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Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2022

GEOGRAPHY P1

MARKS: 150

TIME: 3 hours

This question paper consists of 15 pages.

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INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO SECTIONS.

   SECTION A:
   QUESTION 1: The Atmosphere (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 questions 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, for example 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 (3025AD PHILIPPOLIS) 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.

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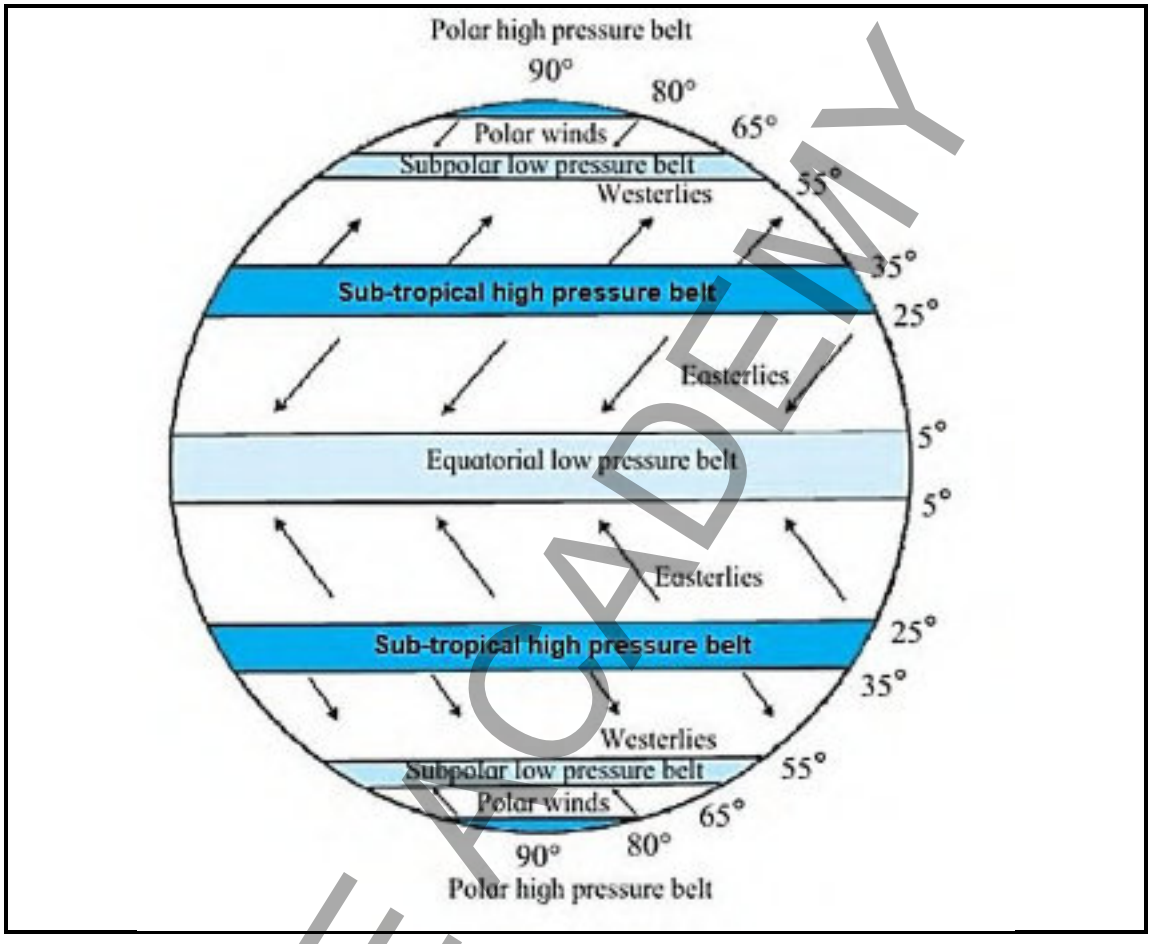
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SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY

QUESTION 1: THE ATMOSPHERE

1.1 The FIGURE shows global air circulation. Match the descriptions below with a term/concept from the diagram. You may use a term/concept more than once. Write only the term/concept next to question numbers (1.1.1 to 1.1.7) in the ANSWER BOOK, for example 1.1.8 polar belt.



