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:	**20 JUNE 2022**

This question paper consist of 15 pages.

MAP: 2331CC PHALABORWA

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 2331CC PHALABORWA topographical map and an extract of the 2331CC 18 PHALABORWA (NORTH) 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 2331CC PHALABORWA topographical map and an extract of the 2331CC 18 PHALABORWA (NORTH) 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.

SECTION A: PHYSICAL GEOGRAPHY

QUESTION 1: THE ATMOSPHERE

QUESTION 1

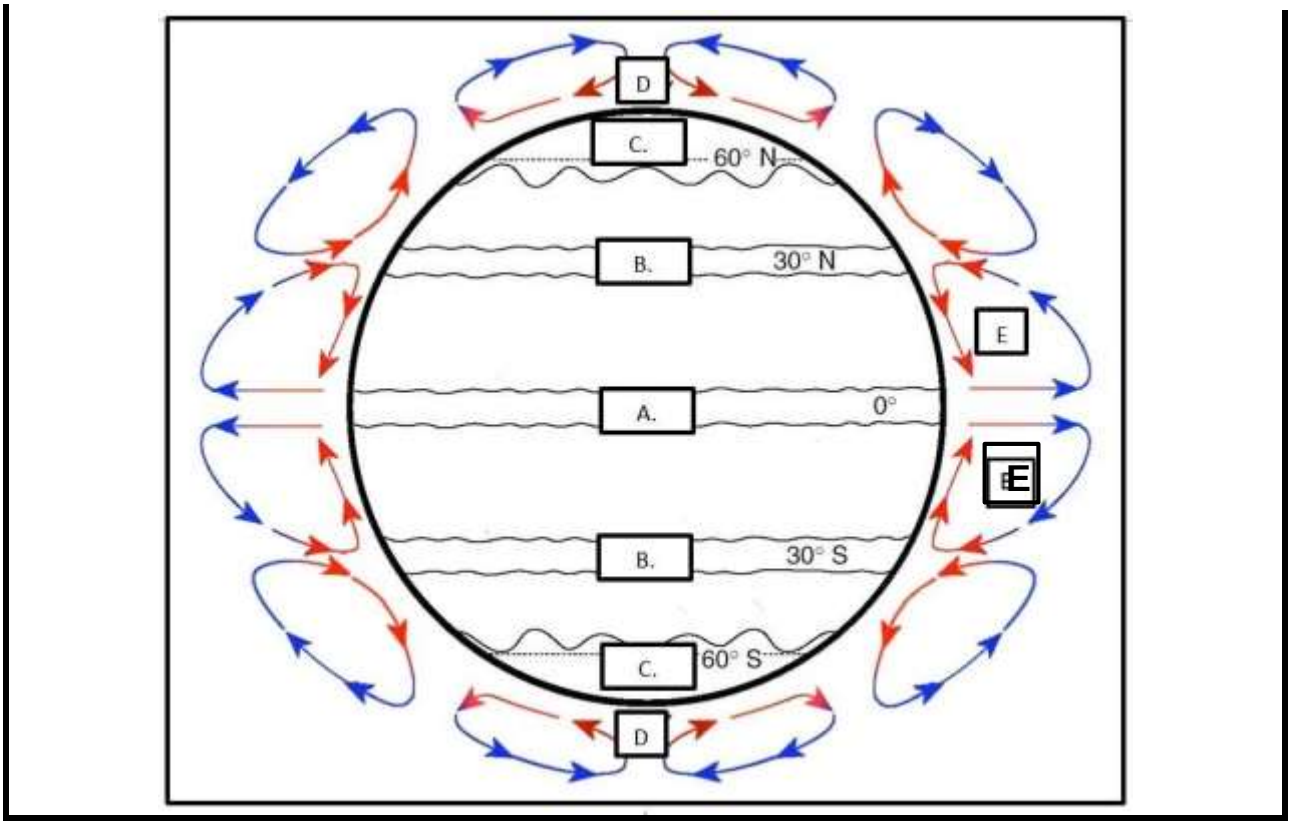
1.1 Choose a term in COLUMN B that matches the description in COLUMN A. Write only the letter (A–I) next to the question numbers (1.1.1–1.1.8) in the ANSWER BOOK, for example 1.1.9 J.

