GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION
MID-YEAR EXAMINATION
2022

GEOGRAPHY

PHYSICAL GEOGRAPHY

QUESTION PAPER

GRADE 11

TIME:	**3 hours**
TOTAL:	**150**
DATE:	**7 JUNE 2022**

This question paper consist of 15 pages.

Stanmorephysics

MAP: 2629 DB ERMELO

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO SECTIONS.

   SECTION A
   QUESTION 1: THE ATMOSPHERE (60 MARKS)
   QUESTION 2: GEOMORPHOLOGY (60 MARKS)

   SECTION B
   QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES (30 MARKS)

2. Answer ALL THREE questions.

3. ALL diagrams are included in the annexure.

4. Where possible, illustrate your answers with labelled diagrams.

5. Leave a line between subsections answered.

6. Start EACH question at the top of a NEW page.

7. Number your answers correctly according to the numbering system used in this question paper

8. Do NOT write in the margins of your ANSWER BOOK.

9. In SECTION B you are provided with a 1: 50 000 2629 DB ERMELO topographical map and an extract of the 2629DB 5 ERMELO of a part of the mapped area.

10. Show ALL calculations and use the formulae provided, where applicable. Marks will be allocated for these.

11. Indicate the unit of measurement in the final answer of calculations,
    e.g., 10 km; 2,1 cm.

12. You may use a non-programmable and a magnifying glass.

13. The area demarcated in RED and BLACK on the topographic map represents the area covered by the orthophoto map.

SPECIFIC INSTRUCTIONS AND INFORMATION FOR SECTION B

14. A 1: 50 000 2629 DB ERMELO topographical map and an extract of the 2629DB 5 ERMELO ortho photo 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 orthophoto map to the invigilator at the end of the examination.

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SECTION A: PHYSICAL GEOGRAPHY

QUESTION 1: THE ATMOSPHERE

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1.1–1.1.8) in the ANSWER BOOK, for example 1.1.9 A.

1.1.1 Lines on a map joining places of equal temperature is known as …

A Isohyets.
B Isobars.
C Isotherms.
D Contours.

1.1.2 The weight of the atmosphere on the surface of the Earth is the …

A pressure gradient.
B pressure gradient force.
C atmospheric pressure.
D geostrophic wind.

1.1.3 Air which moves from a high pressure to a low pressure is …

A wind.
B atmospheric pressure.
C geostrophic flow.
D pressure gradient.

1.1.4 The amount of change in atmospheric pressure between high- and low-pressure areas is known as the ....

A atmospheric pressure.
B pressure gradient.
C Coriolis force.
D thermal pressure.

1.1.5 … is Mid-autumn days that fall on the 21st of March when there's equal length of day and night.

A Summer solstice
B Winter solstice
C Spring equinox
D Autumn equinox

1.1.6 The zone where the two sets of tropical easterlies converge is the …

A Sub-polar Low-pressure zone.
B Sub-tropical High-Pressure zone.
C Intertropical Convergence Zone (ITCZ).
D Polar High-pressure zone.

1.1.7 … is the force which deflects winds due to the earth's rotation.

A Coriolis
B Pressure
C Ferrell's law
D Gradient

1.1.8 The zone where two air masses of different temperatures meet is a …

A Cyclonic front.
B Polar front.
C Tropical front.
D Convergence front. (8 x 1) (8)

1.2 Read the following statements and choose the appropriate word(s) in brackets which will make the statement TRUE. Write down only the question number (1.2.1 to 1.2.7) and the correct answer.

1.2.1 The side of a mountain where winds descends and warm up is the (leeward/windward) side.

1.2.2 A warm dry wind that descends on the leeward side of a mountain is a (monsoon/föhn) wind.

1.2.3 The rate at which the temperature of dry (unsaturated) air decreases with an increase in height (1℃ per 100 metres) is the (dry / wet) adiabatic lapse rate.

