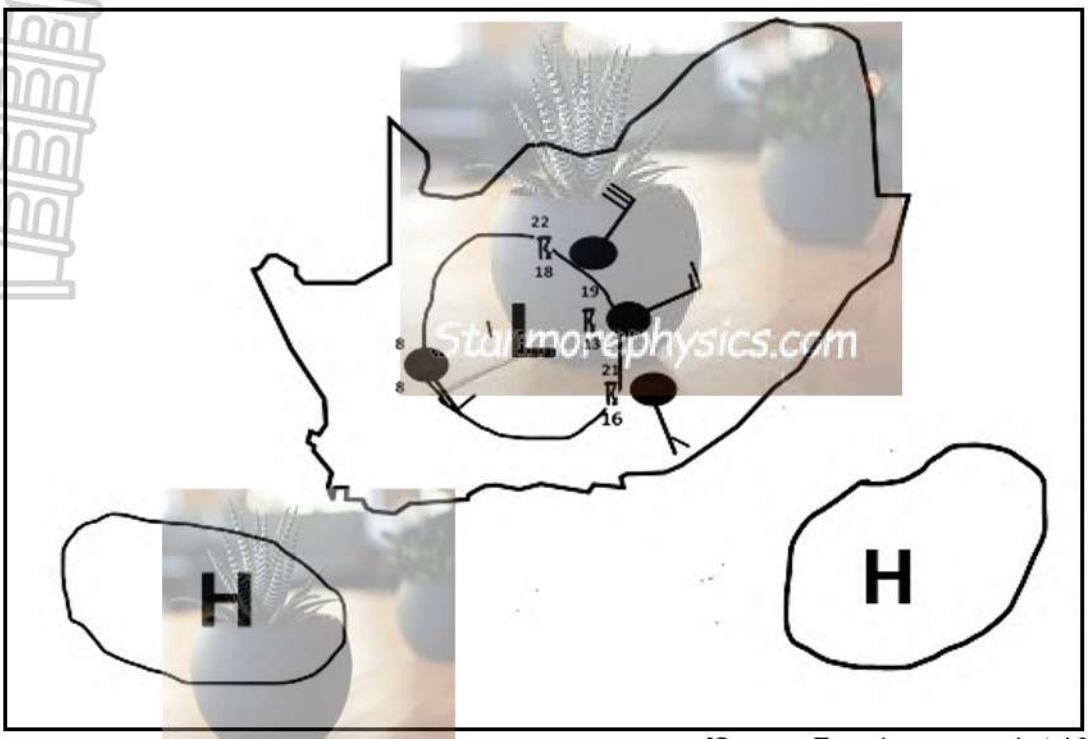
1.3.4 How does latent heat intensify (strengthen) the tropical cyclone? (2 x 2) (4)

1.3.5 Account for the tropical cyclone tracking in an easterly direction. (2 x 2) (4)

1.3.6 Explain the negative economic impact of strong winds on the coastal infrastructure of Mozambique. (2 x 2) (4)

Copyright reserved

1.4 Refer to typical line thunderstorm conditions in South Africa.



[Source: Examiners own sketch]

1.4.1 What are *line thunderstorms*? (1 x 2) (2)

1.4.2 How do line thunderstorms differ from general thunderstorms experienced over South Africa? (1 x 1) (1)

1.4.3 State evidence from the sketch to show that line thunderstorms are prevalent over the central part of South Africa. (2 x 1) (2)