COLUMN A	COLUMN B
1.1.1 The angle of the earth's axis as the earth revolves	A revolution
1.1.2 Movement of the earth around the sun	B orbit
1.1.3 Incoming solar radiation	C equinox
1.1.4 The path that the earth travels around the sun	D insolation
1.1.5 Radiation from the earth	E terrestrial radiation
1.1.6 When one hemisphere is tilted towards the sun on 21 December	F latitude
1.1.7 When neither hemisphere is tilted towards or away from the sun	G parallelism
1.1.8 Line between the light and dark halves of the earth	H circle of illumination
	I solstice

(8 x 1)(8)

1.2 The following figure illustrates GLOBAL AIR CIRCULATION. Answer the following questions by providing the correct term/concept for the descriptive phrase below, for example 1.2.8 Polar.

FIGURE 1.2 GLOBAL AIR CIRCULATION



1.2.1 The area at **A** where maximum heating occurs.

1.2.2 The type of air pressure (high pressure or low pressure) that will be associated with descending air at **B**.

1.2.3 The pressure belt that can be found on the surface at **B**.

1.2.4 A weather system that forms at **C,** where the westerly winds and polar easterlies meet.

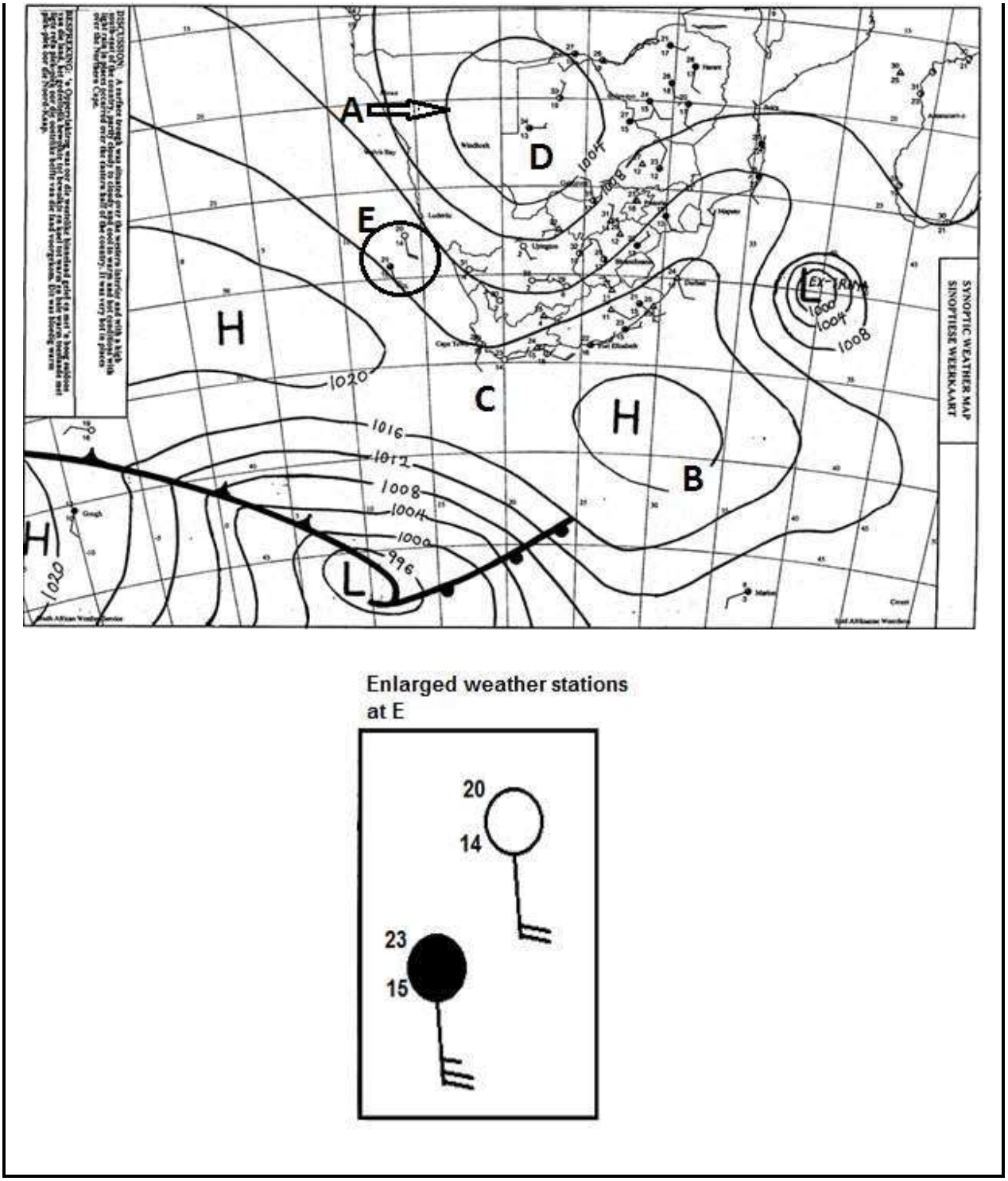
1.2.5 The type of air movement that usually occurs in the upper atmosphere at **A**.

