NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2021

# GEOGRAPHY: PAPER I

Time: 3 hours 200 marks

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**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This question paper consists of 23 pages. Please check that your question paper is complete.

2. Read the questions carefully.

3. **ALL THREE QUESTIONS ARE COMPULSORY.**

4. Credit will be awarded for the following:
   - interpretation
   - explanation
   - evidence of personal observations where this is appropriate to the question.

5. You are encouraged to use sketch maps, diagrams and other explanatory drawings to support your answers wherever relevant.

6. Pay attention to the mark allocation.

7. Number your answers exactly as the questions are numbered.

8. It is in your own interest to write legibly and to present your work neatly.

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## QUESTION 1 INTEGRATED QUESTION: THE GEOGRAPHY OF PINETOWN / NEW GERMANY AND KWAZULU-NATAL

### 1.1 Climate Skills and Interpretation

Select the option that correctly completes the description. Write only the number of the question and the letter corresponding to your answer, for example: 1.1.0 A.

1.1.1 Frost typically forms at the bottom of a valley in the early hours of the morning when there ...

A are clear and windless conditions.
B has been a rainfall event.
C is low humidity.
D is warm air below cold air. (1)

1.1.2 Line thunderstorms form when …

A a cold front moves over the interior of South Africa.
B moist air is pushed up over the escarpment.
C moist air from the east meets dry air from the west over the interior.
D a coastal low moves along the coast of the country. (1)

1.1.3 The pollution over South Africa becomes more concentrated because of …

A the low-pressure trough.
B sinking air from the interior high pressure.
C the lack of tropical cyclones.
D the formation of bergwinds. (1)

1.1.4 The temperature to which a given parcel of air must be cooled for saturation to occur is called …

A adiabatic.
B dew point.
C range.
D relative humidity. (1)

1.1.5 An elongated area of low atmospheric pressure that is associated with a cyclone or low pressure, is known as a(n) ...

A trough.
B anticyclone.
C cyclogenesis.
D ridge. (1)

## 1.2 City Climates

Read the fact file on the temperature increase in South African cities and major metropolitan areas and answer the questions that follow.

**Fact File**

- Cities are generally hotter than the countryside.
- Concrete and tar soak up and exacerbate heat.
- Trees are replaced by tall buildings that reflect and trap heat.
- There is a bubble of hot air that sits over all our cities, making them stiflingly hot when compared to the countryside around them.
- People living in the CBD contend with temperatures that are 6 °C hotter than the countryside. All peri-urban areas have a similar problem.
- According to research, Johannesburg has the most polluted heat island, closely followed by Cape Town and Durban.
- More energy will be needed to cool buildings, which in turn will warm the cities more, while hospitals will be overwhelmed by people suffering from heat exhaustion.

[Source: <https://mg.co.za>]

1.2.1 Explain TWO ways in which tall buildings contribute to the urban heat island. (2)

1.2.2 List TWO other sources of heat in a major metropolitan area. (2)

1.2.3 Besides a rise in temperature, discuss ONE other climatic change Durban can expect. (1)

1.2.4 Discuss TWO socio-economic consequences of the urban heat island over Durban. (4)

1.2.5 Outline THREE projects that a municipality could encourage, to help reduce the effect of the urban heat island. (3)

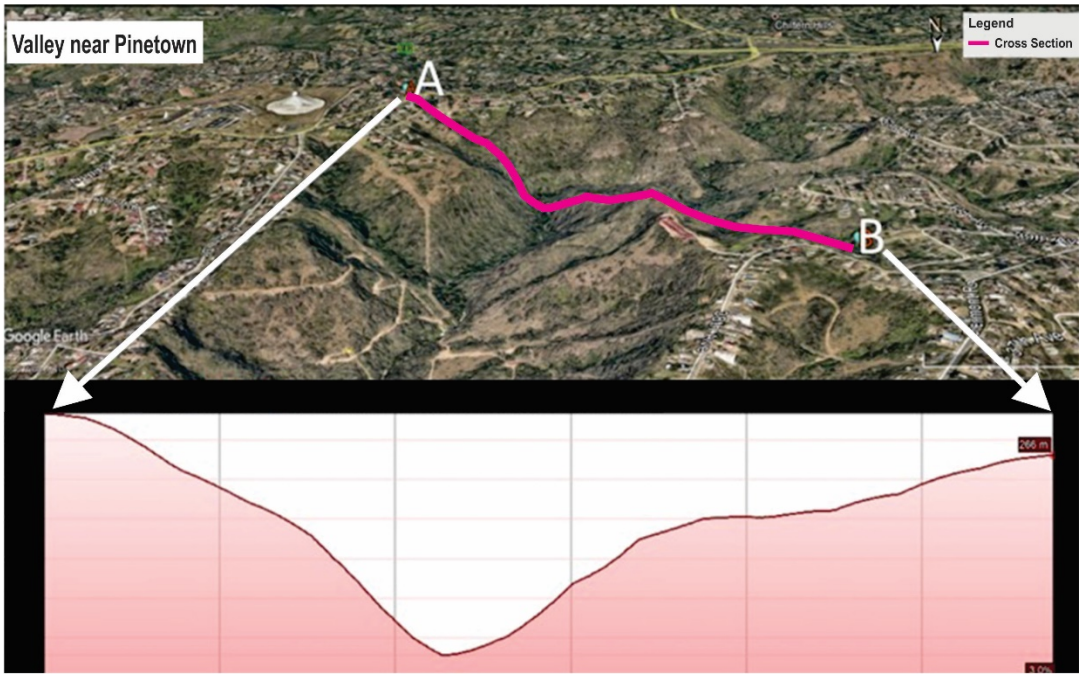
1.2.6 Explain how remote sensing can be used to monitor urban heat islands. (2)

## 1.3 Valley Climates

Study the Google Earth image and cross-section of a valley to the east of Pinetown and New Germany and answer the questions that follow.

**Figure 1 – Valley near Pinetown**




[Source: <https://www.google.com/earth/>]

1.3.1 Define a *valley inversion*. (1)

1.3.2 Explain the easiest way to determine which slope faces north. (2)

1.3.3 Redraw the cross-section of the valley and show the air circulation in the valley at night and early in the morning.

