

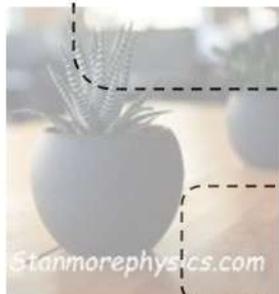


LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

SEKHUKHUNE SOUTH DISTRICT



GRADE 12

GEOGRAPHY
Mid-latitude Cyclone
Topic Test No.1
24 January 2025

Marks : 60

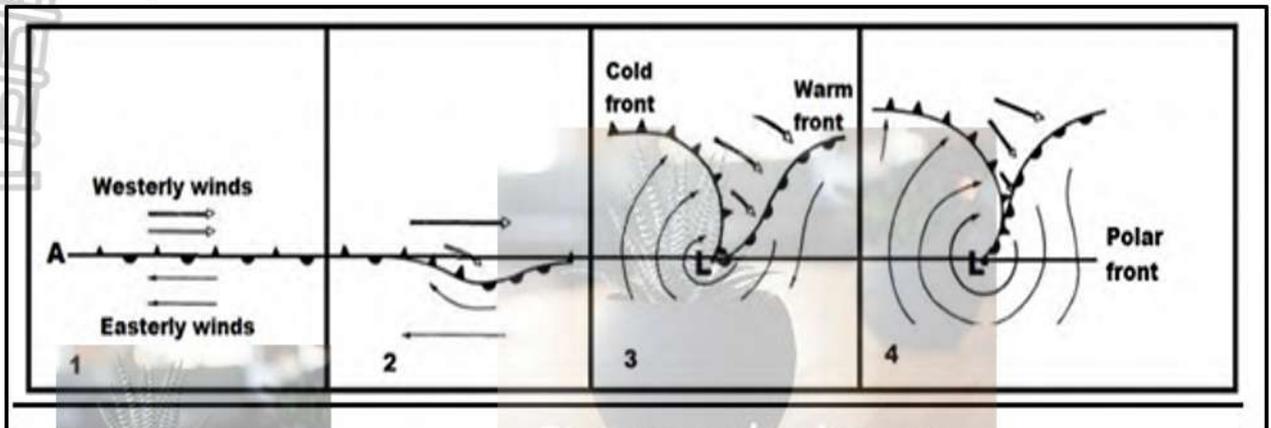
DURATION : 1 Hour

INSTRUCTION AND INFORMATION

- This question paper consists of FIVE questions.
- Answer all the FIVE questions.
- All diagrams are included in the question paper
- Number your answers correctly according to the numbering system used in this question paper.
- Answer in FULL SENTENCES, except when you have to state, name, identify or list.
- Write neatly and legibly

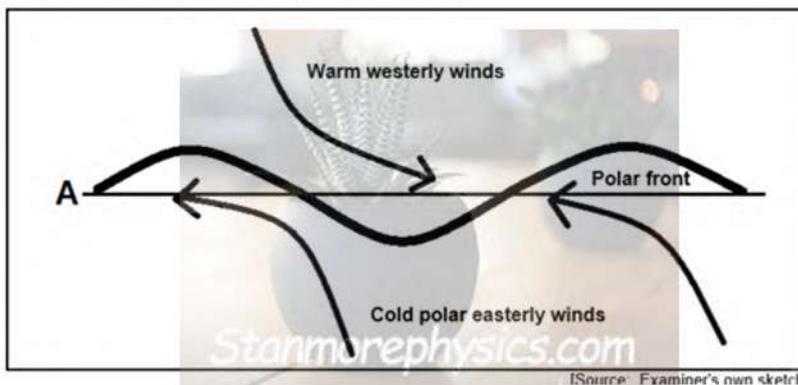
Question 1

1.1. Study the below based on the stages in the development of a mid-latitude cyclone.



- 1.1.1. Which line of latitude, 20° S, 60° S, or 80° S, is represented by line A?
- 1.1.2. Is a mid-latitude cyclone a high pressure system or low pressure system?
- 1.1.3. Describe the circulation of the air, as shown in the stage 2.
- 1.1.4. Name the zone of separation between westerly and easterly winds.
- 1.1.5. Name the stage of development during which fronts form.
- 1.1.6. Define the term cold front, seen in stage 3.
- 1.1.7. Which stage (1, 2, 3 or 4) shows the mid latitude cyclone in the occlusion stage?
- 1.1.8. Give one point of evidence in the diagram that indicates this cyclone occurs in the Southern hemisphere. (8 x 1) (8)