1.2.6 The name of the cell at **E**.

1.2.7 Name the cell at **D**. (7 x 1) (7)

1.3 Refer to the synoptic weather map in FIGURE 1.3.

FIGURE 1.3 SYNOPTIC WEATHER MAP



[Source: www.google images.co.za/url]

1.3.1 Name the lines that join places of equal pressure on synoptic weather maps. (1 x 1) (1)

1.3.2 What is the atmospheric pressure of the line marked **B**? (1 x 1) (1)

1.3.3 Name the atmospheric feature at **C** and the atmospheric pressure system at **D**. (2 x 1) (2)

1.3.4 Give TWO reasons why the synoptic weather map is representative of summer in South Africa. (2 x 1) (2)

Refer to weather station **E**:

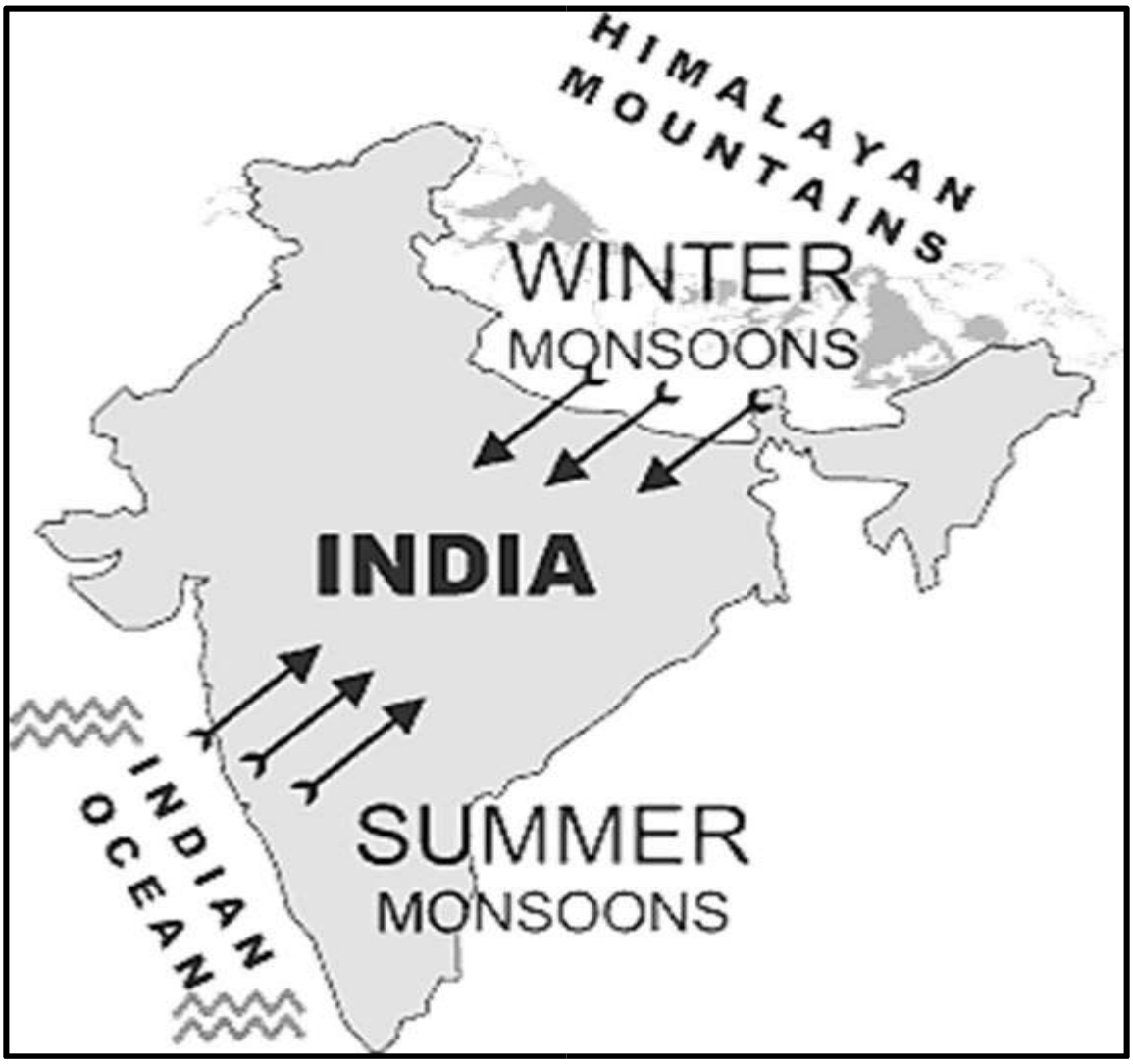