Include the following:

- local winds
- inversion layer
- shade the area where the pollution will be trapped (4)

## 1.4 Fluvial Terminology

Match the term in Column B with the description in Column A. Write only the question number and the term's corresponding letter, e.g. 1.4.0 A.

| | **Column A** | **Column B** | |
|---|---|---|---|
| 1.4.1 | The discharge in a river channel excluding runoff. | A | episodic |
| 1.4.2 | Rivers that flow only after heavy rainfall. | B | laminar |
| 1.4.3 | Point of origin of a river. | C | base flow |
| 1.4.4 | A number used to indicate the level of branching in a river system. | D | water table |
| 1.4.5 | Upper limit of ground water. | E | mouth |
| | | F | source |
| | | G | turbulent |
| | | H | stream order |

(5)

## 1.5 Catchment and River Management

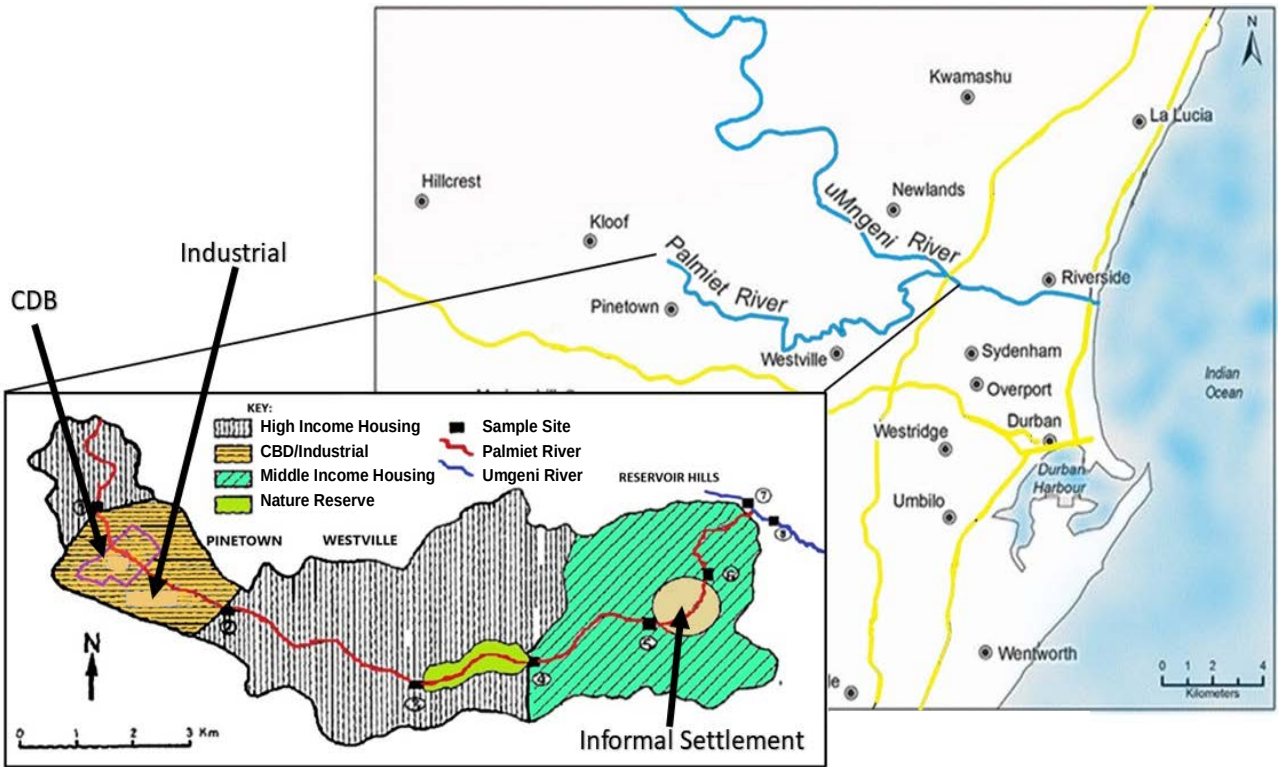
Read the fact file about the rehabilitation of the Palmiet River (a small tributary to the uMngeni River) and study Figure 2, a location and land-use map of the catchment area.

**Fact File**

- The Palmiet catchment is subject to repeated water-quality issues and flooding challenges.
- The rehabilitation of the river has become vital to the area to combat issues such as eutrophication.
- Located within Durban's urban core, it is relatively small, yet it contains a wide range of urban land uses.
- The river has a steep, spatially contained, narrow catchment area with a low bifurcation ratio. It is therefore prone to flooding after heavy rain, which is increasingly predicted for Durban due to climate change.
- The river is a tributary of the uMngeni River. The confluence is just below the Quarry Road West informal settlement.
- Water engineers are working on several constructions to minimise the flooding of the Palmiet River.

**Figure 2 – Location and land-use map of the Palmiet River catchment area**




**[Source: <www.researchgate.net> & <www.semanticscholar.org>]**

1.5.1 Match the word(s) underlined in the fact file on page 5 with the definitions below. Write only the number of the question and the correct term, for example: 1.5.1 (f) River.

(a) A river or stream flowing into a larger river. (1)

(b) The number of stream branches of a given order to the number of stream branches of the next higher order. (1)

(c) The meeting point of two or more rivers. (1)

(d) Excessive richness of nutrients in a body of water that causes a dense growth of plant life. (1)

(e) The area from which rainfall flows into a river system. (1)

1.5.2 Draw a sketched hydrograph, where you show the difference in discharge in a river between a rural area and an urban area. (5)

1.5.3 Explain why it is so important for Durban to keep smaller rivers (lower-order streams) clean. (2)

1.5.4 Discuss TWO effects the informal settlement will have on the river system. (2)

1.5.5 If you were the water engineer, analyse THREE ways in which you could minimise the effect of flooding along the Palmiet River. (6)

## 1.6 **Urban Settlement Terminology**

Match the correct statement in Column B with the terms in Column A. Write only the number and the letter corresponding to your answer, for example: 1.6.0 H.

| | **Column A** | **Column B** | |
|---|---|---|---|
| 1.6.1 | conurbation | A | The unplanned, uncontrolled growth of urban areas into the surrounding countryside. |
| 1.6.2 | counter-urbanisation | B | A well-planned, self-contained settlement complete with housing, employment and services. |
| 1.6.3 | green belt | C | Requires flat land situated next to specialised transport facilities. |
| 1.6.4 | new town | D | The movement of people from urban areas to the countryside seeking a better quality of life. |
| 1.6.5 | retail park | E | An area around an urban area, composed mostly of parkland and farmland, in which development is strictly controlled. |
| | | F | A large urban settlement that is the result of towns and cities spreading out and merging. |
| | | G | An out-of-town shopping centre with a few large warehouse-type stores. |

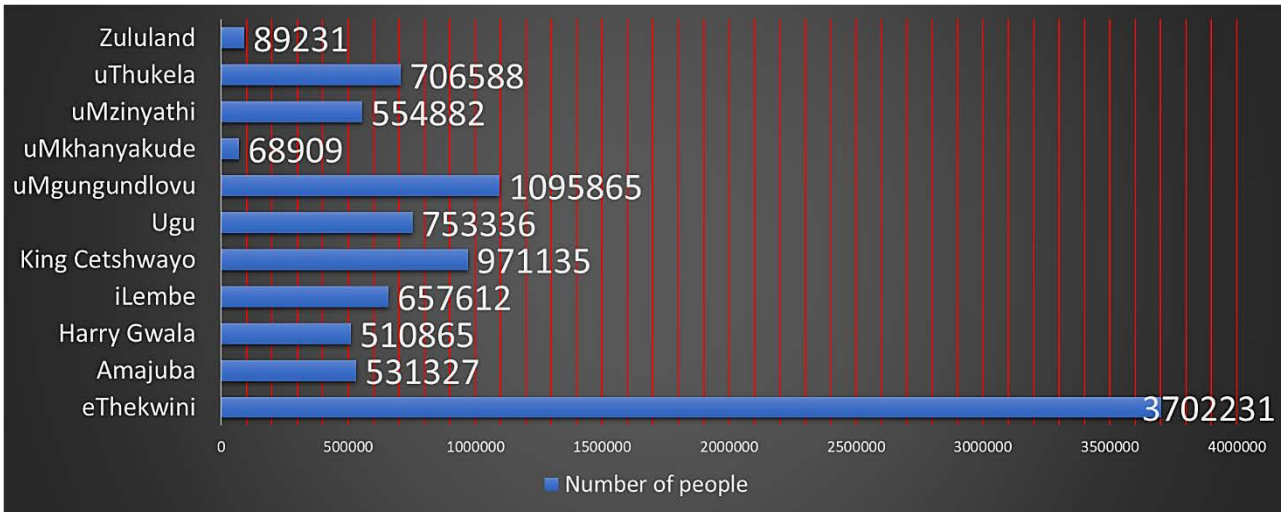
(5)

