



Please paste the barcoded
label here

**TOTAL
MARKS**

--

INTERNATIONAL SECONDARY CERTIFICATE EXAMINATION
MAY 2023

GEOGRAPHY: PAPER I

EXAMINATION NUMBER

--	--	--	--	--	--	--	--	--	--	--	--	--	--

Time: 3 hours

200 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 34 pages. Please check that your question paper is complete.
2. Read the questions carefully.
3. **ALL THREE QUESTIONS ARE COMPULSORY.**
4. Answer ALL the questions on the question paper and hand this in at the end of the examination. Remember to write your examination number in the space provided above.
5. Credit will be awarded for the following:
 - interpretation
 - explanation
 - evidence of personal observations where this is appropriate to the question.
6. You are encouraged to use sketch maps, diagrams and other explanatory drawings to support your answers wherever relevant.
7. Pay attention to the mark allocation.
8. It is in your own interest to write legibly and to present your work neatly.
9. TWO blank pages (page 33–34) are included at the end of the paper. If you run out of space for an answer, use these pages. Clearly indicate the number of your answer should you use this extra space.

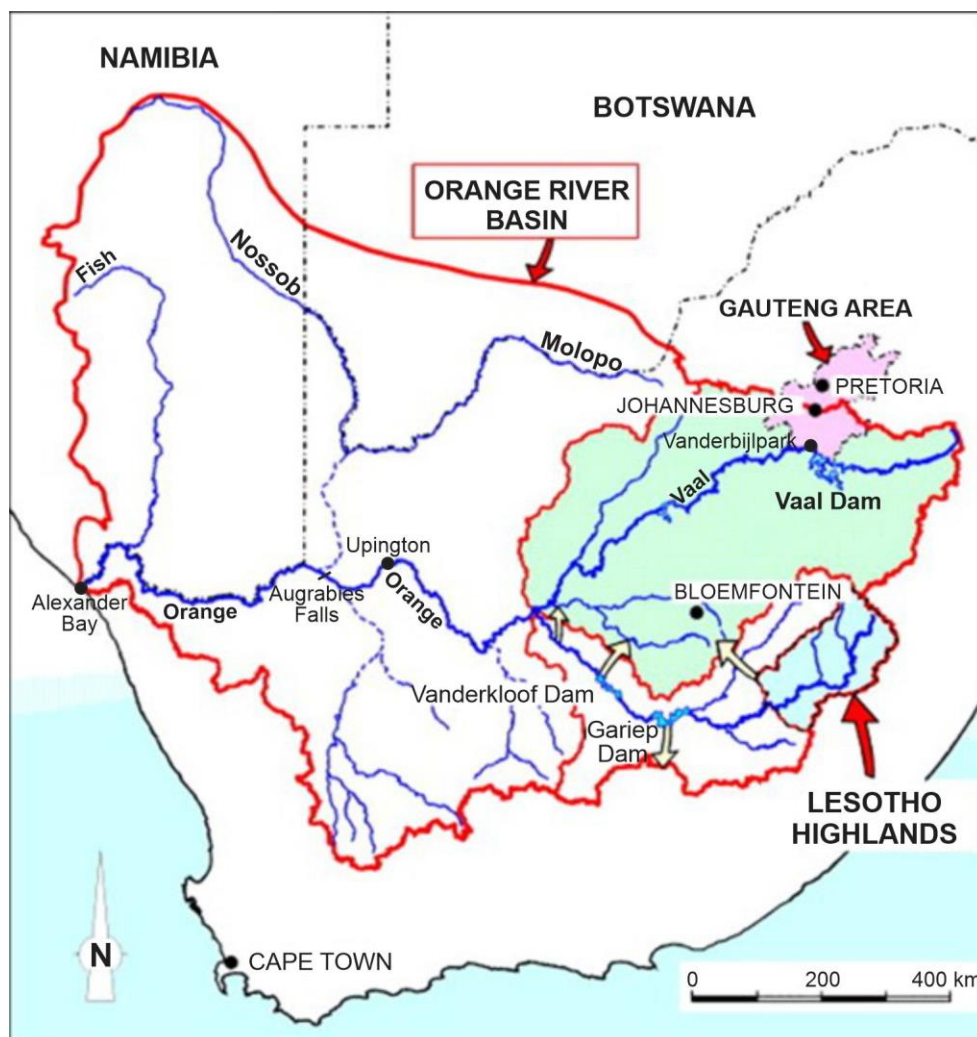
FOR MARKERS' USE ONLY

Question	1	2	3	Total
Marks	100	50	50	200
Obtained				

QUESTION 1 INTEGRATED QUESTION: GREATER ORANGE–VAAL RIVER DRAINAGE BASIN

Carefully study Figure 1 illustrating the greater Orange–Vaal River drainage basin. The Orange River, the longest river in South Africa, is 2 432 km in length, with a total drainage basin area of 973 000 km². The section of the Orange River that runs through Lesotho is called the Senqu River.