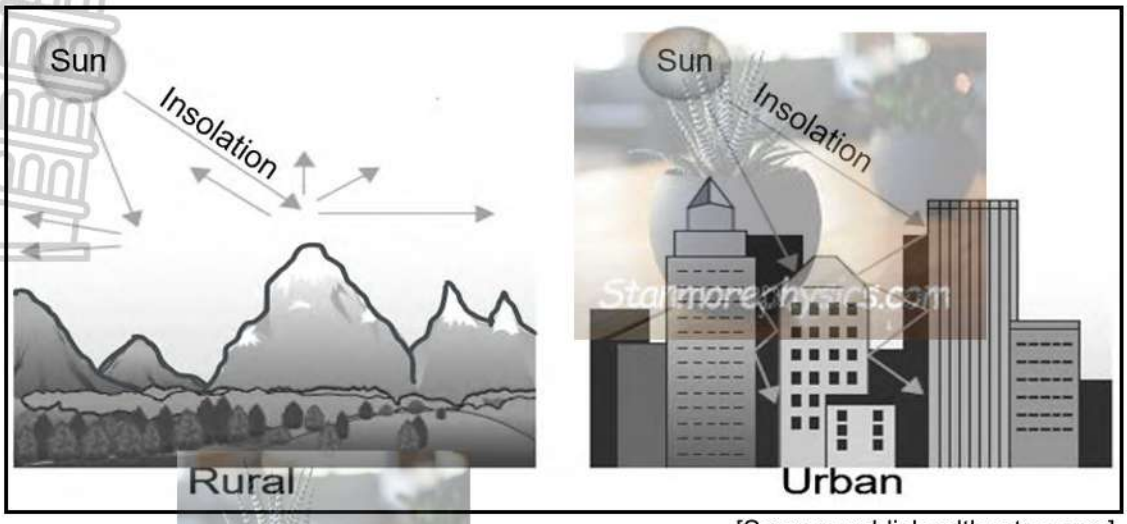
1.4.4 What role did the South Atlantic high-pressure cell play in the development of a moisture front in the middle of the sketch? (1 x 2) (2)

1.4.5 Explain the significance of the north east winds in the formation of line thunderstorms. (2 x 2) (4)

1.4.6 Why would line thunderstorms have a negative environmental impact in the eastern half of the country? (2 x 2) (4)

Copyright reserved

1.5 Refer to the sketches showing the difference between rural and urban climates.



[Source: publichealthnotes.com]

1.5.1 The climatic element illustrated in the sketch is (wind/temperature). (1 x 1) (1)

1.5.2 How does this climatic element (answer to QUESTION 1.5.1) affect the amount of humidity in rural regions? (1 x 2) (2)

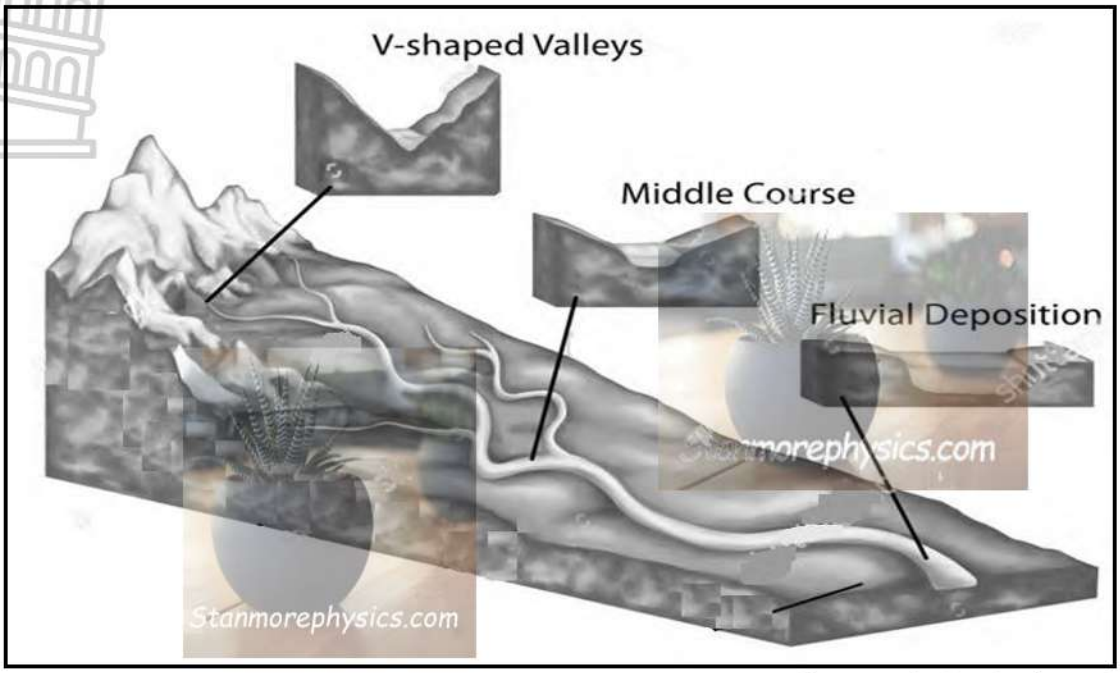
1.5.3 Explain how the different shapes and density of buildings (in the sketch) contribute to the city having higher temperatures. (2 x 2) (4)