## 1.7 Changing Urban Patterns and Land Use in South African Cities

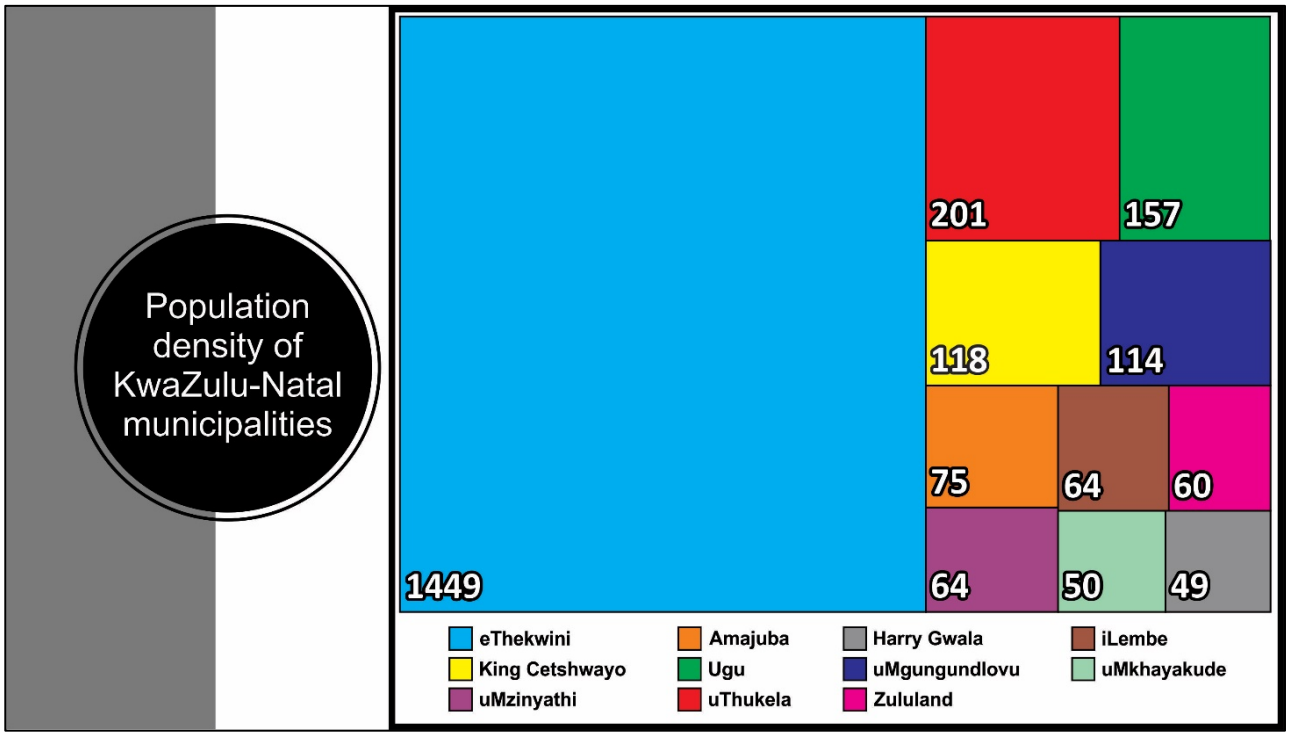
Study the infographics illustrating the size and density of the population in the metropolitan and district municipalities of KwaZulu-Natal.

**Figure 3A – Population of KwaZulu-Natal municipalities**




[Source: <https://southafrica-info.com>]

**Figure 3B – Population density of KwaZulu-Natal municipalities**




[Source: <https://southafrica-info.com>]

1.7.1 Define the following terms:

(a) *urbanisation* (1)

(b) *metropolitan area* (1)

1.7.2 Explain why eThekwini is the only metropolitan area in KwaZulu-Natal. (2)

1.7.3 Name the district municipality with the lowest population density. (1)

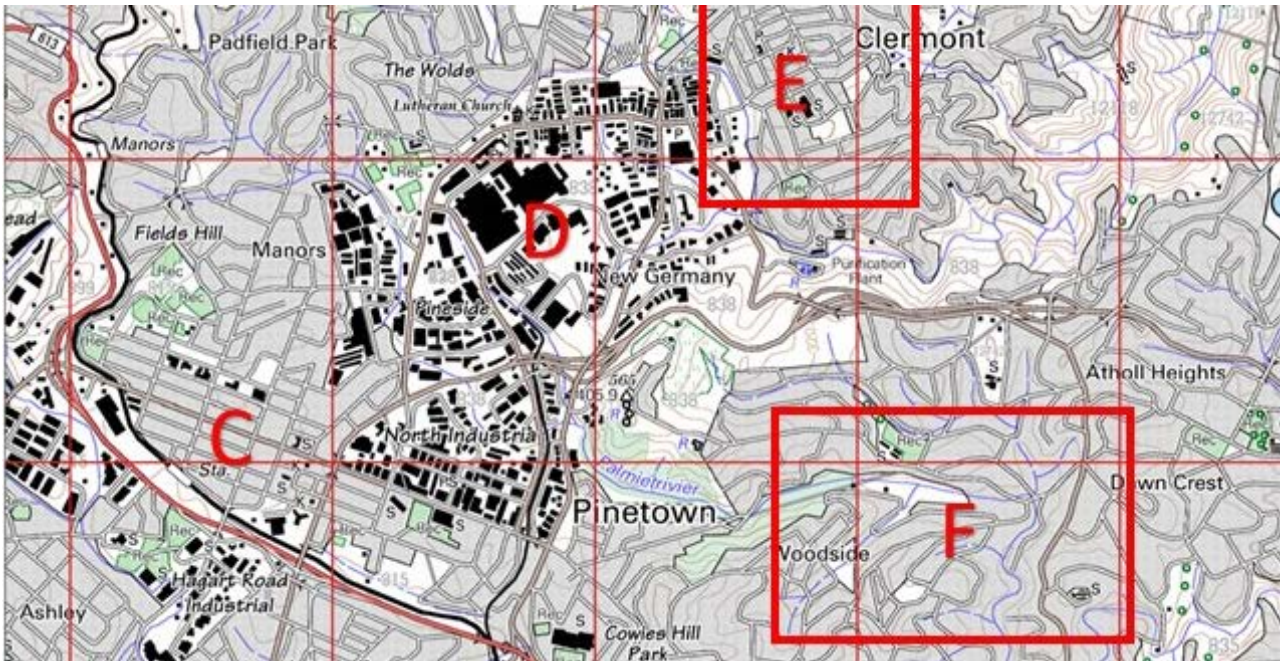
1.7.4 Discuss TWO drawbacks of rapid urban growth. (2)

1.7.5 eThekwini metro (Durban) is a typical apartheid-planned city. Name TWO characteristics of an apartheid-planned city. (2)

## 1.8 Urban Structure and Patterns

Study the topographic map extract and answer the questions that follow.