(a) What is the wind direction of weather stations **E**? (1 x 1) (1)

(b) In a paragraph of approximately EIGHT lines, explain how Coriolis and pressure gradient forces influenced the wind direction at these weather stations at **E**.

(4 x 2) (8)
[15]

1.4 Study FIGURE 1.4 which shows a monsoon wind in India and answer the following questions

FIGURE 1.4: MONSOON WIND



[Source: mr dowling.com]

1.4.1 Why is a monsoon wind an example of a regional wind? (1 x 1) (1)

1.4.2 Why are monsoon winds referred to as seasonal winds? (1 x 2) (2)

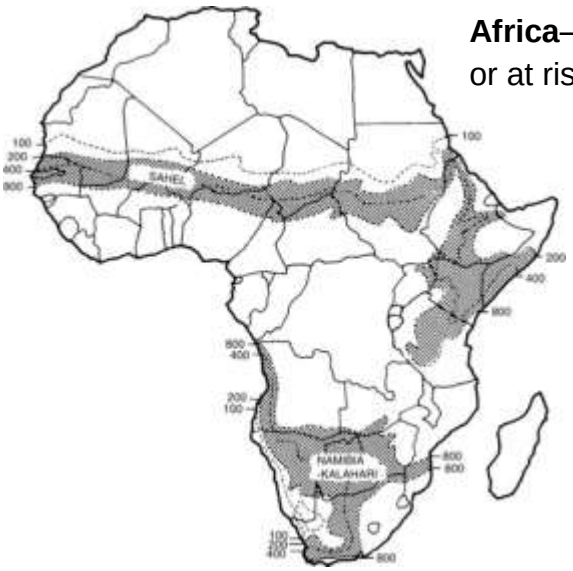
1.4.3 Discuss the role that the Himalayan mountains play in the winter monsoon. (2 x 2) (4)