1.5.4 In a paragraph of approximately EIGHT lines, explain how urban planners could put strategies in place regarding the shapes and density of buildings in order to reduce the higher temperatures. (4 x 2) (8)

[60]

QUESTION 2: GEOMORPHOLOGY

2.1 Refer to the sketch, which shows river profiles. Complete the statements in COLUMN A with the options in COLUMN B. Write only **Y** or **Z** next to the question numbers (2.1.1 to 2.1.8) in the ANSWER BOOK, example 2.1.9 Y.

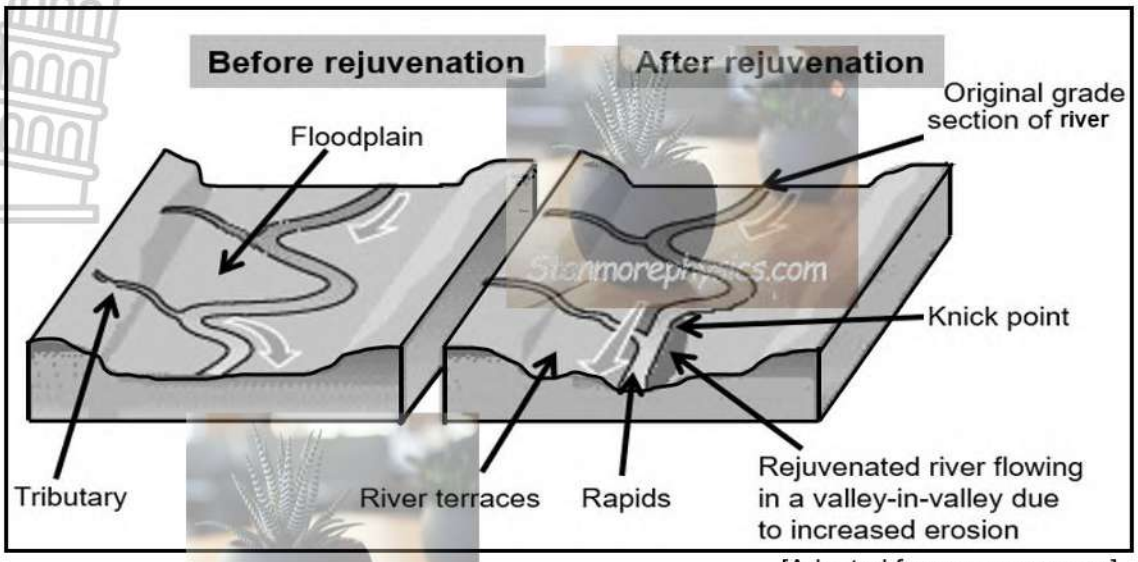


[Source: shutterstock.com]

	COLUMN A		COLUMN B
2.1.1	Cross profiles show …	**Y:** **Z:**	a side view of the river a view from bank to bank
2.1.2	The dominant fluvial process in the middle course is …	**Y:** **Z:**	lateral erosion vertical erosion
2.1.3	Fluvial landform that encourages farming.	**Y:** **Z:**	floodplain waterfall
2.1.4	Fluvial deposition encourages the formation of …	**Y:** **Z:**	deltas rapids
2.1.5	The volume of water in the upper course is …	**Y:** **Z:**	high low
2.1.6	The source of a river can be found in the …	**Y:** **Z:**	upper course lower course
2.1.7	The area drained by a river and its tributaries, are known as the …	**Y:** **Z:**	river system drainage basin
2.1.8	V-shaped valleys in the upper course is caused by …	**Y:** **Z:**	vertical erosion lateral erosion

(8 x 1) (8)

2.2 Refer to the sketch of river rejuvenation. Choose the correct word(s) from those given in brackets. Write only the word(s) next to the question numbers (2.2.1 to 2.2.7) in the ANSWER BOOK.