**Figure 4 – Topographic map extract of Pinetown**




[Source: NGI and SAGTA Map Downloader]

1.8.1 Pinetown's CBD and industrial area.

(a) Area **C** is the CBD of Pinetown. List TWO characteristics of a CBD. (2)

(b) Give the economic sector into which area **C** falls. (1)

(c) Describe TWO locational factors for the industrial area at **D**. (2)

(d) Comment on ONE advantage and ONE disadvantage of the location of the industrial area at **D**. (2)

1.8.2 Study the residential areas labelled **E** and **F**.

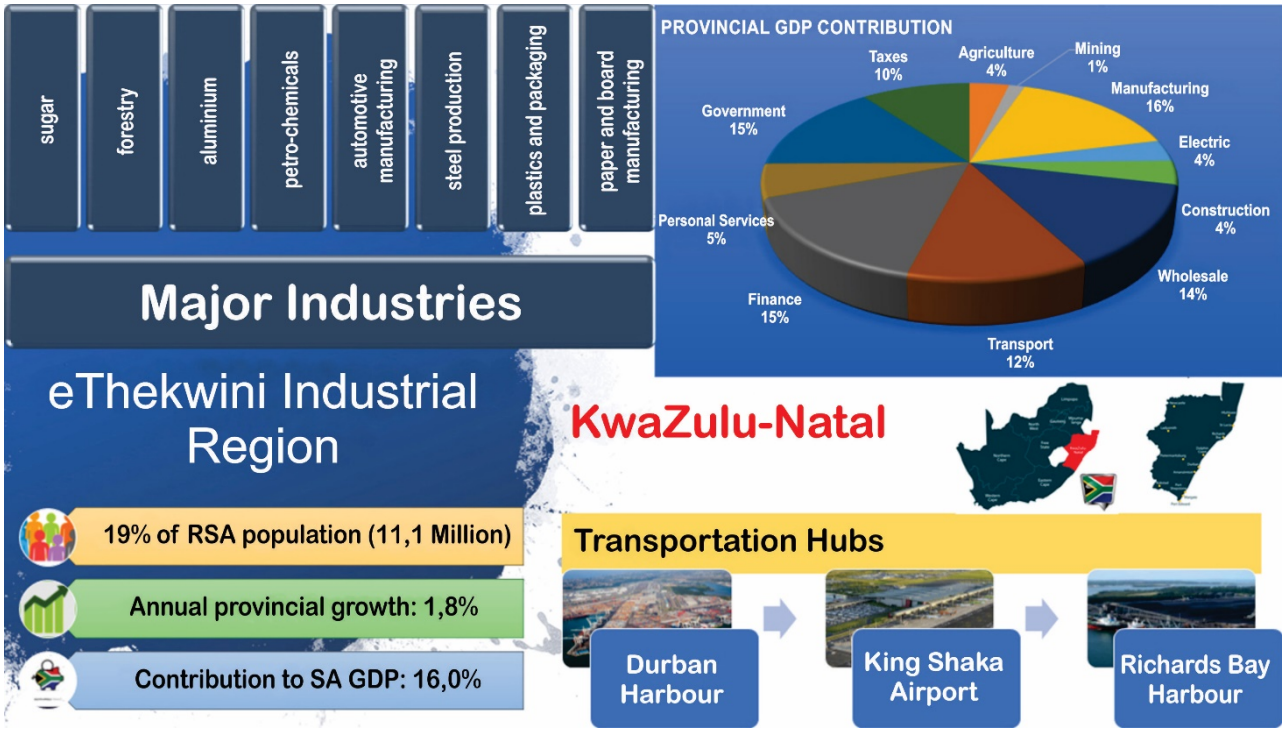
(a) Identify the street patterns of **E** and **F**. (2)

(b) Which of these areas has the highest income? Give ONE piece of evidence from the map to substantiate your answer. (2)

## 1.9 Secondary and Tertiary Sectors

Study the following infographic that provides information about eThekwini and KwaZulu-Natal and complete the instruction that follows.

**Figure 5 – eThekwini and KwaZulu-Natal industrial regions**




[Source: <http://www.statssa.gov.za & Bizniz Africa>]

Write a report for the provincial working committee where you outline the following for the eThekwini industrial region.

- Assess the main factors influencing the location of the eThekwini industrial region.
- Describe the main industrial activities in the province.
- Outline the factors that promote industrial development.
- Outline the factors that hinder industrial development.

*Note: You may draw on any examples you have studied to support your discussion. Use the rubric below to guide the planning and structure of your report.*

| CRITERIA | MARKS |
|---|---|
| ***Writing skills***<br>• Take into consideration structure and presentation.<br>• Use of brief introduction and conclusion.<br>• Logical discussion and use of subheadings. | **5** |
| ***Content knowledge***<br>• Correct use of geographical terminology and concepts.<br>• Adherence to topic and subheadings. | **14** |
| ***Supporting evidence – analysis and understanding***<br>• The ability to analyse and evaluate the topic is assessed in this category.<br>• Reference made to case study material / fact file / source material provided.<br>• If appropriate, reference must be made to familiar / local or other examples. | **5** |

(24)