1.4.4 How does the summer monsoon develop? (2 x 2) (4)

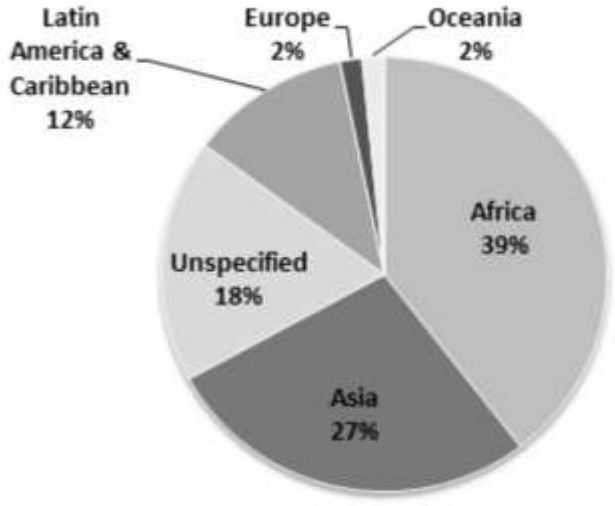
1.4.5 Explain the negative impact that the summer monsoon has on the people of India. (2 x 2) (4)

[15]

1.5 Refer to the infographic on desertification and answer the following questions.



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*. (1x2) (2)

1.5.2 Identify the continent with the highest rate of desertification. (1x1) (1)

1.5.3 Which region is the most vulnerable to desertification, on the continent identified in QUESTION 1.5.2? (1x2) (2)

1.5.4 Quote TWO causes of desertification from the text. (2x1) (2)

1.5.5 Discuss the economic implications of desertification on the areas mentioned in QUESTION 1.5.3. (2x2) (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. (2x2) (4)
[15]
[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)

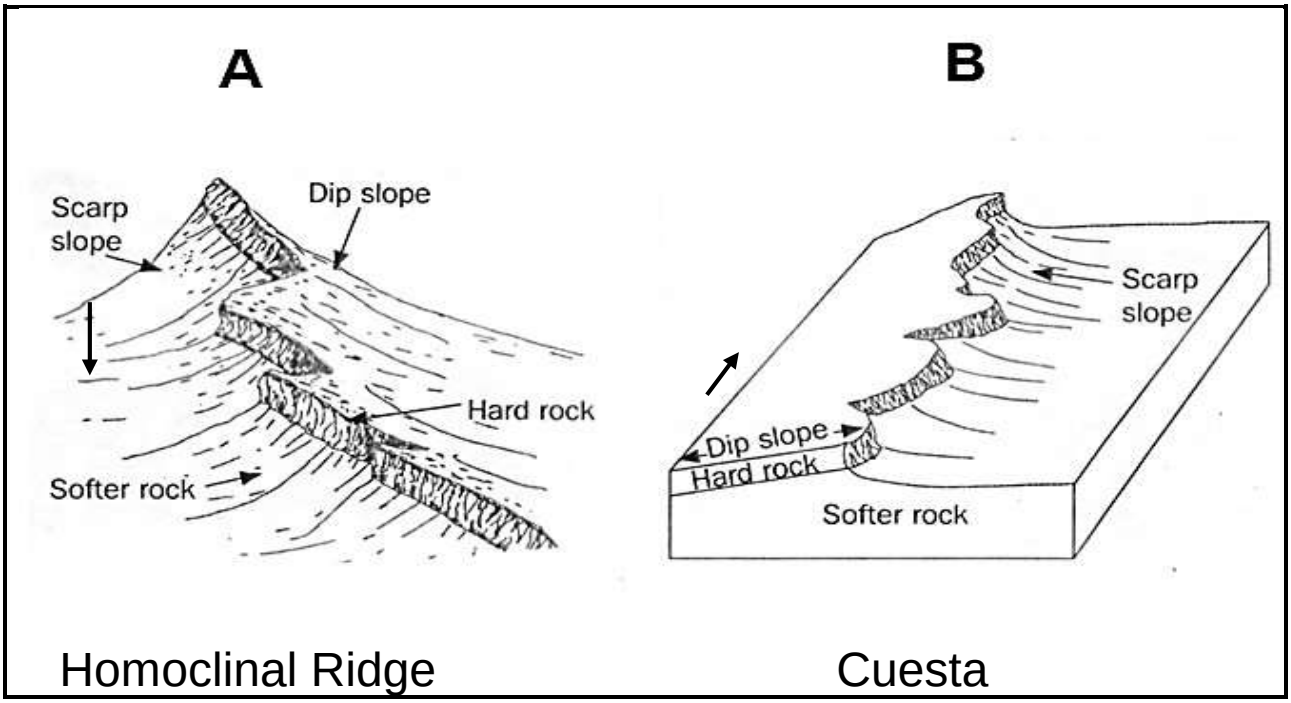
2.2 Choose a term from COLUMN B that matches the geomorphologic description in COLUMN A. Write ONLY the letter (A–I) next to the question number (2.2.1–2.2.8) in the ANSWER BOOK, for example 2.2.9 J.