[Adapted from goconqr.com]

2.2.1 River rejuvenation is the process where a river erodes (laterally/ vertically) again.

2.2.2 The point where the old erosion meets with the new is called a (valley/ knickpoint).

2.2.3 River rejuvenation is caused by a (drop in sea level/watershed changing its position).

2.2.4 River terraces form (before/after) rejuvenation.

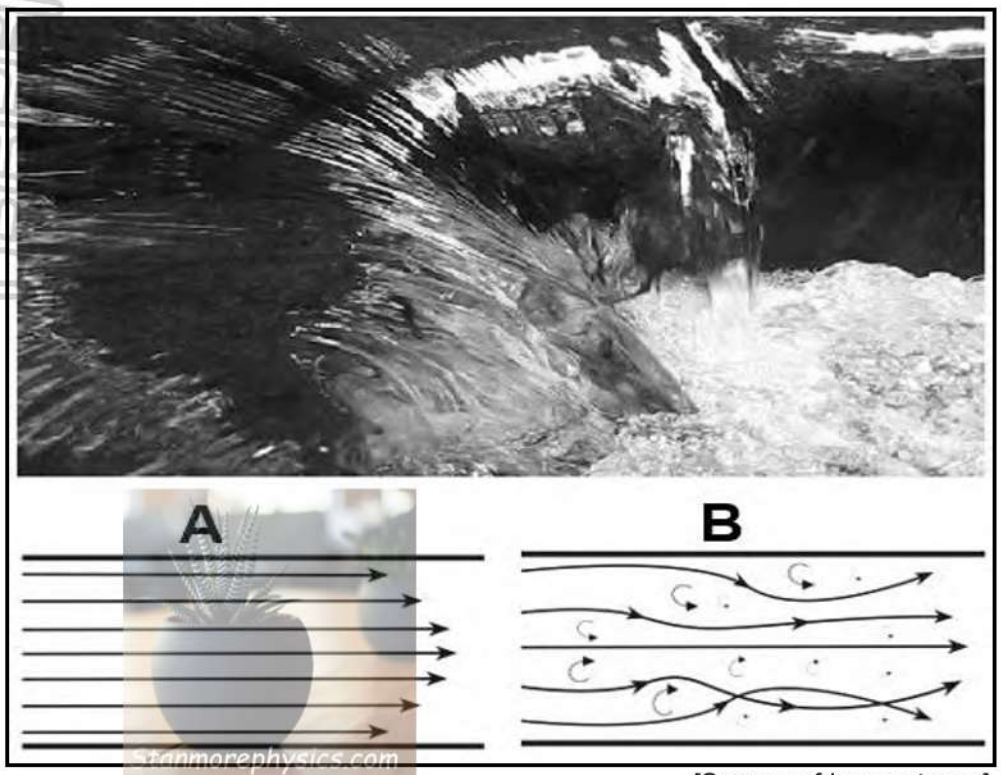
2.2.5 (Valley-in-valleys/Rapids) form on the floodplain.

2.2.6 The tributaries after rejuvenation lengthen due to (lateral/headward) erosion.

2.2.7 River rejuvenation will cause the river profile to be (graded/ungraded).

(7 x 1) (7)

2.3 Refer to the image and sketches of the flow of water in a river.



[Source: cfdsupport.com]