**100 marks**

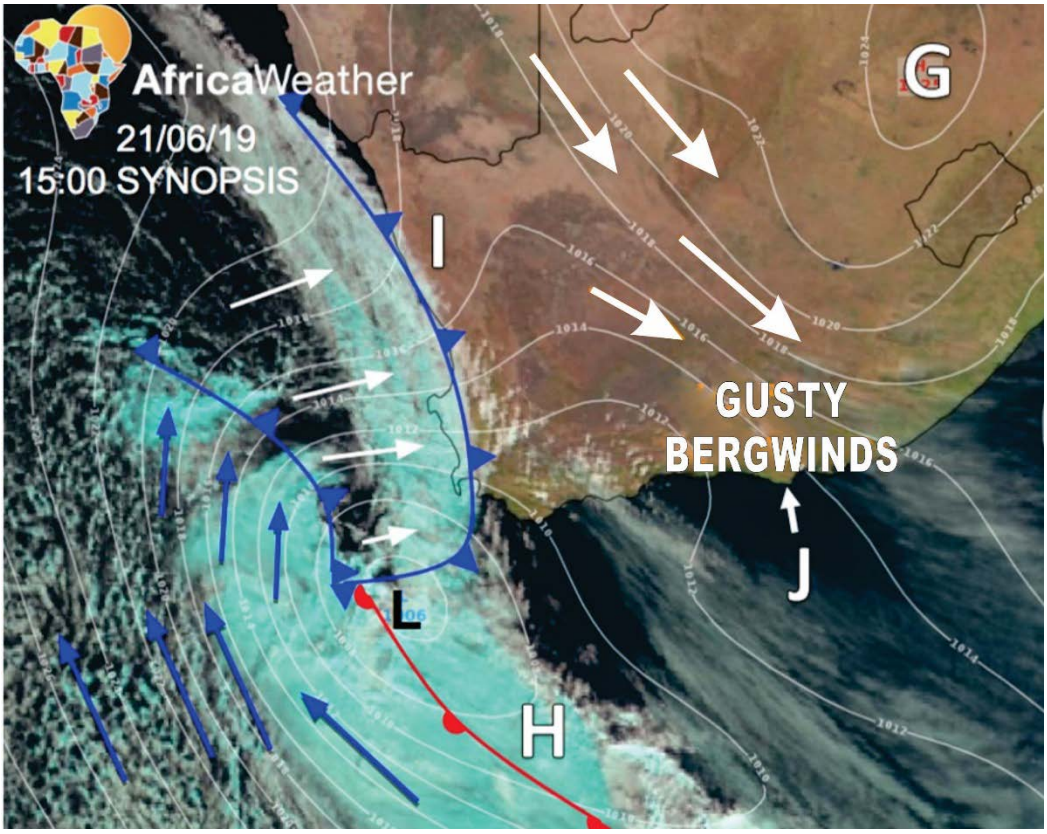
 

## QUESTION 2 CLIMATE, WEATHER AND GEOMORPHOLOGY

### 2.1 Mid-Latitude Cyclone

Study the synoptic chart and satellite image of weather conditions over South Africa on 21 June 2019.

**Figure 6 – A synoptic chart**




[Source: <https://www.africaweather.com>]

2.1.1 Select the correct term to complete the following descriptions. Write the number of the question and the letter corresponding to your answer, for example: (f) A.

(a) The high pressure labelled **G** is the … High Pressure.

A South Atlantic
B South Indian
C Interior
D Southern African (1)

(b) The sector of a mid-latitude cyclone, labelled **H,** is called the … sector.

A warm
B cold
C dry
D wet (1)

(c) The front labelled **I** is known as a(n) … front.

A cold
B warm
C moist
D occluded (1)

(d) The clouds mostly found at front **I** are ... clouds.

A cumulonimbus
B nimbostratus
C cirrus
D stratus (1)

(e) The wind direction change caused by front **I** is called …

A shearing.
B backing.
C veering.
D sinking. (1)

2.1.2 The bergwinds shown in Figure 6 are common at this time of year.

(a) Name ONE hazard usually associated with bergwinds. (1)

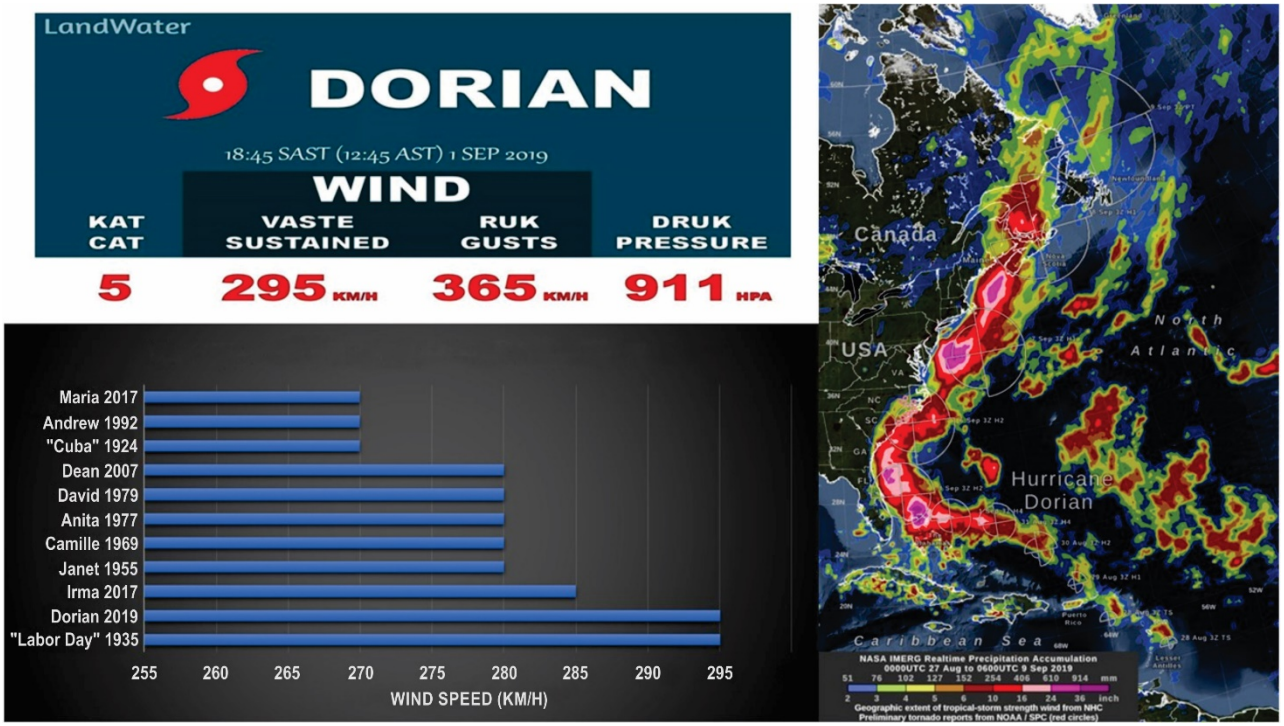
(b) Draw a basic weather station model of the weather conditions that Port Elizabeth (now Gqeberha), labelled **J**, would experience under the influence of bergwinds. (6)

## 2.2 Tropical Cyclones

Study the infographic below.

**Figure 7 – Infographic on Hurricane Dorian**




2.2.1 List the landfall wind speeds of the following hurricanes:

(a) Hurricane Dean (1)

(b) Hurricane Irma (1)

2.2.2 List THREE conditions that had been met for Dorian to develop from a tropical storm to a category 5 hurricane. (3)

2.2.3 Outline TWO impacts that this storm had on the people where it made landfall. (2)

2.2.4 Predict THREE main differences in how the USA (MEDC) and Haiti (LEDC) would have dealt with the impact of Hurricane Dorian. (6)

## 2.3 Fluvial Terminology

Match the statements in Column B with the terms in Column A. Write only the number and the letter corresponding to your answer, for example: 2.3.0 H.