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 Refer to FIGURE 2.3 showing landforms that formed because of inclined/tilted strata.

FIGURE 2.3: INCLINED/TILTED STRATA



[Source: google/images]

2.3.1 Differentiate between the dip slope of a homoclinic ridge and a cuesta. (2 x 1) (2)

2.3.2 Did the landforms in the sketches of FIGURE 2.3, develop because of igneous or sedimentary rocks? (1 x 2) (2)

2.3.3 Name the tectonic process that may have caused these landforms to be tilted. (1 x 1) (1)

2.3.4 Refer to the dip slope and scarp slope in landforms **A** and **B**.

(a) Describe the difference between the *dip slope* and *scarp slope*. (2 x 1) (2)

(b) Comment on the fact that erosion is faster at the scarp slope than at the dip slope. (2 x 2) (4)

2.3.5 Why is it difficult to farm in tilted/inclined landscapes? (2 x 2) (4)
[15]

2.4 FIGURE 2.4 shows TWO features of the Karoo landscape that is associated with horizontally layered rock.

FIGURE 2.4: KAROO LANDSCAPE

[Source: jpeg;base64]

2.4.1 Match the types of Karoo landscape (butte and mesa) with the statements below:

(a) Flat crest has a greater width than height (1 x 1) (1)

(b) Flat crest has a greater height than width (1 x 1) (1)