[Source: studyhash.com]

1.1.1 The Ferrel Cell is associated with these winds

1.1.2 ITCZ is associated with this belt of pressure

1.1.3 Very cold winds

1.1.4 The Hadley Cell is associated with these winds

1.1.5 Very low temperatures in this pressure belt results in snow

1.1.6 This pressure belt is located between 25°–35°

1.1.7 Winds converge at this pressure belt resulting in thunderstorms

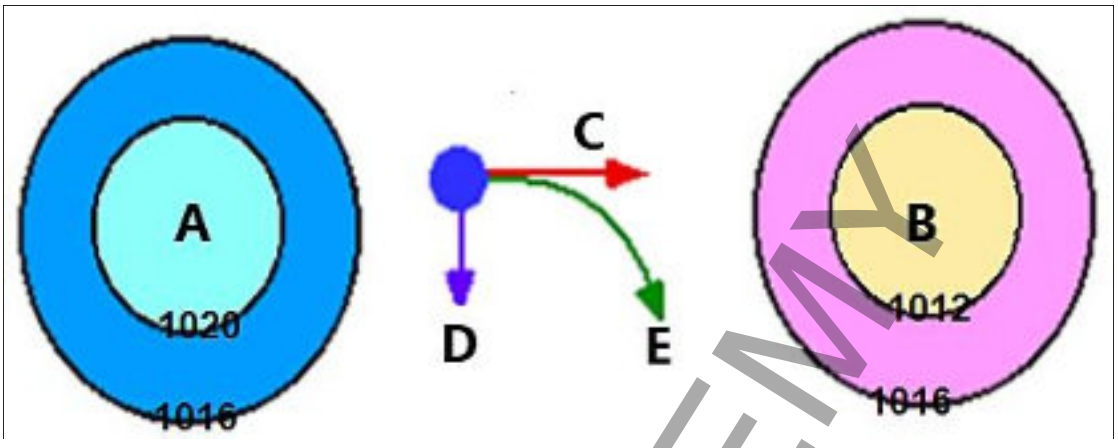
(7 x 1) (7)

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1.2 Refer to the FIGURE that shows the relationship between pressure gradient and Coriolis force. Choose the correct word(s)/letter(s) from those given in brackets which will make each statement geographically CORRECT. Write only the word(s)/letter(s) next to the question numbers (1.2.1 to 1.2.8) in the ANSWER BOOK.



[Source: wwzoloatmos.vicc.ede]

1.2.1 Winds blow flow from (**A** to **B**/**B** to **A**).

1.2.2 (Coriolis/Pressure gradient) force determines the speed at which air moves.