Figure 1: Map of the greater Orange–Vaal River drainage basin, southern Africa



[Source: sciencedirect.com adapted]

1.1 Geographical Skills and Techniques

1.1.1 Which tributary of the Orange River flows through two southern African countries apart from South Africa?

(1)

1.1.2 In which direction does the Vaal River flow where it exits the Vaal Dam?

(1)

- 1.1.3 In which country is the greatest area of the Orange River drainage basin located?

(1)

- 1.1.4 What is the approximate straight-line distance (km) from the Gariep Dam wall (Orange River) to the confluence of the Orange and Vaal rivers?

(2)

- 1.1.5 Which river forms part of the boundary between South Africa and Botswana?

(1)

- 1.1.6 Explain why the Vaal River contributes more water to the Orange River than the Fish, Nossob and Molopo Rivers.

(4)

- 1.1.7 The GPS coordinates below (A and B) are for the Vaal Dam (Vaal River) and the Gariep Dam (Orange River).

A. 26° 53' 41" S; 28° 08' 44" E

B. 30° 37' 15" S; 25° 30' 14" E

Write the correct dam name next to the letter of its GPS coordinates.

A: _____

B: _____

(2)

1.1.8 Study Figure 2 showing the Vaal Dam (Vaal River).

Figure 2: Vaal Dam, Gauteng–Free State



[Source: Sentinelhub; AfriWX]

(a) What type of image is Figure 2?

(1)

(b) Explain why Figure 2 is classified as an example of *remote sensing*.

(2)

(c) Does Figure 2 display high or low resolution? Explain your answer.

(2)

(d) Classify the following information related to the Vaal Dam as either *spatial* or *attribute* GIS data.

(i) The Vaal Dam was constructed in 1938.

(1)

(ii) The altitude of the Vaal Dam is 1 532 m above sea level.

(1)

(iii) The Vaal Dam wall is 63,4 m high.

(1)

- (e) Is the Vaal Dam, as depicted in Figure 2, 100% full? Provide TWO reasons for your answer.

(4)

1.2 Economic Geography

Economic activities in the Vaal River region (Gauteng)

Case Study: Iron and Steel industry, Vanderbijlpark.

Fact File: ArcelorMittal Works, Vanderbijlpark, Gauteng

- The Iron and Steel Industrial Corporation (ISCOR) was established in South Africa in 1942.
- Iron and steel works opened in Vanderbijlpark on the Vaal River in 1952 – processing iron ore and other raw materials from mines throughout southern Africa.
- ArcelorMittal takes over ISCOR South Africa in 2006.
- Vanderbijlpark Works is one of the world's largest inland steel mills and the largest supplier of flat steel products in sub-Saharan Africa. The plant employs some 4500 staff.
- The plant's steel products are manufactured in an integrated process. Raw materials such as iron ore, coke and dolomite are charged to blast furnaces where they are converted to liquid iron. The liquid iron is refined in basic oxygen furnaces to produce liquid steel. The liquid steel is cast into slabs, which are hot rolled into heavy plate in a plate mill, or into coils in a strip mill. The coils are either sold as hot-rolled sheets in coil or processed further into cold-rolled and coated products, such as hot-dip-galvanised, electro-galvanised and pre-painted sheet, and tinplate.
- Vanderbijlpark Works has two blast furnaces and three basic oxygen furnaces.
- Steel products are produced for the local market and for the high-profit export market.

[Source: ArcelorMittal]



[Source: Vaalweekblad]

Write a geographical essay in which you assess the factors influencing economic activities in the Vaal River region of Gauteng, specifically the iron and steel industry in Vanderbijlpark.

Use the following subheadings as a guide:

- Factors influencing economic activities: economic, physical, political and social. (Brief mention of each factor.)
- Factors favouring and hindering* the location of the iron and steel industry.
- Impact of development programmes on economic activities in the region.
- Environmental issues linked to economic activities.