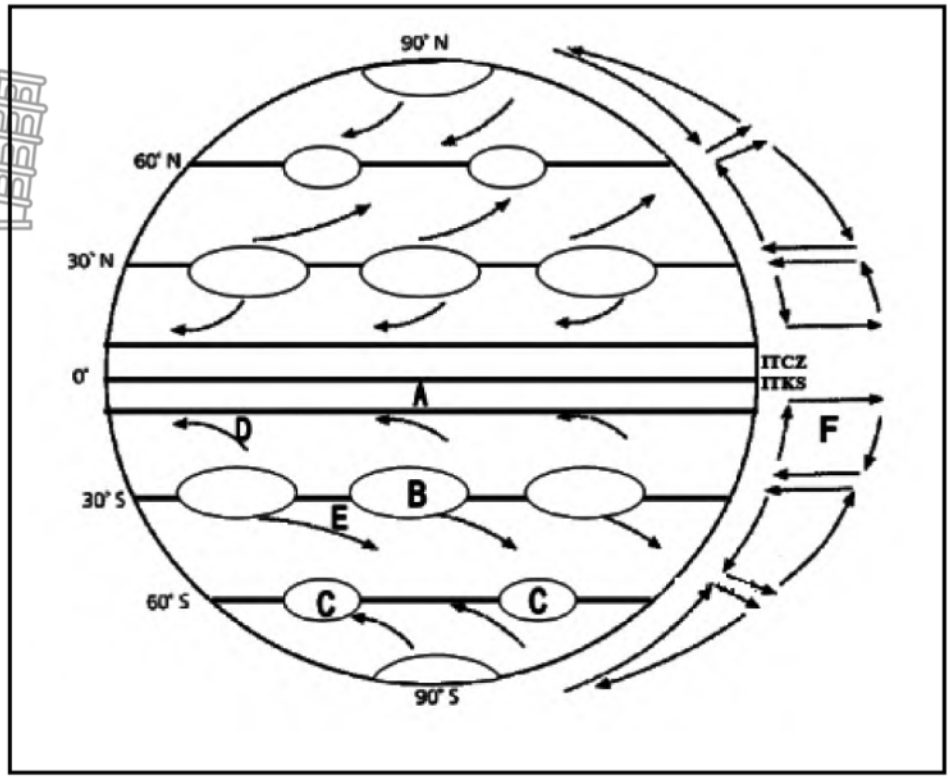
1.2.4 The rate at which temperature changes in the atmosphere with change in altitude is the (lapse rate/temperature range).

1.2.5 A change in conditions brought about by wetter conditions in the Pacific Ocean is known as (El Nino / La Nina).

1.2.6 The difference between summer and winter temperatures is (temperature range/lapse rate).

1.2.7 A seasonal wind that blows in the Tropical regions is a (monsoon/mountain) wind. (7 x 1) (7)

1.3 Refer to FIGURE 1.3, illustrating air pressure belts and wind circulation at different latitudes on a global scale.



Source: efaidnbmnnnibpcajpcglclefindmkaj/https://online.htseden.co.za/wp-content/uploads/2021/03/Geography-Grade-11-Term-1-Week-3_2021-1.pdf

1.3.1 Identify pressure belts **A** and **B**? (2 x 1) (2)

1.3.2 (a) Identify the planetary winds that develop at **D** and **E.** (2 x 1) (2)

(b) Explain why the planetary winds identified in QUESTION 1.3.2 (a) shows a deflection. (1 x 2) (2)

1.3.3 (a) Name the tri-cellular cell which develops at **F**. (1 x 1) (1)

(b) Describe how cell **F** develops? (2 x 2) (4)

1.3.4 The subpolar low-pressure belt is located at **C**. Explain how it is possible for a low-pressure cell to develop at such a high latitude. (2 x 2) (4)