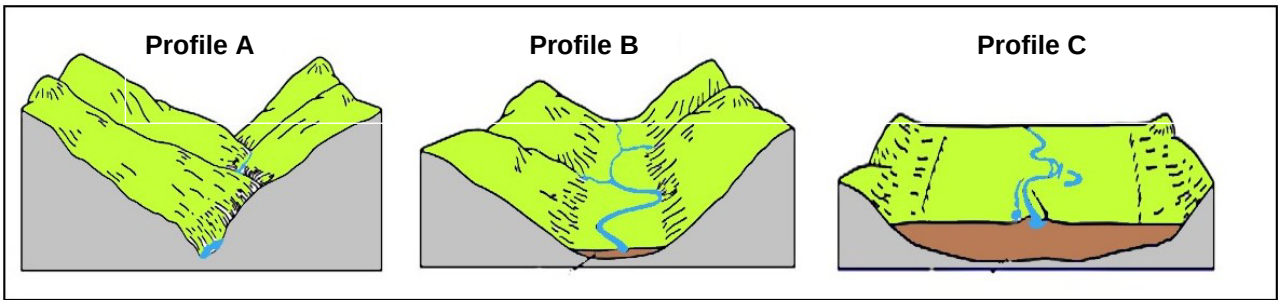
| | Column A | Column B | |
|---|---|---|---|
| 2.3.1 | alluvium | A | The winding curve or bend of a river. |
| 2.3.2 | deposition | B | The area of land drained by a river and its tributaries. |
| 2.3.3 | embankments | C | The laying down of material carried by rivers. |
| 2.3.4 | downstream | D | The direction of a stream's current. |
| 2.3.5 | drainage basin | E | The lateral ridge of land descending from a hill or mountain. |
| | | F | The riverbank raised to prevent flooding. |
| | | G | The landform that occurs on the inside of a riverbank. |
| | | H | The fine soil left behind after a river flood. |

(5)

## 2.4 Drainage Basin

Study the three cross-profiles of a river.

**Figure 8 – Cross-profile at different stages of a river**




[Adapted by Examiner]

2.4.1 Label the stage of each of the THREE profiles in Figure 8. (3)

2.4.2 Name ONE feature we would find in each stage. (3)

2.4.3 Explain how a river becomes rejuvenated. (2)

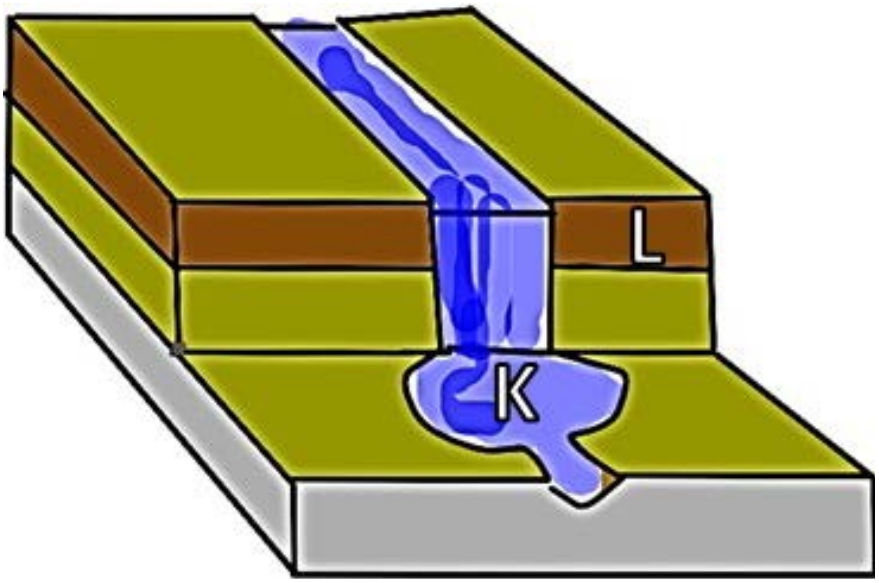
2.4.4 Give ONE feature that would be evidence of a river's rejuvenation. (1)

## 2.5 Fluvial Feature

Study the cross-section of a waterfall.

**Figure 9 – A cross-section of a typical waterfall**




2.5.1 Provide labels for **K** and **L**. (2)

2.5.2 Name the main erosive process at **K**. (1)

2.5.3 Waterfalls result in *headward erosion*. Explain what this term means. (2)

## 2.6 Stream Capture

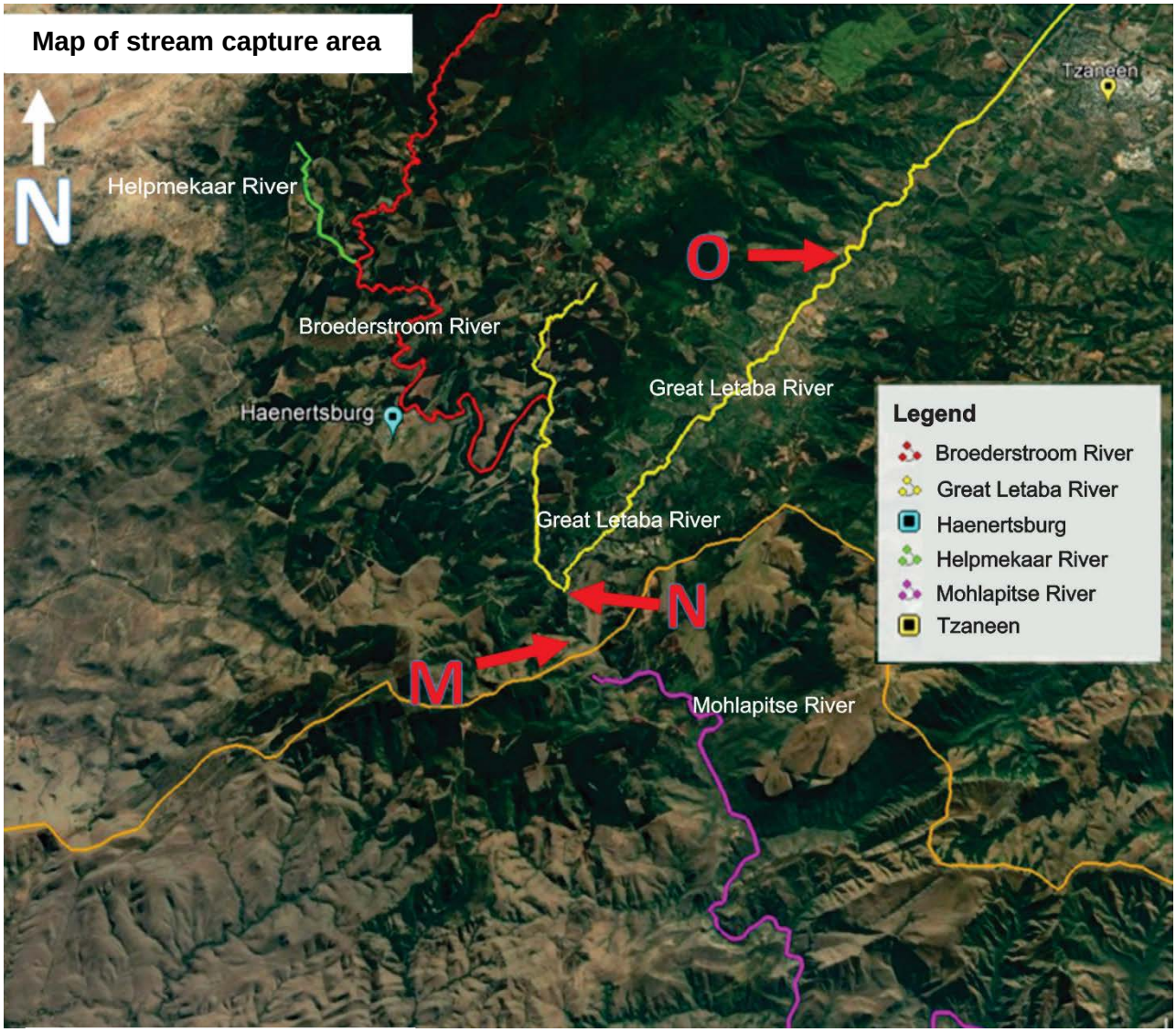
Read the fact file and study the Google Earth image in Figure 10 – a region in Limpopo where stream capture took place.