1.2.3 A (coriolis/pressure gradient) force causes winds to deflect or change direction.

1.2.4 In the northern hemisphere winds deflect to the (left/right).

1.2.5 Subsidence is associated with a (high/low) pressure.

1.2.6 A (geostrophic/berg) wind blows when the pressure gradient and the Coriolis force is equal in strength.

1.2.7 Convergence is associated with a (low/high) pressure.

1.2.8 The pressure gradient is (steep/gentle) when isobars are far apart.

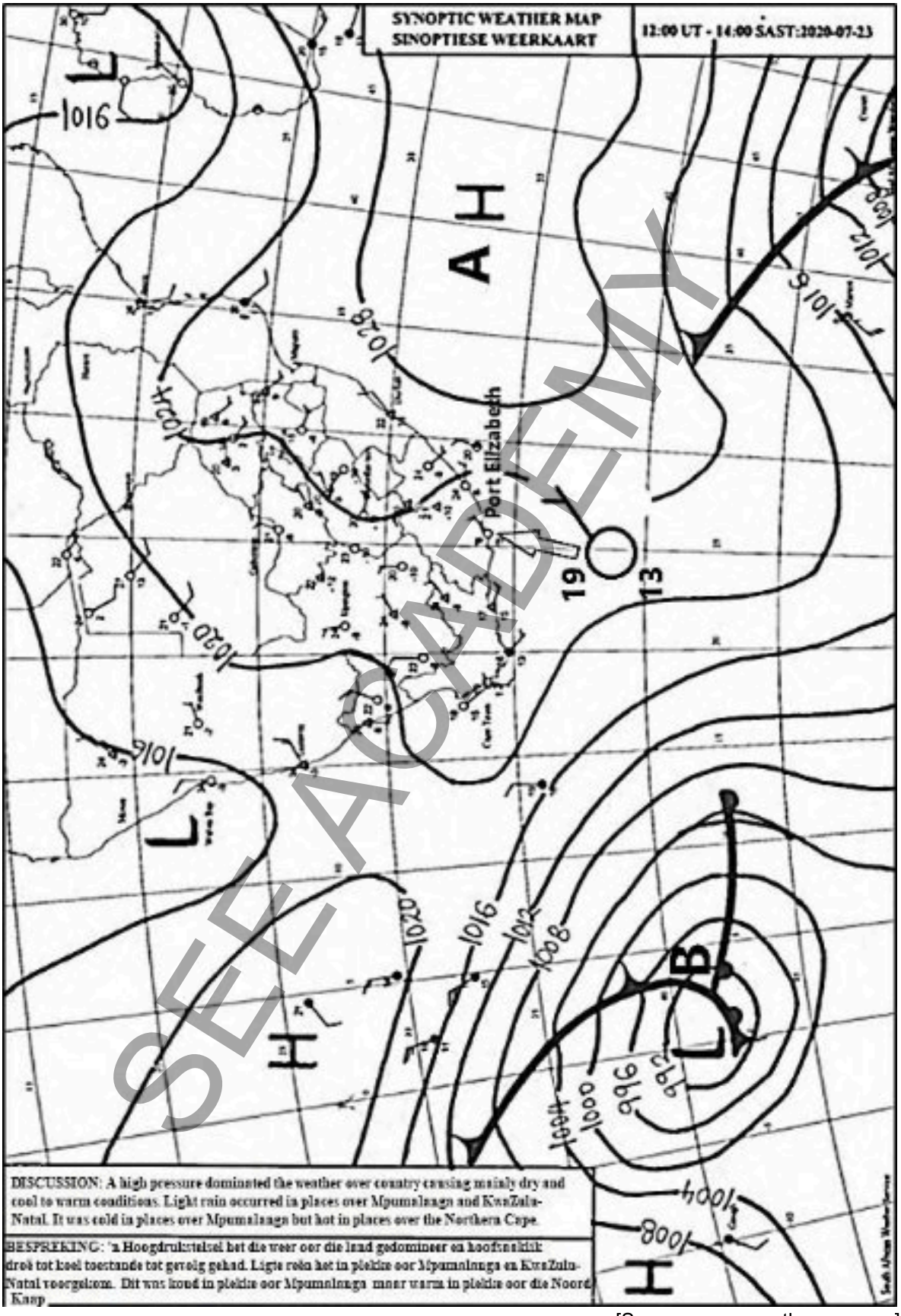
(8 x 1) (8)

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1.3 Refer to the FIGURE showing a synoptic weather map of Southern Africa.



[Source: www.weathersa.co.za]

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1.3.1 Give evidence that the synoptic weather map represents winter conditions. (1 x 1) (1)