2.4.2 Why do both these landforms have steep concave slopes? (1 x 1) (1)

2.4.3 Describe the cap rock on these landscapes. (1 x 2) (2)

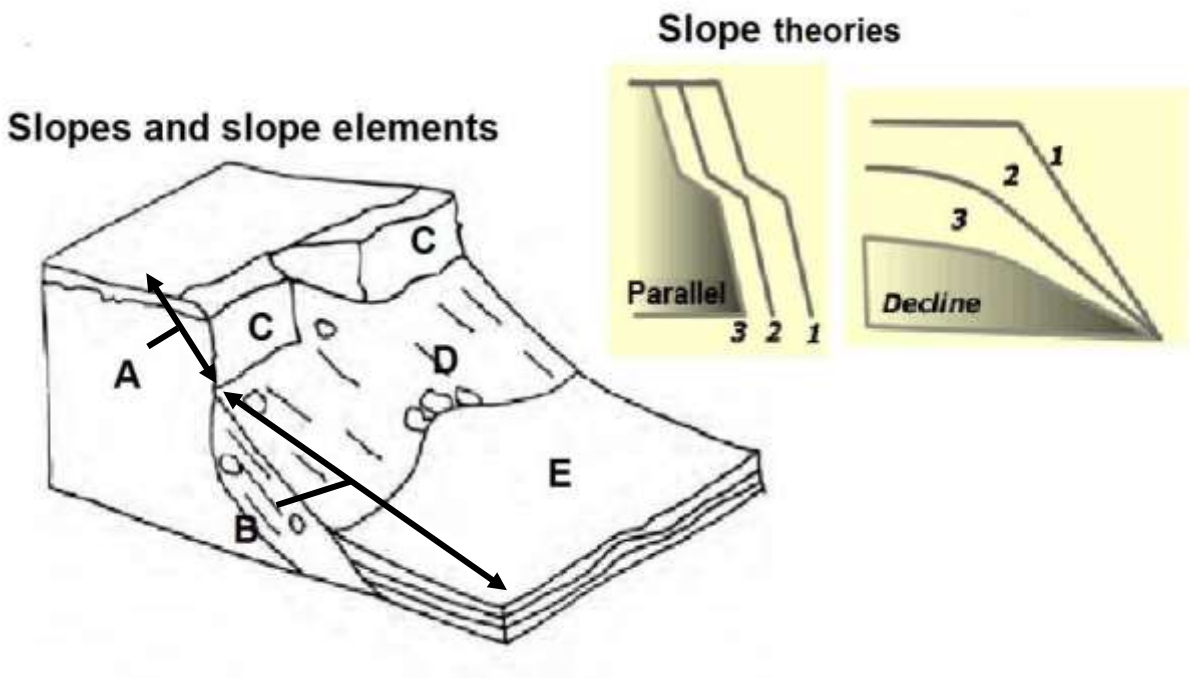
2.4.4 Explain the significance of cap rock on these landscapes. (1 x 2) (2)

2.4.5 In a paragraph of approximately EIGHT lines, explain how topography associated with horizontally layered rocks can be of benefit and an obstacle to human activity. (4 x 2) (8)

[15]

2.5 Study FIGURE 2.5, which represents slopes in a semi-arid region and answer the following questions.

FIGURE 2.5 SLOPES AND SLOPE RETREAT



[Source: www.google/images]

2.5.1 Classify slopes **A** and **B** according to their shape. (2 x 1) (2)

2.5.2 Explain why vegetation growth is nearly impossible at slope element **C**. (1 x 1) (1)

2.5.3 Refer to the slope retreat processes.

(a) What is *slope retreat*? (1 x 1) (1)

(b) Which ONE of the slope theories will occur in the area illustrated by the sketch? (1 x 1) (1)

(c) Explain your choice in QUESTION 2.5.3 (b). (1 x 2) (2)

2.5.4 In a paragraph of approximately EIGHT lines, distinguish between the main characteristics of slope elements **C** and **D** respectively. (4 x 2) (8)
[15]

SECTION B: GEOGRAPHICAL SKILLS AND TECHNIQUES (MAPWORK)

All questions refer to the extract of 1: 50 000 of the 2331 CC PHALABORWA topographic map and the 2331 CC 18 PHALABORWA NORTH. Orthophoto map of a part of the mapped area.