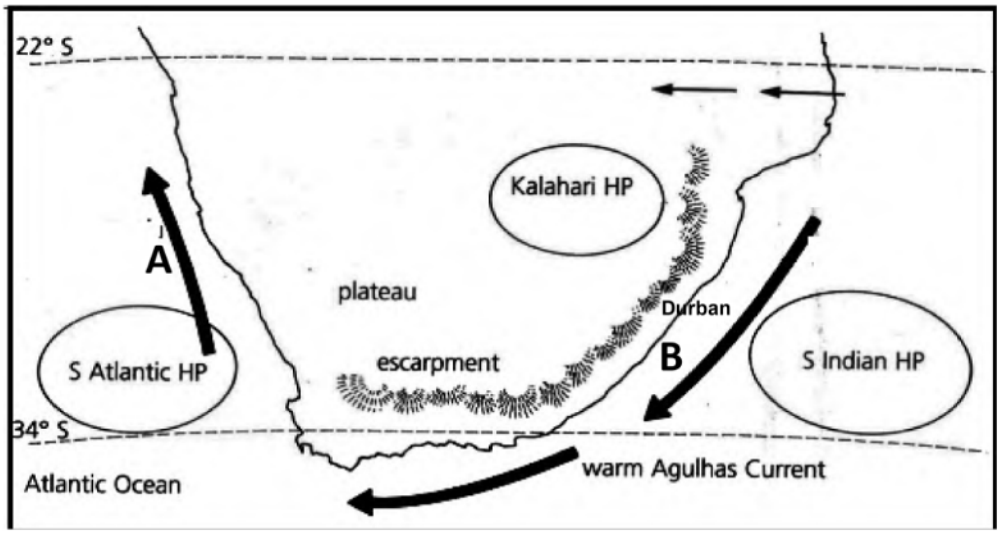
1.4 Refer to the infographic on Africa's weather and climate.

TOWN	MAXIMUM TEMP (°C)	MINIMUM TEMP (°C)
Pretoria	24	4
Johannesburg	21	3
Nelspruit/Mbombela	30	9
Polokwane	25	5
Mafikeng	24	6
Bloemfontein	21	3
Kimberley	21	6
Cape Town	19	12
East London	25	13
Durban	25	10

Ocean currents influence the weather of the coastal areas.

Due to evaporation from the oceans, the winds blowing from the sea to the land carry moisture, (Onshore winds) to coastal areas.

Any moisture in the air condenses to form either mist or fog



1.4.1 Define onshore wind (1 x 2) (2)

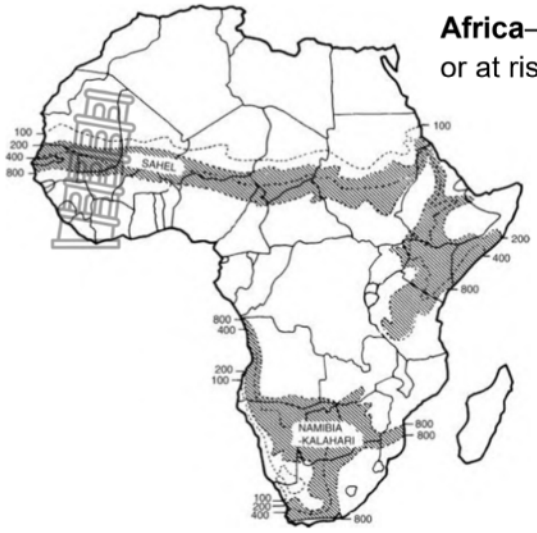
1.4.2 Use the information from the infographic and determine which city has the smallest temperature range? (1 x 1) (1)

1.4.3 Identify ocean currents **A** and **B**, which influence the climate of the South Africa. (2 x 1) (2)

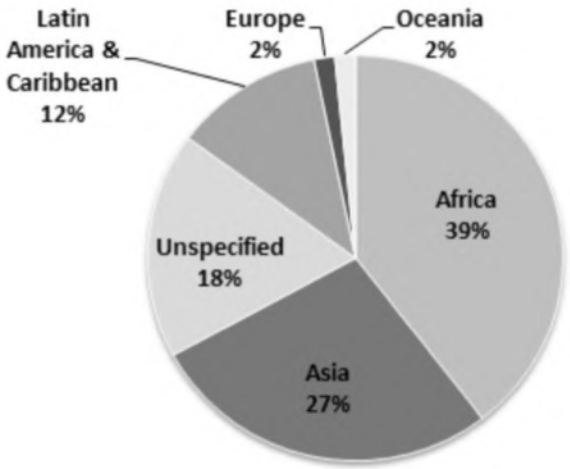
1.4.4 Explain why ocean current A is responsible for cold and dry west coastal conditions. (2) (1 x 2)

1.4.5 In a paragraph of approximately EIGHT lines, discuss the influence of ocean current **B** (identified in QUESTION 1.4.3), on the temperature and rainfall of Durban. (4 x 2) (8)

1.5 Refer to the infographic on desertification.



Africa—Shaded area - area suffering or at risk of desertification.