**Fact File**

- A *river capture* site can be found in the Wolkberg Wilderness Area, a point on the Letaba River where a prehistoric act of "piracy" occurred.
- Many years ago, the Great Letaba River eroded back into the hills and captured the headwaters of the Mohlapitse River.
- Today the Letaba River flows fast and clear at this spot.
- The Mohlapitse River is now deprived of the previous strong flows from the Broederstroom and the Helpmekaar rivers.
- It is now a soggy wetland with no means of gathering the strength to flow into the Olifants River.

[Source: <www.iinfo.co.za>]

**Figure 10 – Stream capture in Limpopo**




[Source: <https://www.google.com/earth/>]

2.6.1 Explain what a misfit / beheaded river is. (1)

2.6.2 Match the labels **M**, **N** and **O** on Figure 10 to the following stream capture features:

(a) captor (1)

(b) elbow of capture (1)

(c) wind gap (1)

2.6.3 Explain how the Mohlapitse River was captured. (2)

**50 marks**

## QUESTION 3 RURAL AND URBAN SETTLEMENT AND ECONOMIC GEOGRAPHY OF SOUTH AFRICA

### 3.1 Settlement Terminology

Match the terms in the block with the statements below. Write only the number of the question and the correct term, for example: 3.1.6 megalopolis.

| | | | |
|---|---|---|---|
| **brownfield** | **nucleated** | **high** | **low** |
| **situation** | **site** | **ribbon** | **circular** |
| **greenfield** | **dispersed** | | |

3.1.1 A … settlement has buildings that are all spread out. (1)

3.1.2 Disused or derelict urban land, which is available for the redevelopment of a business park, is called a … site. (1)

3.1.3 A settlement that contains top-level shops and services is a …-order settlement. (1)

3.1.4 The … of a settlement describes the physical nature of where it is located. (1)

3.1.5 A … development is a settlement that has a long narrow shape and is located next to a road or a river. (1)

### 3.2 Rural Settlement

Study the following photograph.

**Photograph 1 – Farm in the Northern Cape**

[Source: Examiner's photograph]

3.2.1 This farm is a commercial farm. Give TWO pieces of evidence to prove this statement. (2)

3.2.2 Discuss THREE reasons why people move from rural to urban areas. (6)

3.2.3 Describe TWO consequences of people leaving a rural area. (4)

## 3.3 Urban Hierarchies

Study the photograph below.

**Photograph 2 – Typical local shopping centre**


[Source: Examiner's photograph]

3.3.1 Select the correct word in brackets to complete the statements. Write only the number of the question and the correct term, for example: (d) free.

(a) The anchor tenant at the mall is (MTN / Wimpy / Spar). (1)

(b) The MTN store will have a (small / medium / large) threshold population. (1)

(c) The Wimpy has (high- / middle- / low-) order goods. (1)

3.3.2 Analyse TWO effects that shopping mall developments have on the CBDs of many South African urban areas. (4)

## 3.4 Economic Terminology

Match the descriptions in Column B to the terms in Column A. Write only the number and the letter corresponding to your answer, for example: 3.4.0 H.

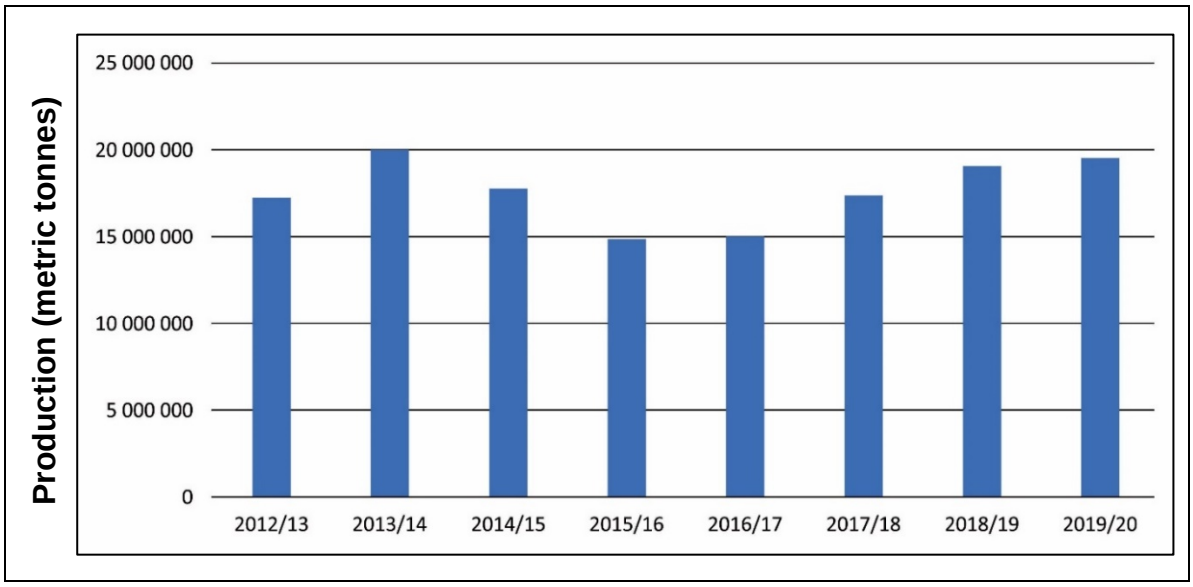
| | Column A | Column B | |
|---|---|---|---|
| 3.4.1 | IDZ | A | A market-oriented industry whose establishments are distributed in direct proportion to the distribution of the population. |
| 3.4.2 | footloose industry | B | An area of land that is far from the coast, large rivers, or the places where people live. |
| 3.4.3 | forward linkage | C | A purpose-built industrial estate that is linked to an international seaport or airport and that attracts fixed direct investments. |
| 3.4.4 | hinterland | D | A place where cargo is shifted from one form of transport to another. |
| | | E | An industry that can be placed at any location without effect from factors such as resources or transport. |
| | | F | Created when investment in a project encourages investment in subsequent stages of production. |

(4)

## 3.5 Agriculture

Study the following graph.

**Figure 11 – Sugar production in South Africa**




[Source: <https://sasa.org.za/>]

3.5.1 Give the year of highest sugar production. (1)

3.5.2 Write down how many metric tonnes were produced in 2016/17. (1)

3.5.3 Name ONE sugar production region in South Africa. (1)

3.5.4 Discuss TWO reasons why the sugar industry is important to the overall economy of South Africa. (2)

3.5.5 Land reform has been identified as one of the many rural development strategies initiated by the South African government.