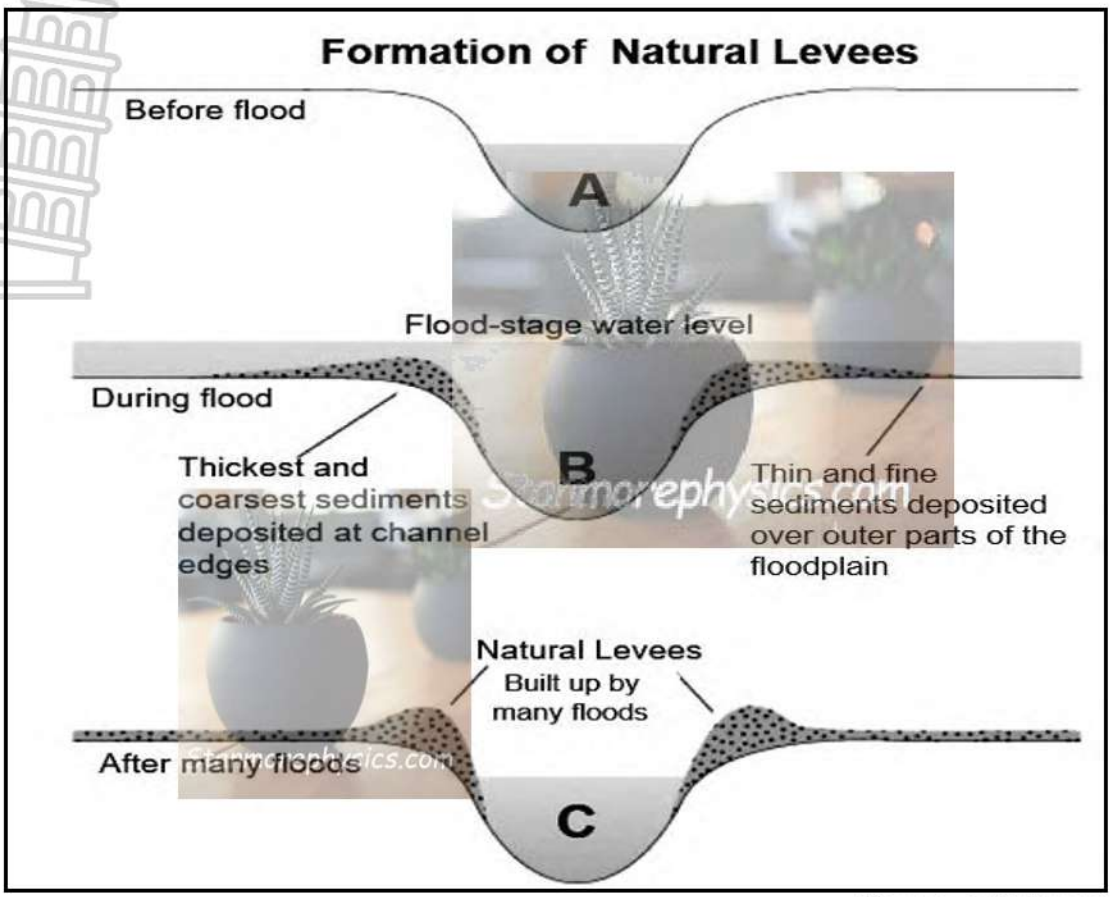
2.3.1 Classify the water flow as (*laminar* or *turbulent*) in sketch **A**. (1 x 1) (1)

2.3.2 How did the river bed determine the type of water flow in sketch **A** (your answer to QUESTION 2.3.1). (1 x 2) (2)

2.3.3 Why would the water flow in sketch **A** encourage deposition? (2 x 2) (4)

2.3.4 In a paragraph of approximately EIGHT lines explain how the fluvial features and steep gradient (slopes) of the upper course impacts on the flow of water in sketch **B**. (4 x 2) (8)

2.4 Refer to the sketch of the formation of a levee.



[Source: quizlet.com]

2.4.1 What is a *natural levee*? (1 x 2) (2)

2.4.2 Does sketch **A**, **B**, or **C** reflect the flood stage? (1 x 1) (1)

2.4.3 How does flooding of the river contribute to the formation of the levee? (1 x 2) (2)

2.4.4 What is the significance (importance) of the thickest and coarsest sediments, being deposited, for the formation of natural levees? (1 x 2) (2)

2.4.5 How is the formation of a levee of benefit to the floodplain? (2 x 2) (4)

2.4.6 Explain the negative impact of levees to the surrounding farming community. (2 x 2) (4)

2.5 Below is an extract on river management.

Port Elizabeth is the largest city in the Eastern Cape, with 1 million inhabitants. 70% of the water supply to Port Elizabeth comes from the Kouga, Baviaans- and Kromme catchment areas, and the Baviaans and Kouga that feeds into the Kouga dam. The Kouga dam services Port Elizabeth and the Gamtoos Valley, which is one of South Africa's prime citrus production regions.