Desertification can be caused by drought, overpopulation, over-farming, deforestation and climate change. The effects of desertification are seen in many parts of the world.

The most vulnerable region is a 3,000-mile stretch of land that includes ten countries in the Sahel region of Africa. The Sahel is the area between the Saharan Desert and the Sudanian Savannah. This region is under constant stress due to frequent droughts and soil erosion. A dense forest can become a field of dust in a matter of years, making mass migrations inevitable. Africans frequently migrate south in search of fertile land.

[Source: Adapted from: https://borgenproject.org/desertification-in-africa/; https://www.oecd.org/dac/environment-development/DESERTIFICATION-RELATED%20FINANCE%20MARCH%202015_FINAL.pdf https://www.sciencedirect.com/topics/social-sciences/desertification]

1.5.1 Define the term *desertification*. (1 x 2) (2)

1.5.2 Identify the continent with the highest rate of desertification. (1 x 1) (1)

1.5.3 Which region is the most vulnerable to desertification, on the continent identified in QUESTION 1.5.2? (1 x 2) (2)

1.5.4 Quote TWO causes of desertification from the text. (2 x 1) (2)

1.5.5 Discuss the economic implications of desertification on the areas mentioned in QUESTION 1.5.3. (2 x 2) (4)

1.5.6 "This area is under constant stress due to frequent droughts." Suggest management strategies that can be implemented to reduce the risk of drought in the areas mentioned in QUESTION 1.5.3. (2 x 2) (4)

[60]

QUESTION 2: GEOMORPHOLOGY

2.1 Read the following statements and choose the appropriate word(s) in brackets which will make the statements TRUE. Write down only the question number (2.1.1 to 2.1.7) and the answer.

2.1.1 A slope which is curved inwards so that the lower part of the slope is flatter and higher part of the slope is steeper is a (convex/concave) slope.

2.1.2 Erosion of a land mass in such a way that landforms become narrower is (back wasting / down wasting).

2.1.3 The breaking down of rocks due to extremes in temperatures is (chemical/mechanical) weathering.

2.1.4 The steep slope of a ridge is the (dip/scarp) slope.

2.1.5 The horizontal layers of magma intrusion are (sills/dykes).

2.1.6 The mushroom shaped intrusive feature is the(laccolith/lopolith).

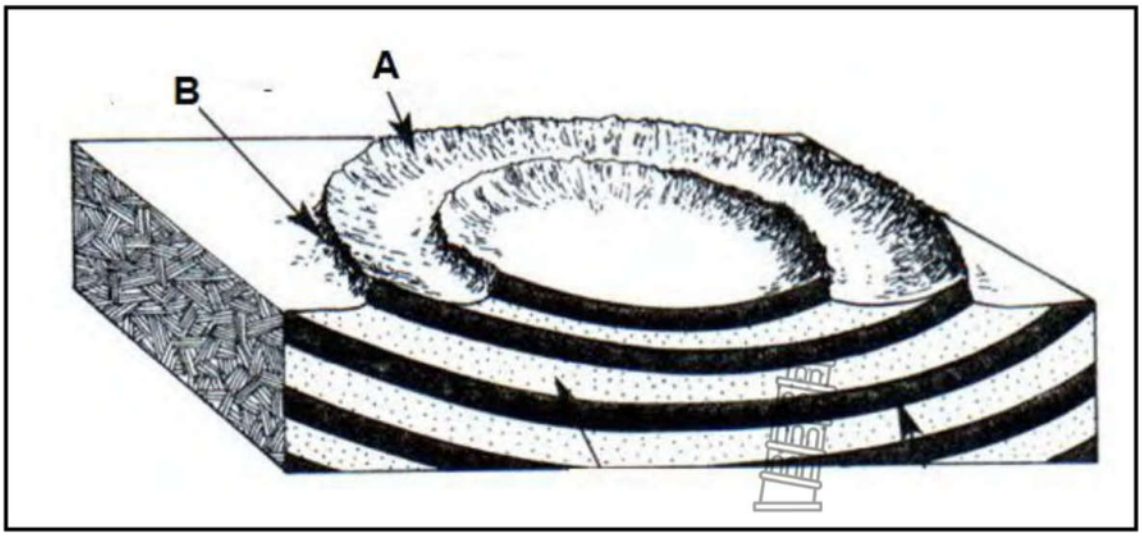
2.1.7 The largest dome shaped intrusions of magma deep within the earth's surface is a (laccolith/batholith). (7 x 1) (7)