1.3.2 Determine the isobaric interval on the synoptic weather map. (1 x 1) (1)

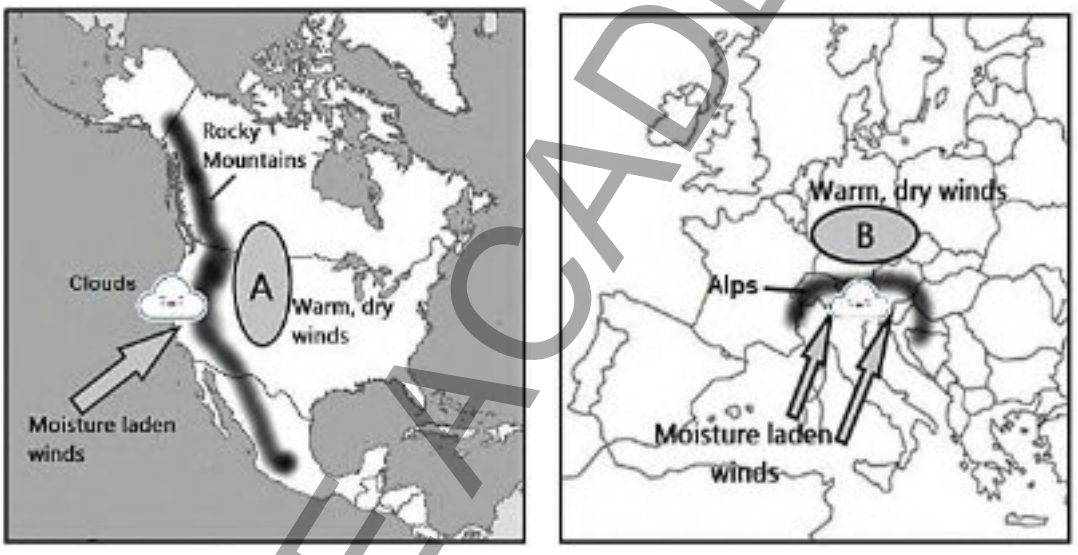
1.3.3 Give the weather conditions of the weather station at Port Elizabeth. (4 x 1) (4)

1.3.4 Name the high-pressure cell at **A**. (1 x 1) (1)

1.3.5 How will the position of **A** decrease the rainfall over the eastern part of the country? (2 x 2) (4)

1.3.6 Explain how the warm and cold ocean currents on the eastern and western side of South Africa would control the temperature of South Africa in winter. (2 x 2) (4)

1.4 Study the FIGURE based on a diagram showing warm, dry winds that blow over the North American and European continents.



[Source: Examiner]

1.4.1 Provide the local names of the warm, dry winds indicated by **A** and **B** on the different continents. (2 x 1) (2)

1.4.2 Is the wet adiabatic lapse rate found on the windward or leeward side? (1 x 1) (1)

1.4.3 Why is the wind dry at **A** and **B** on the maps? (2 x 2) (4)

1.4.4 In a paragraph of approximately EIGHT lines, explain the influence that these warm, dry winds have on economic activities in the areas indicated on the different maps. (4 x 2) (8)

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1.5 Below is an extract on the effects of desertification in the Sahel Region.

THE EFFECTS OF DESERTIFICATION IN AFRICA

Desertification is a process that destroys fertile land. This can be caused by drought, overpopulation, over-farming, deforestation and climate change. 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 Sahara 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.

Agriculture in Africa tends to result in low productivity, as most of the land is characterised as a semi-desert. Clearing the land of trees also reduces the structure of the soil. Coupled with wind erosion, the topsoil blows away and leaves a desert-like land.

The country that is arguably the most damaged by desertification is Senegal. Migrations in Senegal are common, as wind erosion, deforestation and climate change wreaks havoc on farms and livestock. Those most affected by desertification in Senegal move to Gabon, a country in West Africa, or even to Europe or South America. More than half of Senegalese work in agriculture, and desertification forces those with meagre profits to move elsewhere to escape poverty.

[Source: borgenprojects.org/desertification-in-africa]

1.5.1 According to the extract, state ONE human cause of desertification. (1 x 1) (1)

1.5.2 Name the region most vulnerable to desertification in Africa. (1 x 1) (1)

1.5.3 Why is fertile soil so important to the people of Africa? (1 x 1) (1)

1.5.4 What social impact would a lack of fertile soil have on the people of Africa? (2 x 2) (4)

1.5.5 How does desertification in Senegal have a negative economic impact on other countries in Africa? (2 x 2) (4)

1.5.6 Suggest TWO management strategies that could be implemented to combat (reduce) the spread of desertification. (2 x 2) (4)

[60]

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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 2.1.7) in the ANSWER BOOK, for example 2.1.8 A.

2.1.1 Table Mountain is an example of a …

A canyon.
B hogsback.
C butte.
D mesa.

2.1.2 … are the largest of all intrusive forms.