1.2. Refer to the sketch showing the development of mid-latitude and choose the answers from the brackets.



- 1.2.1. A mid-latitude cyclone is also known as a (coastal low pressure/ extra tropical cyclones).
- 1.2.2. The mid-latitude in the sketch develops in the (Southern/ Northern) Hemisphere.
- 1.2.3. The stage of development shown in the sketch is (wave/ mature) stage.
- 1.2.4. A mid latitude cyclone moves in a/an (easterly/ westerly) direction.

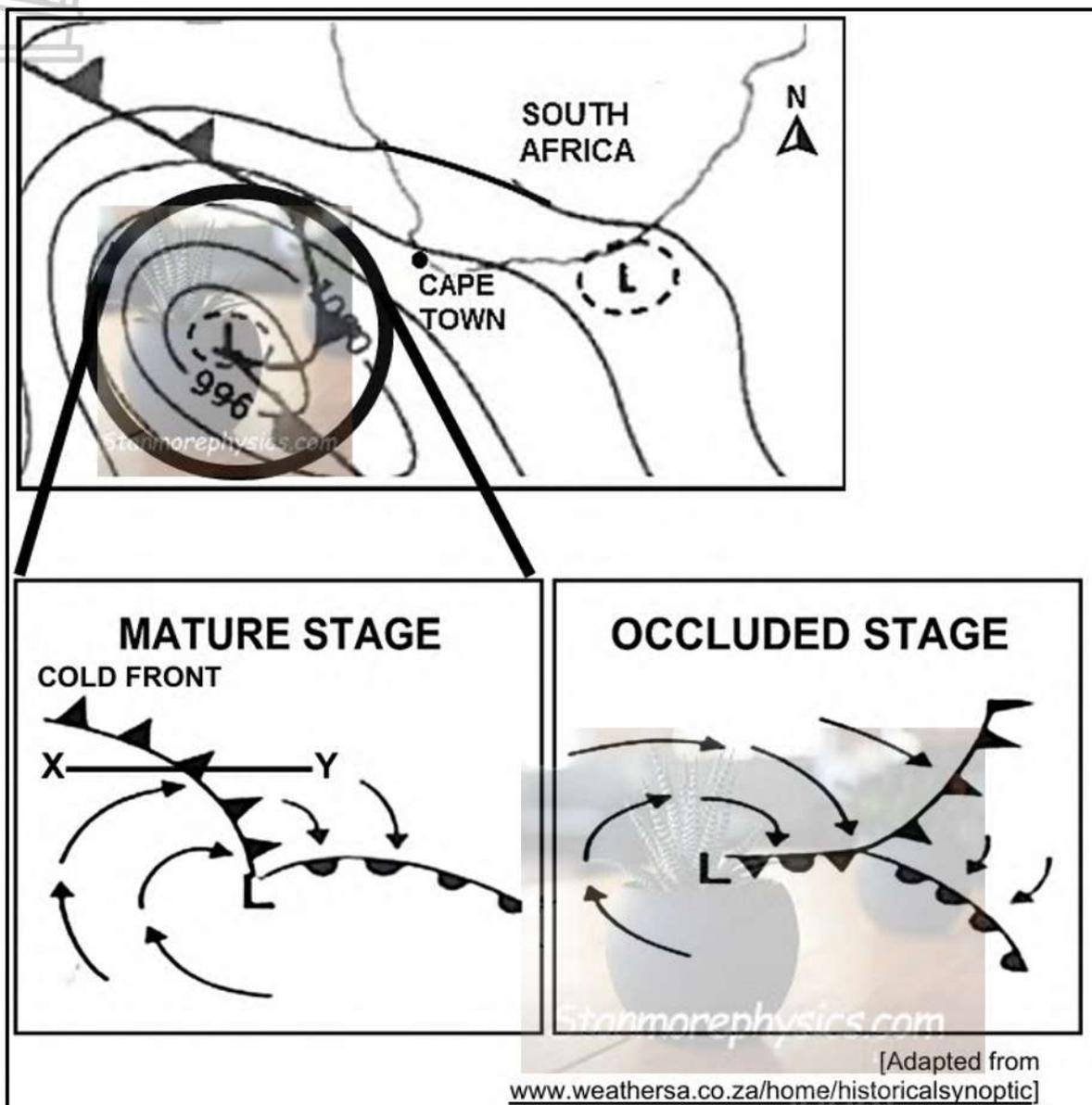
1.2.5. A mid-latitude cyclone has greater influence in South Africa in (summer/ winter).