2.2 Choose a term from COLUMN B that matches the geomorphologic description in COLUMN A. Write ONLY the letter (A–I) next to the question number (2.2.1–2.2.8) in the ANSWER BOOK, for example 2.2.9 J.

COLUMN A		COLUMN B	
2.2.1	Large area with deep steep sided valleys with narrow valley floors	A	Butte
2.2.2	The plateau is reduced in width due to the process of back wasting, thereby creating this feature	B	Cuesta
2.2.3	Flat topped hills with a greater height than width	C	Canyon
2.2.4	Landform where the resistant cap rock has been removed	D	Plateau
2.2.5	A large flat area elevated above sea level	E	Parallel retreat
2.2.6	Hard resistant rock found on the top of horizontal features like mesa and butte	F	Cap rock
2.2.7	Landscape that consists of flat topped mountains of different widths	G	Mesa
2.2.8	The process of back wasting is also referred to as.	H	Karoo landscape
		I	Conical hill

(8 x 1) (8)

2.3 FIGURE 2.3 shows topography associated with inclined strata.



[Source: Adapted from: https://learn.mindset.africa/sites/default/files/resourcelib/emshare-show-note-asset/863_fdoc.pdf]

2.3.1 Identify the landform in FIGURE 2.3. (1 x 2) (2)

2.3.2 Does this feature occur in inclined or horizontal strata? (1 x 1) (1)

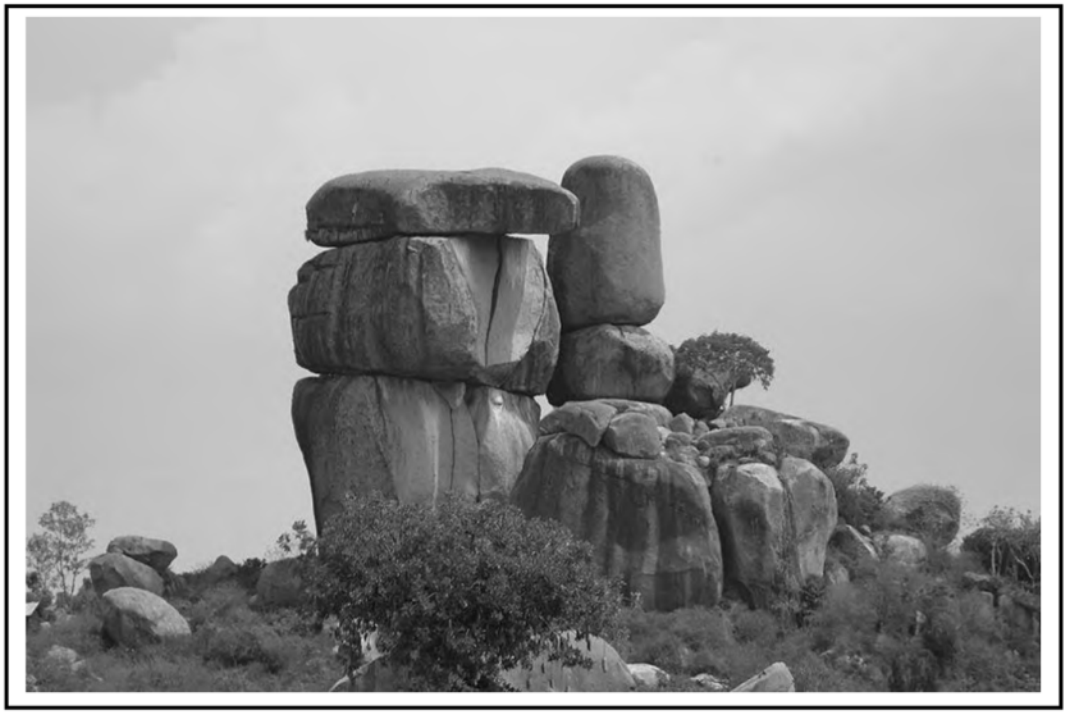
2.3.3 Label slopes **A** and **B** in FIGURE 2.3, as either a dip or scarp slope. (2 x 1) (2)