A Lopoliths
B Batholiths
C Laccoliths
D Domes

2.1.3 A … is a horizontal intrusion of igneous rock that forms a sheet.

A sill
B pipe
C volcano
D dyke

2.1.4 An asymmetrical ridge with a steep dip slope of more than 45° is a …

A canyon.
B hogsback.
C butte.
D mesa.

2.1.5 A … is a vertical intrusion of igneous rock.

A dyke
B pipe
C volcano
D sill

2.1.6 The extensive flat surface of a Karoo landscape is called a …

A knickpoint.
B pediment.
C pediplain.
D peneplain.

2.1.7 … form when rivers incise into joints in rocks.

A Canyons
B Domes
C Mountains
D Hills

(7 x 1) (7)

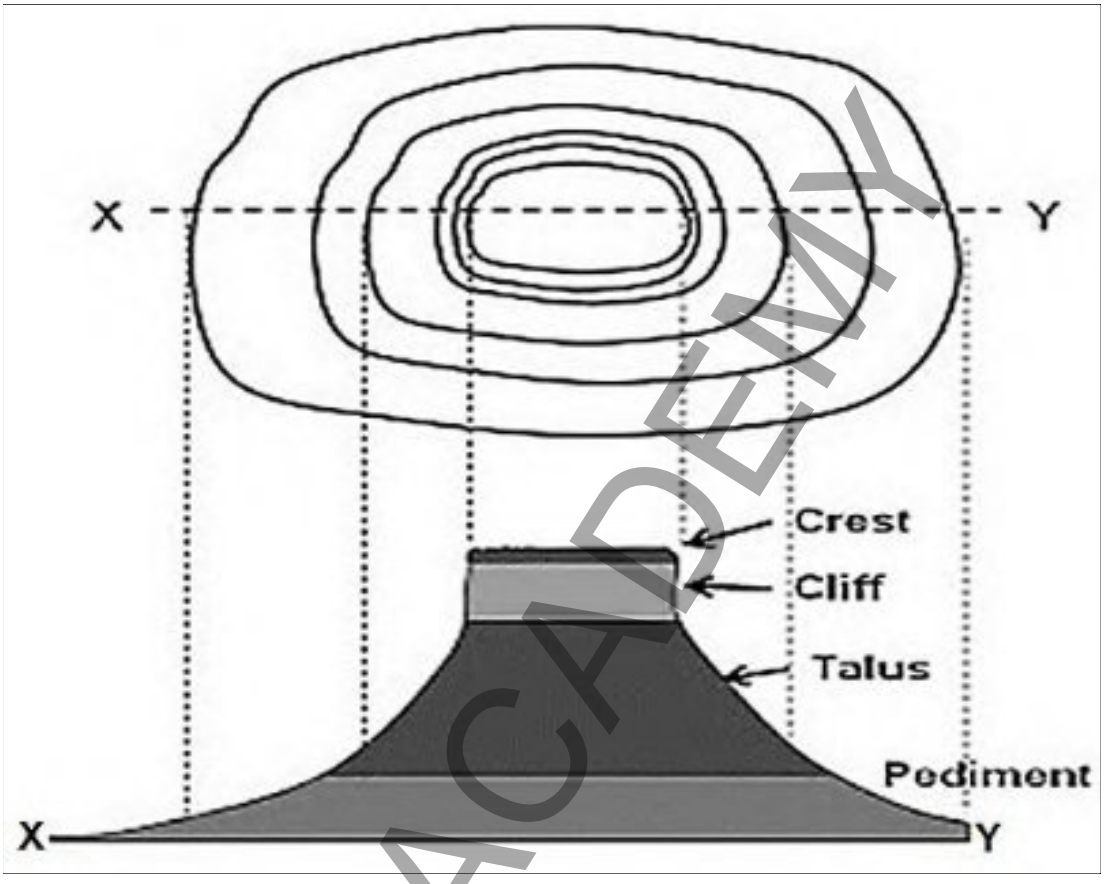
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2.2 Refer to FIGURE 2.2 that shows slope elements. Write only the slope element that matches the description next to the question numbers (2.2.1 to 2.2.8) in the ANSWER BOOK, for example, 2.2.9 cliff. You can choose a slope element more than once.