1.2.6. Line A is the (40° / 60°) latitude.

1.2.7. Name zone at line A

(7 x 1) (7)

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



1.3.1. In what stage of formation is the mid-latitude cyclone that is approaching Cape Town?

(1 x 1) (1)

1.3.2. Why is Cape Town currently experiencing higher temperatures compared to the air behind the cold front?

(1 x 1) (1)

1.3.3. How will the wind direction change as the cold front passes over Cape Town?

(1 x 2) (2)

1.3.4. Give a reason for your answer to QUESTION 1.3.3.

(1 x 2) (2)



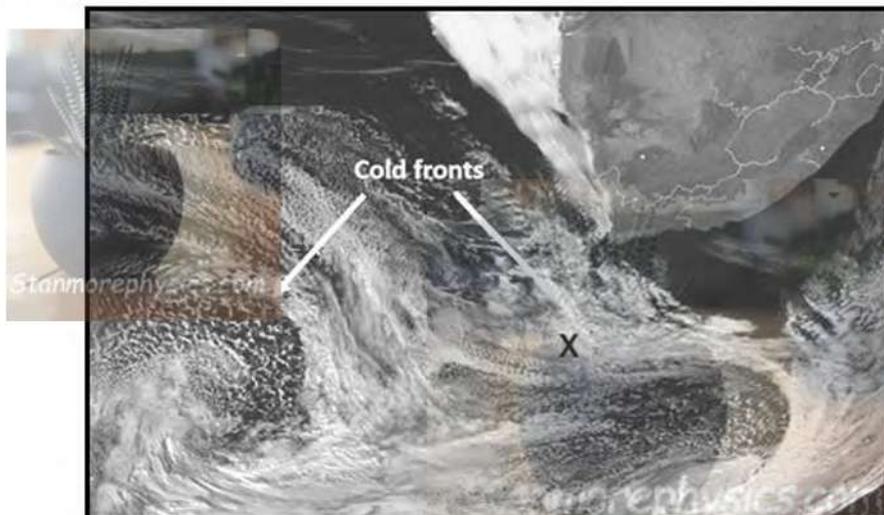
1.3.5. Draw a cross profile from X to Y of the cold front. Clearly indicate the air movement, cloud type and weather. (3 x 1) (3)

1.3.6. Explain the development of the cold front occlusion which will lead to the dissipation of the mid-latitude cyclone. (3 x 2) (6)

(15)

1.4. Refer to the extract and the satellite image of mid-latitude cyclones.

COLD FRONTS MOVE OVER THE WESTERN CAPE: AUGUST 2021



Parts of the Western Cape are already in the grips of cold and rainy weather and this will continue as a series of cold fronts reach the province this weekend.

As the last and strongest cold front makes landfall on Sunday morning, widespread rain will start over the Peninsula, the Cape Winelands and the Overberg, where weather prediction models have currently indicated a further 20–30 mm of rain in Cape Town and more than 50 mm in the mountainous areas. With the area already becoming water-logged, this heavy rainfall may lead to localised flooding. Rainfall will spread along the south coast, west coast and Namakwa districts on Sunday.

Maximum temperatures will drop to 12 °C in the Western Cape. Snow will start falling on Sunday evening into Monday morning across the high ground of the Western and Northern Cape, reaching the Eastern Cape and Lesotho on Monday. Snowfalls will not be confined to the mountains of these provinces as some towns and mountain passes can expect light snowfall as well.