2.3.4 Describe the steepness of the slopes mentioned in QUESTION 2.3.3. (2 x 2) (4)

2.3.5 Discuss how this landscape can be utilized by humans. (3 x 2) (6)

[15]

2.4 FIGURE 2.4 is an illustration of Tors.



Source: https://en.wikipedia.org/wiki/Tor_(rock_formation)#/media/File:Kit-Mikayi.JPG

2.4.1 Provide a definition for *Tors.* (1 x 2) (2)

2.4.2 Name TWO types of weathering that is responsible for the formation of this landform. (2 x 1) (2)

2.4.3 Name the original landform from which the Tors depicted in FIGURE 2.4 developed. (1 x 1) (1)

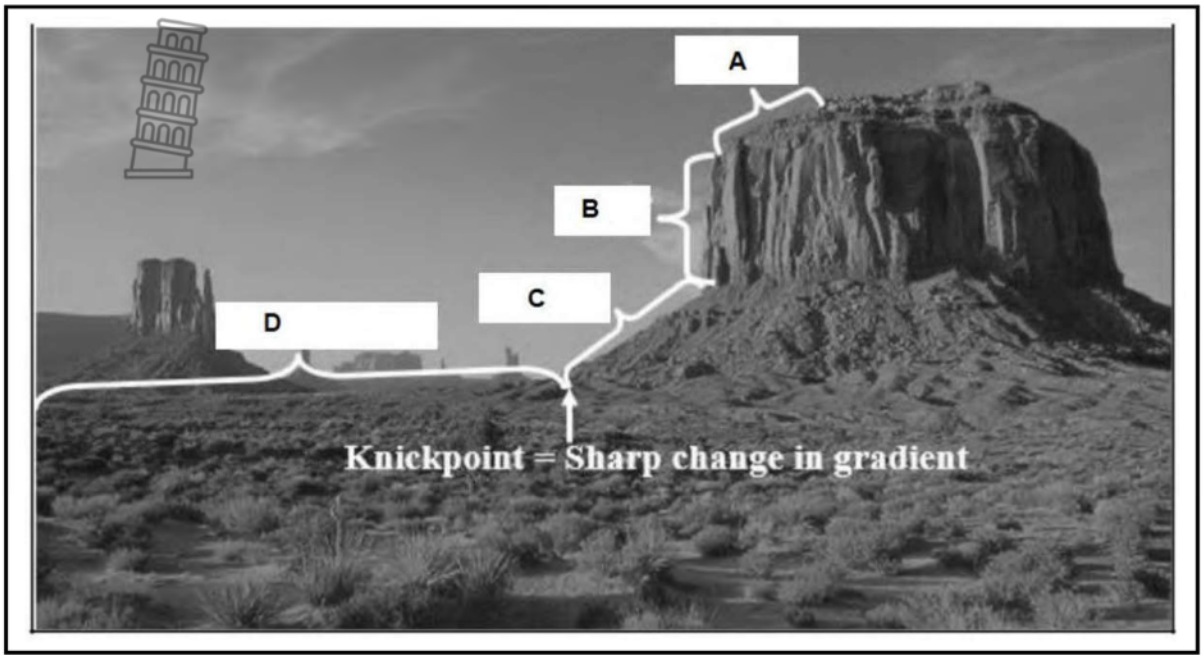
2.4.4 Explain how this landform can be of an economic advantage for the local community. (2 x 2) (4)

2.4.5 Describe the formation of Tors. (3 x 2) (6)

[15]

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2.5 FIGURE 2.5. is an illustration of slope elements.