FIGURE 2.2: SLOPE ELEMENTS



[Source: easymapwork.blogspot.com]

2.2.1 Ideal for farming because of a gentle slope

2.2.2 Steep vertical slope formed by resistant rock

2.2.3 Constant slope where deposition occurs

2.2.4 Convex in shape and found at the top of a hill/mountain

2.2.5 Flat slope with an angle of 1° to 7°

2.2.6 The angle of this slope element is usually greater than 80°

2.2.7 A sharp break in angle in this slope element causes the knickpoint to form

2.2.8 Weathering occurs on this slope under the force of gravity (8 x 1) (8)

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2.3 Refer to the photograph showing the Drakensberg Mountain as an example of a basaltic plateau.



[Source: www.bing.com]

2.3.1 Name the type of topography associated with a basaltic plateau. (1 x 1) (1)

2.3.2 What evidence on the photograph indicates that the basaltic plateau rocks are uniform in resistance to erosion? (1 x 2) (2)

2.3.3 Why are the slopes of the basaltic plateau rugged (uneven)? (1 x 2) (2)

2.3.4 How do basaltic plateaus form? (2 x 2) (4)

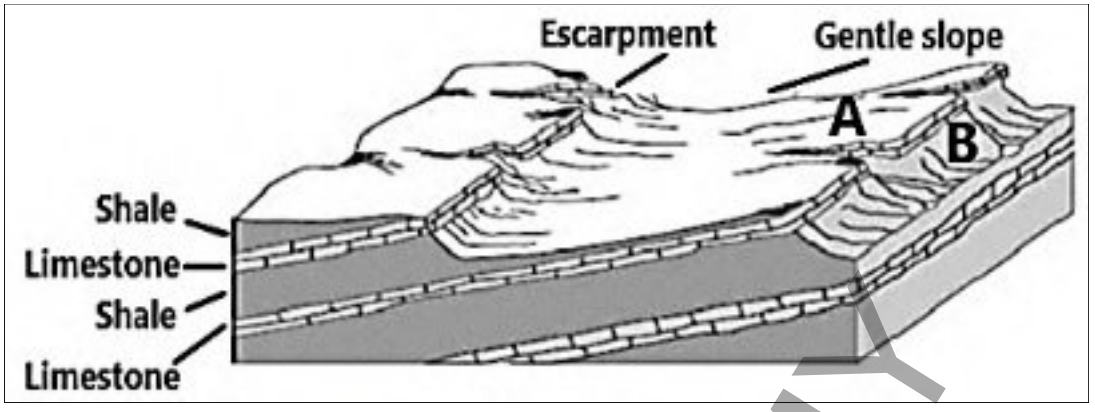
2.3.5 What physical (natural) impact does the Drakensberg basaltic plateau have on human activity? (3 x 2) (6)

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2.4 Refer to the FIGURE showing a cuesta.



[Source: www.bing.com]

2.4.1 Name a type of sedimentary rock depicted in the sketch. (1 x 1) (1)

2.4.2 What evidence in the sketch indicates that this is a cuesta? (2 x 1) (2)

2.4.3 Identify the slopes at **A** and **B**. (2 x 1) (2)

2.4.4 Why will the slope at **B** be steeper than the slope at **A**? (1 x 2) (2)

2.4.5 How will a cuesta dome form? (2 x 2) (4)

2.4.6 Explain how cuestas are of benefit for human activities. (2 x 2) (4)

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2.5 Study the FIGURE which illustrates tors.



[Source: researchgate.net]

2.5.1 Name ONE igneous intrusion that tors can originate from. (1 x 1) (1)

2.5.2 What are the rocks at **A** known as during the process of tor formation? (1 x 1) (1)

2.5.3 Name the type of igneous rock that **A** consists of. (1 x 1) (1)

2.5.4 How did weathering in the vertical and horizontal joints of igneous rocks determine the shape of the rocks at **A**? (2 x 2) (4)

2.5.5 In a paragraph of approximately EIGHT lines, explain how tors develop. (4 x 2) (8)

[60]