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

ENGLISH	AFRIKAANS
River	Rivier
Island	Eiland
Rapids	Stroomversnellings
Furrow	Voor
Landing Strip	Landingstrook
Digging	Uitgrawing
Mainstream	Hoofstroom
Canal	Kanaal

GENERAL INFORMATION ON PHALABORWA

N

Coordinates: 23°52' S; 31°04' E

Phalaborwa is a town in Limpopo, South Africa. It is located near the confluence of the Ga-Selati River and the Olifants River, along the Western border of the Kruger National Park in the Lowveld. Tourism and wildlife play dominant roles in the life of this town. Attractions, such as the Blyde River Canyon, the Three Rondavels, God's Window, Bourke's Luck Potholes and river cruises on the Olifants River, make Phalaborwa an important tourist destination in this province. This area, also known as the Valley of the Olifants, has the highest winter temperatures in South Africa. The rainfall is low and the average winter temperatures range from 9 °C to 26 °C. During summer the average temperatures vary from 20 °C to 33 °C with occasional heavy rainfall. The highest recorded temperature was 50 °C in December 2018

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

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 2331CC, the 23 refers 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 **12** (in block **D2**) to **J** point height **421** (in block C4**).** (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 **12** (block **D2**) to **J** point height **421** in block **C4.** 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 Phalaborwa, the area covered by the Orthophoto map is … from Khululekani (block A1).

A east
B southwest
C north
D southeast (1 x 1) (1)

3.2.2 The landform in 7 in block B1 on the orthophoto map is a …

A ridge.
B valley.
C gorge.
D mountain. (1 x 1) (1)

3.2.3 The feature **6** on the orthophoto map is a …

A cemetery
B recreational area
C hospital
D houses (1 x 1) (1)

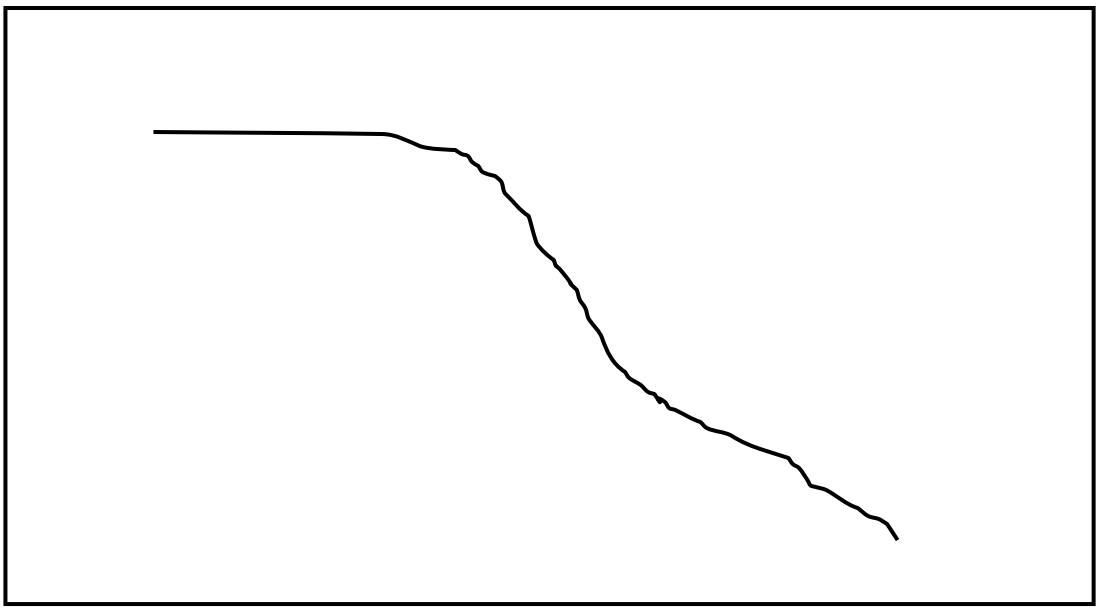
Refer to the topographic map.

3.2.4 Phalaborwa 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 Explain why the area in block B1 and C1 is suitable for crop farming. (1 x 2) (2)

The following diagram is a cross section.



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

(b) Explain why this sewerage works in Block D2 is well situated. (1 x 2) (2)

[12]

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

Refer to block **E2** 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 Phalaborwa golf course.

[Source: https://www.sa-venues.com/golf/hans-merensky-golf-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