The Port Elizabeth catchment area, however, suffers from the impacts of climate change, leading to increased flood and drought events, effects of which are increased by overgrazing, alien invasive trees, wetland degradation, erosion, and bad spatial planning. These effects have led to decreased retention capacity of the soil and increased runoff. The catchment area can be restored by planting indigenous vegetation to repair the landscape and reduce soil erosion. Planting procedures can be refined to maximise survivorship and minimize costs in different soil types and by training local communities, restoration practitioners and land users on restoration and planting, as well as other land uses. Restoration of degraded hillslopes in the Baviaanskloof will increase baseflow, improve water retention and reduce sediment build-up, benefiting the Port Elizabeth catchment area.

[Source: replenishafrica.com]

Stanmorephysics.com

2.5.1 According to the extract, why are the Kouga, Baviaans and Kromme catchment areas important to Port Elizabeth? (1 x 1) (1)

2.5.2 What is a *catchment area*? (1 x 2) (2)

2.5.3 Quote TWO physical factors, from the extract, that impact negatively on the Port Elizabeth catchment area. (2 x 1) (2)

2.5.4 What is the negative impact of poor planning on the catchment area? (1 x 2) (2)

2.5.5 Why would inter-basin water transfer schemes not be a viable (appropriate) solution to increase water supply to the Kouga, Baviaans and Kromme catchment area? (2 x 2) (4)

2.5.6 Explain how the sustainable management of the Kouga, Baviaans and Kromme catchment would have a positive economic impact on the city of Port Elizabeth. (2 x 2) (4)

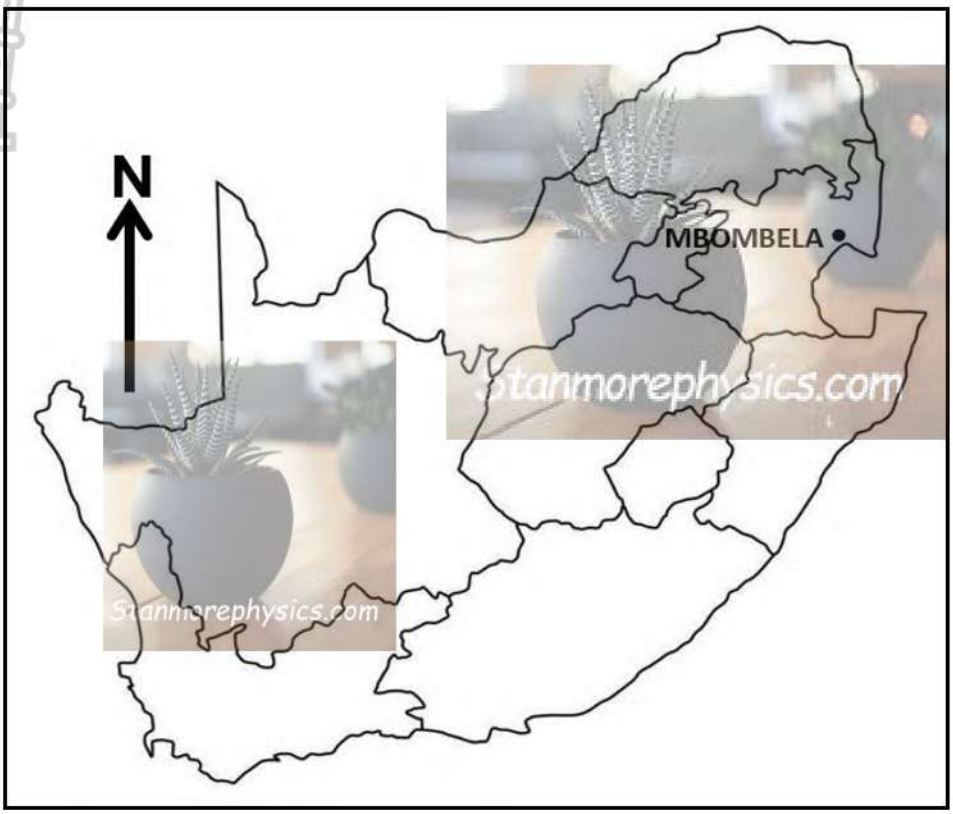
[60]

TOTAL SECTION A: 120

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

GENERAL INFORMATION ON MBOMBELA



Coordinates: 25°27′57″S 30°59′07″E

City of Mbombela is situated in the eastern part of South Africa and is the capital of Mpumalanga Province. The city is built on the fertile, flat valley floor of the Umgwenya (Crocodile) River where there is ample water supply from the river. The city serves as a gateway to some of the best eco- and adventure activities in Southern Africa with its moderate climate.