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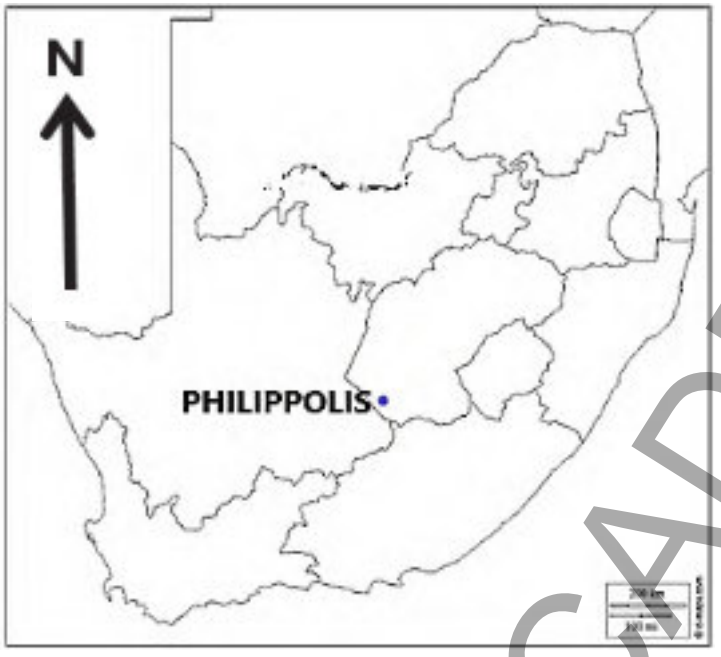
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SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

The questions below are based on the 1 : 50 000 topographical map 3025AD PHILIPPOLIS, as well as the orthophoto map of a part of the mapped area.

GENERAL INFORMATION ON PHILIPPOLIS



Philippolis is a small town situated in the Motheo and Xhariep region of the Free State Province in South Africa. In 1823 it served as a missionary outpost for the Bushman. This makes Philippolis the oldest settlement in the Free State Province.

Seventy-five of Philippolis's buildings have been declared as national monuments.

Philippolis's climate is characterised by warm to hot summers and cool to cold winters. This semi-desert area also brings fluctuations of temperature from day to night with an average amount of annual precipitation of 353,0 mm.

Coordinates: 30° 15' S 25° 16' E

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

ENGLISH	
Diggings	Delwery/Uitgrawings
Furrow	Voor
Sewerage works	Rioolwerke

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 Bearing:

(a) The true bearing of trigonometrical station 275, **M** in block **D4**, from spot height 1 404, **N** in block **C4**, on the topographical map is … (1 x 1) (1)

(b) Determine the magnetic bearing of QUESTION 3.1.1 (a) for 2017. Show ALL calculations. Marks will be awarded for calculations. (2 x 1) (2)

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3.1.2 Refer to the main road (717) between **O** and **P** on the topographical map.

(a) Calculate the gradient along the main road (717) between bench-marks 1 357,5 and 1 326,7. Show ALL calculations. Marks will be awarded for calculations.

Formula: $\textbf{Gradient} = \frac{\textbf{Vertical Interval (VI)}}{\textbf{Horizontal Equivalent (HE)}}$

(5 x 1) (5)

(b) Explain with the help of the topographical map and your answer to QUESTION 3.1.2 (a), why it would be easy to construct the transport routes in the area. (2 x 1) (2)

3.2 MAP INTERPRETATION

3.2.1 The feature at **3** on the orthophoto map is/a …

A library.
B diggings.
C cemetery.
D sewerage works. (1 x 1) (1)

3.2.2 The feature along the line labelled **R** on the topographical map is a …

A spur.
B saddle.
C ridge.
D valley. (1 x 1) (1)

3.2.3 Study the landforms marked **1** and **2** on the orthophoto map.

(a) Name the landforms **1** and **2** respectively. (2 x 1) (2)

(b) Which landform, **1** or **2**, on the orthophoto map has been exposed to erosion the longest? Give a reason for your answer evident on the orthophoto map. (1 + 2) (3)

3.2.4 Extensive erosion occurs in blocks **D2** and **E3** on the topographical map. State TWO strategies that were put in place upstream by the farmer in block **C5** to reduce the impact of the erosion. (2 x 1) (2)