[Source: http://www.holycrosshigh.co.za/Alida/GRADE%2011_WEEK%2011.pdf]

2.5.1 Name the slope elements **A, B** and **D**. (3 x 1) (3)

2.5.2 Define the concept 'knickpoint'. (1 x 2) (2)

2.5.3 Why will farming activity be practiced on slope element **D** than on the slope element **C**? (1 x 2) (2)

2.5.4 In a paragraph of approximately EIGHT lines, discuss ONE characteristic of each slope element labelled **A** to **D**. (4 x 2) (8)

[15]

[60]

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SECTION B: GEOGRAPHICAL SKILLS AND TECHNIQUES (MAPWORK)

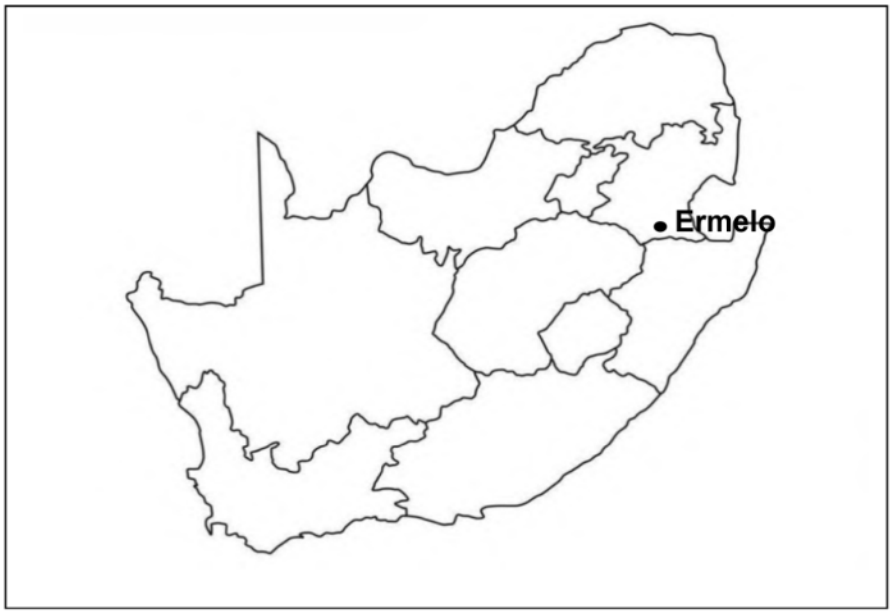
All questions refer to the extract of 1: 50 000 of the 2629 DB ERMELO topographical map and an extract of the 2629DB 5 ERMELO orthophoto map of a part of the mapped area.

QUESTION 3

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

ENGLISH	AFRIKAANS
River	Rivier
Purification plant	Watersuiweringswerke
Opencast Mine	Oopgroefmyn
Furrow	Kanaal

GENERAL INFORMATION ON ERMELO



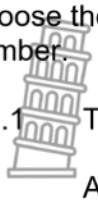
Ermelo is the educational, industrial and commercial town of the Gert Sibande District Municipality in Mpumalanga province, South Africa. It is both a mixed agriculture and mining region. It is located 210 km east of Johannesburg.
Mining is important to the district with anthracite, coal and torbanite mined.
The climate is warm and temperate. The summers have a good deal of rainfall, while the winters have very little. The average annual temperature is 14.7 °C. In a year, the rainfall is on average 883 mm.
The geology in the vicinity of Ermelo is comprised of rocks of the Karoo Supergroup, and mainly consists of sandstones, gritstones, shales and coal beds of the Ecca Subgroup, made up of the Volksrust and Vryheid Formations.

[Source: Adapted from: https://en.wikipedia.org/wiki/Ermelo,_Mpumalanga https://csegrecorder.com/articles/view/assessing-risk-to-the-ermelo-ring-road-from-historical-coal-undermining.

https://en.climate-data.org/africa/south-africa/mpumalanga/ermelo-11358/]

3.1 MAP SKILLS AND CALCULATIONS

Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number.



3.1.1 The contour interval on the Orthophoto map is … metres.

A 5
B 10
C 20
D 25 (1 x 1) (1)

3.1.2 In the map reference/index 2629 DB, is 26 referring to …

A longitude
B latitude
C easterly
D westerly (1 x 1) (1)

Refer to the topographic map and orthophoto map.