(a) Explain the concept of *land reform*. (1)

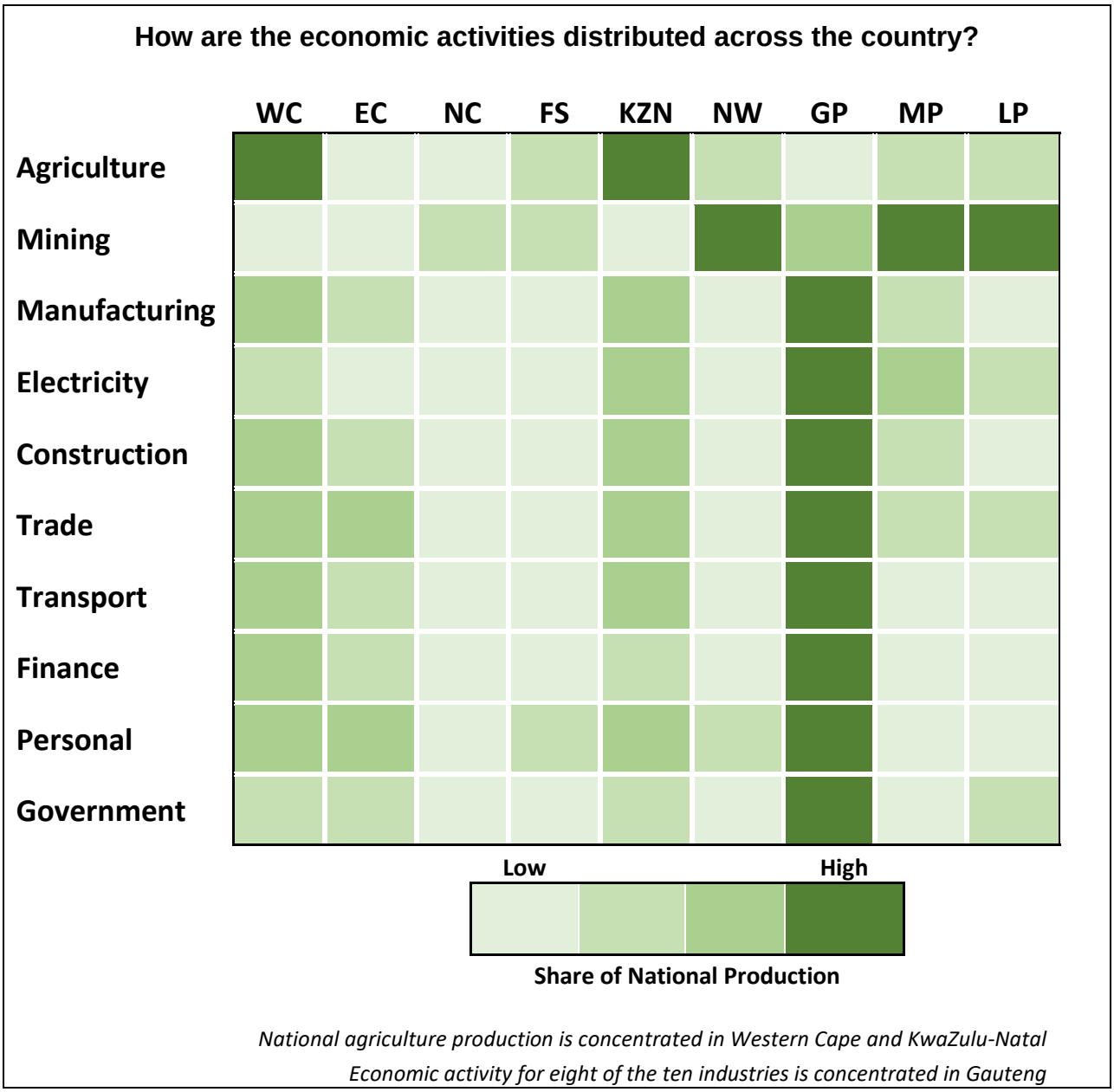
(b) Explore TWO challenges of the land reform process as a rural development initiative. (4)

## 3.6 South African Economy

Study the graph below.

**Figure 12 – Distribution of economic activities across provinces**




[Source: <http://www.statssa.gov.za>]

3.6.1 Explain why most economic activities seem to be most productive in Gauteng. (2)

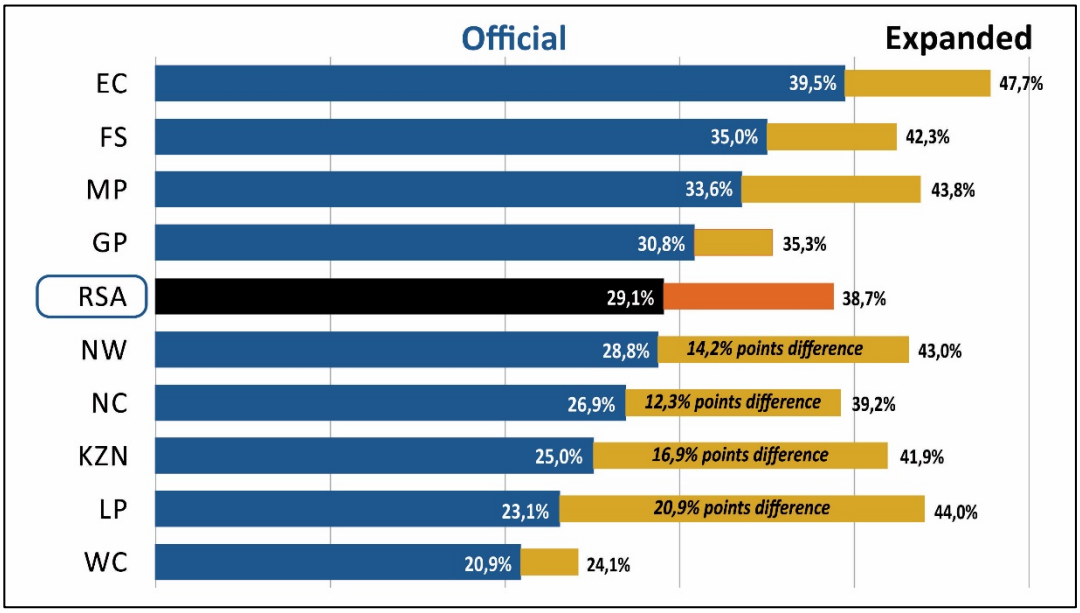
3.6.2 Give an example of an economic activity from Figure 12 for each of three economic sectors. (3)

3.6.3 Assess which province has the lowest economic production. Provide a possible explanation for your answer. (2)

## 3.7 Unemployment and the Informal Sector

Study the graph below.

**Figure 13 – The provincial unemployment rate for 2019 – both official and expanded**




[Source: <http://www.statssa.gov.za>]

3.7.1 Explain the concept of *expanded unemployment* illustrated in the graph. (1)

3.7.2 Discuss TWO consequences of a high unemployment rate. (2)

3.7.3 Explore the role that the informal sector can play in reducing unemployment. (2)

**50 marks**

**Total: 200 marks**