[Adapted from <https://www.enca.com/weather/here-comes-the-cold>]

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- 1.4.1. Give the general direction of movement of the mid-latitude cyclones. (1 x 1) (1)
- 1.4.2. Give a reason for the direction of movement of the mid-latitude cyclones. (1 x 2) (2)
- 1.4.3. Quote evidence from the extract for the localised flooding. (1 x 2) (2)
- 1.4.4. Why do cold fronts affect the Western Cape mainly in winter? (1 x 2) (2)
- 1.4.5. How will snowfall influence the water supply in the Western Cape? (1 x 2) (2)
- (15)**
- 1.4.6. Describe the processes that resulted in the formation of cumulonimbus clouds along the cold front at X. (3 x 2) (6)
- (15)**
- 1.5. Refer to extract on mid-latitude cyclones.**

MID-LATITUDE CYCLONES OVER THE WESTERN CAPE

South Africa is among a handful of countries that experience winter rainfall in some areas and summer rainfall in others. The south-western tip of the country has a Mediterranean climate, with hot dry summers and cool wet winters. This is because mid-latitude cyclones migrate further north during winter, allowing the edge of the cold front arm to sweep across the southernmost part of the country. This results in frontal winter rainfall over the Western Cape. The movement of the cold front over the Western Cape is generally associated with a variety of weather changes. These cyclones can have a positive or negative impact on tourism.

[Source: Examiner's extract]

- 1.5.1. Name the type of climate that is found at the south-western tip of the country. (1 x 1)(1)
- 1.5.2. Describe the climate experienced at the south-western tip of the country during winter as indicated in the extract. (1 x 1)(1)
- 1.5.3. Why do mid-latitude cyclones migrate (move) further north in winter? (1 x 2)(2)
- 1.5.4. Describe the changes in the weather associated with the passing of a cold front over Cape Town. (2 x 2) (4)
- 1.5.5. In a paragraph of approximately EIGHT lines, explain the negative impact of cold fronts on tourism in Cape Town. (4 x 2)(8)
- (15)**

===== **TOTAL 60 MARKS** =====



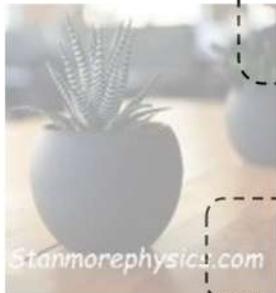
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GEOGRAPHY

Mid-latitude cyclone

Topic Test 1

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1.1.1 60° S

1.1.2 Low

1.1.3 Clockwise

1.1.4 Polar front

1.1.5 Mature stage

1.1.6 Front section of the cold moving air mass

1.1.7 Stage 4

1.1.8 Clockwise rotation of air

(8 x 1) (8)

1.2.1. Extra tropical cyclone

1.2.2. Southern

1.2.3. Wave

1.2.4. Easterly

1.2.5. Winter

1.2.6. 60 °

1.2.7. Polar front

(7 x 1) (7)

1.3.1. Mature (1)

(1 x 1) (1)

1.3.2. Located in the warm sector (1)

Ahead of the cold front (1)

[ANY ONE]

(1 x 1) (1)

1.3.3. Change from a north-westerly wind to a westerly / south-westerly wind (1)

The wind strength decreases (1)

The wind direction will change in an anticlockwise direction (1)

[ANY ONE]

(1 x 1) (1)