3.1.3 Determine the true bearing from trigonometrical station **305** (in block **D2**) to the benchmark (in block **D1).** (1 x 1) (1)

3.1.4 Calculate the present magnetic declination for the map. (5 x 1) (5)

3.1.5 Use your answers from QUESTION 3.1.3 and 3.1.4 to calculate the present magnetic bearing from trigonometrical station **305** (block **D2**) to the benchmark in block **D1.** Show all calculations. (2 x 1) (2)

[10]

3.2 MAP INTERPRETATION

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 number.

3.2.1 Wesselton, the area covered by the Orthophoto map is … from Ermelo.

A east
B west
C north
D south (1 x 1) (1)



3.2.2 The landform in blocks **C1** and **D1** on the orthophoto map is a …

A ridge.
B valley.
C gorge.

D mountain. (1 x 1) (1)

3.2.3 The land use at **6** on the orthophoto map is (a) …

A cemetery
B factories
C hospital
D houses (1 x 1) (1)

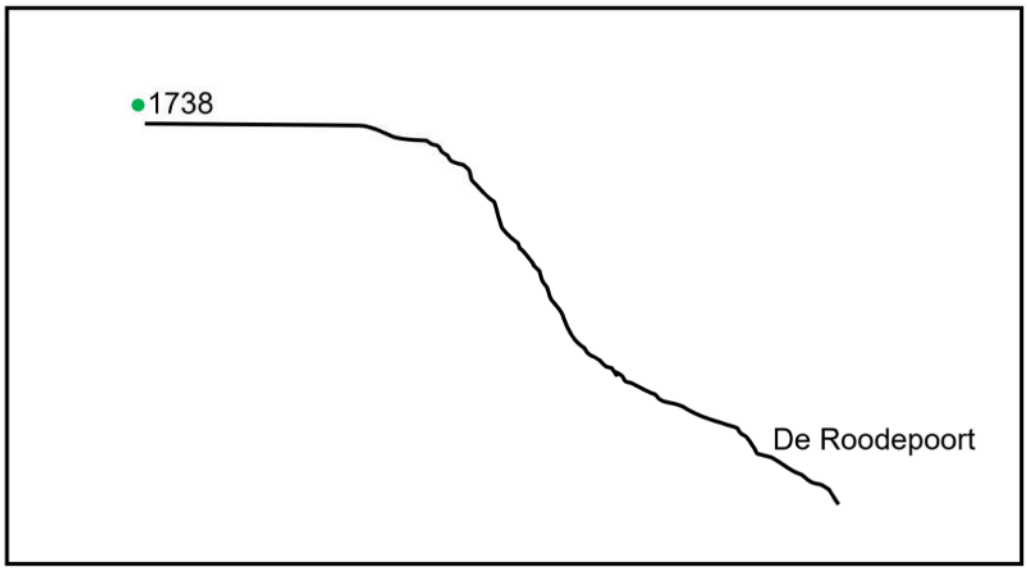
Refer to the topographic map.

3.2.4 Ermelo receives seasonal rainfall. Discuss this statement. (1 x 1) (1)

3.2.5 Give evidence from the topographic map to support the statement in QUESTION 3.2.4. (2 x 1) (2)

3.2.6 How does the farmers in the area prepared themselves for the possibility of dry seasons? (1 x 2) (2)

The following diagram is a cross section from spot height 1738 (in block **B1)** to the De Roodepoort farm (in block **C1),** on the topographic map.



3.2.7 (a) Explain how slope decline might affect the appearance of the slope . (1 x 2) (2)

(b) South-west of De Roodepoort farm is cultivated land. Explain why this is the ideal location for farming. (1 x 2) (2)

[12]

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

Refer to block **B2** on the topographic map.

3.3.1 Give examples from this block for a/an:

(a) Line symbol
(b) Point symbol
(c) Area symbol (3 x 1) (3)

3.3.2 Refer to FIGURE 3.3 showing the Ermelo golf course.



[Source: https://www.sa-venues.com/golf/ermelo-country-club.php]

(a) Name the type of data in the photo image. (1 x 1) (1)

(b) Explain how GIS assisted the developers in the choice of location of this golf course. (2 x 2) (4)

[8]
[30]

TOTAL: 150