3.2.5 Was this aerial photograph used to produce the orthophoto map taken between 09:00 and 10:00 or 14:00 and 15:00? Give a reason for your answer. (1 + 2) (3)

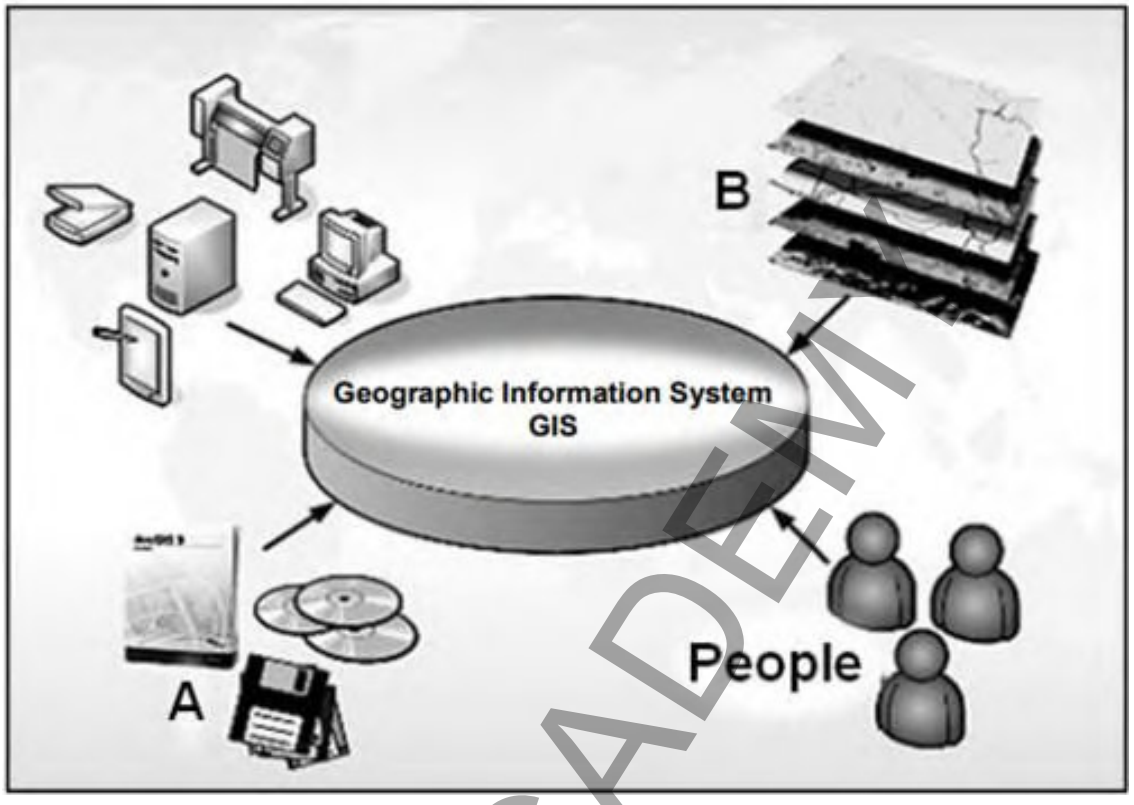
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3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

FIGURE 3.3.1: COMPONENTS OF GIS



[Adapted from Google Images]

3.3.1. FIGURE 3.3.1 shows the different components of a GIS.

(a) Identify components **A** and **B.** (2 x 1) (2)

(b) What role do people play in GIS? (1 x 1) (1)

3.3.2 In order to do a paper GIS, it is important to familiarise oneself with the different layers of information. Refer to FIGURE 3.3.1 and the topographical map to answer the questions that follow.

(a) Are the thematic layers at **B** *raster data* or *vector data* in FIGURE 3.3.1? (1 x 1) (1)

(b) Name TWO thematic layers you would find in block **B1.** (2 x 1) (2)

3.3.3 The orthophoto map has a high resolution. Give ONE reason for this statement. (1 x 2) (2)

[30]

TOTAL: 150

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