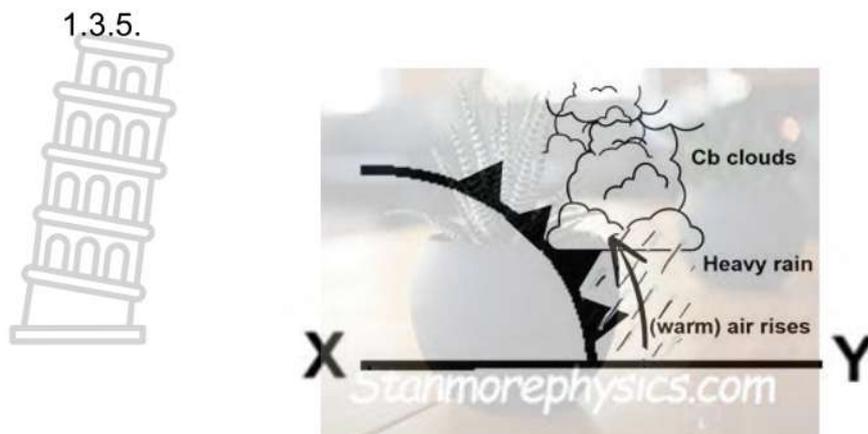
1.3.4. Clockwise circulation of air into a low-pressure cell (in the southern hemisphere) (2)

Air moves along the pressure and deflected (to the left) by the Coriolis force

(2)

[ANY ONE]

(1 x 2) (2)



Marks are allocated for: correct positioning and shape depicting:

- Air movement (uplifting of air) (1)
- Cumulonimbus (Cb) clouds (1)
- Heavy rain / torrential downpours (1) (3 x 1) (3)

1.3.6. The cold front which is moving faster undercuts / overtakes the warm front.

(2) Stanmorephysics.com

The warm air is forced to rise resulting in a narrowing of the warm sector.

(2)

The coldest air is found behind the cold front causing the warm air to be uplifted along the cold front (2)

The cool air (in front of the warm front) is completely uplifted. (2)

The system dissipates once the warm air has been displaced and there is only cold air on the surface (2)

[ANY THREE] (3 x 2) (6)

1.4.1. West to east/eastwards (1) (1 x 1) (1)

1.4.2. Driven by the westerlies (2) (1 x 2) (2)

1.4.3. 'series of cold fronts' (2)

'widespread rain' (2)

'20-30 mm of rain' (2)

'more than 50 mm' (2)

'waterlogged' (2)

'heavy rainfall' (2)

[ANY ONE] (1 x 2) (2)

1.4.4. Shifting of the ITCZ to the north (2)

South Atlantic High has migrated northwards (2)

- Mid-latitude cyclones migrate further north (2)
Pressure belts follow the perpendicular sunrays northwards (2).
[ANY ONE] (1 x 2) (2)
- 1.4.5. Increases (2) (1 x 2) (2)
- 1.4.6. The cold air undercuts the warm air (2)
Rapid upliftment of warm air occurs (2)
Rising warm air cools and condenses (2)
Condensation results in cumulonimbus clouds (2)
[ANY THREE] (3 x 2) (6)
- 
- 1.5.1. Mediterranean (1) (1 x 1) (1)
- 1.5.2. Cool wet (winters) (1) (1 x 1) (1)
- 1.5.3. The shifting of the ITCZ (2)
Sun is now overhead of the Tropic of Cancer/follow the shifting rays of the sun/apparent movement of the sun (2)
[ANY ONE] (1 x 2) (2)
- 1.5.4. Decrease in temperature (2)
Pressure decreases (but increases with cold sector) (2)
Cloud cover increases/cumulonimbus clouds form (2)
More precipitation/heavy rain/snow/hail/thunderstorms (2)
Humidity decreases (2)
Wind direction changes (backs northwest to southwest) (2)
Increase in wind speed/sudden gusty winds (2)
[ANY TWO] (2 x 2) (4)
- 1.5.5. Heavy rainfall will make tourist destinations inaccessible (2)
Rock falls and landslides decrease accessibility (2)
Strong winds decrease accessibility (2)
Rough seas and high waves decrease accessibility (2)
Rough seas decrease business for tour operators (2)
Snow on the mountains makes hiking trails inaccessible (2)
Outdoor activities will be affected by the poor weather/dangerous conditions (can give examples rain, wind, cold and hail) (2)

Travel arrangements of tourists will be affected by poor weather conditions (examples flights, tour buses, sea travel) (2)

The aesthetical appeal of the tourist attraction may be diminished by poor weather conditions (example debris on the beaches) (2)

Reduced income of tourism sector due to poor weather conditions (cancellation of bookings) (2)

[ANY FOUR]

(4 x 2) (8)

=====end=====