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

The following English term and their translations are shown on the topographic map:

ENGLISH	AFRIKAANS
Aerodrome	Vliegveld
Canal	Kanaal
Diggings	Uitgrawings
Furrow	Voor
Golf course	Gholfbaan
Sewerage works	Rioolwerke
Show grounds	Skougronde
Waterfall	Waterval
Weir	Studam

Copyright reserved

3.1 MAPWORK SKILLS AND CALCULATIONS

Refer to the topographical map and the orthophoto map. Four options are given for the questions below. Choose the correct answer and write only the letter (A–D) next to the question numbers (3.1.1 to 3.1.3) in the ANSWER BOOK e.g. 3.1.4 A.

3.1.1 Mbombela is situated in the … Province.

A North West
B Mpumalanga
C Gauteng
D Free State (1 x 1) (1)

3.1.2 The true bearing from spot height 873 in block **E4** to the trigonometrical station in block **E5** is …



A 24°.
B 50°.
C 204°.
D 180°. (1 x 1) (1)

3.1.3 The co-ordinates for the communication tower at **F** in block **D3** is …

A 25°28'25" E 30°57'55" S.
B 25°28'25" S 30°57'55" S.
C 25°28'24" S 30°57'54" E.
D 25°31'36" S 30°58'55" E. (1 x 1) (1)

3.1.4 Calculate the magnetic declination of the topographical map for 2022. Use the steps below to answer the question. Show ALL calculations. Clearly indicate the direction in relation to true north in your final answer.

Difference in years
Mean annual change
Total change
Magnetic declination 2022 (5 x 1) (5)

3.1.5 Determine the magnetic bearing for 2022 from spot height 873 in block **E4** to the trigonometrical beacon in block **E5**.

Formula:
Magnetic bearing = True bearing (TB) + Magnetic declination (MB) (2 x 1) (2)

3.2 MAP INTERPRETATION

Refer to the topographic map and the orthophoto map.

3.2.1 The settlement at **G** in block **E1**, experiences low temperatures during the night due to …

A anabatic winds.
B katabatic winds.
C fog.
D aspect. (1 x 1) (1)

3.2.2 The Umgwenya River in block **C5**, is an example of a … river.

A permanent
B exotic
C periodic
D episodic (1 x 1) (1)

3.2.3 Refer to the orthophoto map.

(a) Is the average temperature higher at **1** or **2**? (1 x 1) (1)

(b) Give TWO reasons for your answer to QUESTION 3.2.3(a). (2 x 2) (4)

Stanmorephysics.com

3.2.4 Refer to the fluvial landform at **H** on the topographic map and the photograph below.



(a) If one stood at the viewing point **X** (in the photograph) looking at the waterfall, would one be looking towards **J** or **K** on the topographic map? (1 x 1) (1)

(b) How does this waterfall in the photograph hinder the construction of a bridge at **J** on the topographic map? (1 x 2) (2)

(c) The waterfall will migrate (move) in a southerly direction. Substantiate this statement with evidence from the topographic map. (1 x 2) (2)

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

Refer to the topographic map.

3.3.1 Is the demarcated area in blocks **B5** and **C5** an example of *raster* or *vector* data? (1 x 1) (1)

3.3.2 Give a reason for your answer to QUESTION 3.3.1. (1 x 1) (1)

3.3.3 Give evidence from the demarcated area that proves that the farmer considered the infrastructure data layer for the location of this farm. (1 x 2) (2)

3.3 4 Why is the location of this farm considered to be poor river management? (2 x 2) (4)

[30]

TOTAL SECTION B: 30
GRAND TOTAL: 150

Copyright reserved