*hinder: to obstruct the progress of; to make more difficult

You may draw on your general knowledge and understanding of industrial location and economic development; however, specific reference must be made to the iron and steel industry in Vanderbijlpark. Your essay will be assessed according to the rubric below:

Criteria	Marks
Writing Skills - Take into consideration structure and presentation - Use of brief introduction and conclusion - Logical discussion and use of sub-headings	5
Content knowledge - Correct use of geographical terminology and concepts - Adherence to topic and specified sub-headings	15
Supporting evidence – analysis and understanding - The ability to analyse and evaluate the topic is assessed in this category - Reference made to case study material / fact file / source material - If appropriate, reference must be made to familiar / local or other examples	5

[illegible]

[illegible]

[illegible]

1.3 Climate and Weather

Study Figure 3 of the 100 MW Ilanga CSP (concentrated solar power) solar energy power plant close to Upington/ Orange River (Northern Cape), capable of supporting 100 000 households.

Figure 3: Ilanga CSP solar energy power plant, Northern Cape



[Source: Emvelo; Mail & Guardian]

- 1.3.1 Justify the location of this solar energy plant by referring to subtropical anticyclones and associated weather conditions. A labelled diagram must form part of your answer.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

(10)

- 1.3.2 Alexander Bay, a small town at the mouth of the Orange River, experiences a desert climate with only 35 mm of rain per annum (pa). Account for the low rainfall.

(4)

1.4 Settlements

Study Figure 4 illustrating Heron Banks Golf and River Estate on the Free State bank of the Vaal River, close to Vanderbijlpark, approximately 72 km from the Vaal Dam. The estate offers stand-alone homes, townhouses, a club house and golf course with 3 km river frontage.

Figure 4: Heron Banks Golf and River Estate, Vaal River – Free State



[Source: Estate Living]

1.4.1 Describe the *situation* of Heron Banks Golf and River Estate.

(2)

1.4.2 Describe the *site* of Heron Banks Golf and River Estate.

(2)

1.4.3 Why are estates like Heron Banks usually located on the rural–urban fringe?

(2)

1.4.4 Explain why estates similar to the example in Figure 4 are considered desirable and growing in popularity.

[illegible]

(6)

1.4.5 Suggest THREE disadvantages of living in an estate similar to the one illustrated in Figure 4.

[illegible]

(6)

1.5 Geomorphology

Study Figure 5 of the Augrabies Falls on the Orange River, Northern Cape.

Figure 5: Augrabies Falls, Orange River – Northern Cape



[Source: SA Places]

1.5.1 For each of the statements below, select the correct option. Write only the letter of the selected option in the answer block provided.

(a) The Augrabies Falls flow over granite, which is ...

- A permeable.
- B resistant.
- C porous.
- D metamorphic.

1.5.1 (a)	
-----------	--

(1)

(b) The type of river flow evident in Figure 5 is ...

- A turbulent.
- B centripetal.
- C laminar.
- D trellis.

1.5.1 (b)	
-----------	--

(1)

- (c) The plunge pool at the bottom of the Augrabies Falls is created mainly due to ...

- A deposition.
- B sedimentation.
- C headward erosion.
- D hydraulic action.

1.5.1 (c)	
-----------	--

(1)

- (d) The Augrabies Falls retreats upstream over time due to ...

- A river capture.
- B headward erosion.
- C traction.
- D saltation.

1.5.1 (d)	
-----------	--

(1)

- (e) During periods of flooding, the Augrabies Falls cover all the rock visible in Figure 5. This increase in discharge is a consequence of ...

- A decreased throughflow.
- B heavy rainfall in the greater catchment area.
- C a drop in the water table.
- D a reduction in baseflow.

1.5.1 (e)	
-----------	--

(1)

1.5.2 Draw a labelled sketch longitudinal profile of the Orange River from the confluence of the Orange and Vaal rivers to the Atlantic Ocean (refer to Figure 1, page 2). You must include these labels in the appropriate places on the longitudinal river profile:

- Augrabies Falls
- ultimate (permanent) base level of erosion
- temporary base level of erosion
- knick point
- direction of migration of the Augrabies Falls



(6)

1.5.3 Does the river profile (Question 1.5.2) illustrate a graded or ungraded river? Explain your answer.

(4)

1.5.4 The Augrabies Falls area receives a low annual rainfall of 124 mm. Explain why this section of the Orange River could be classified as an *exotic* river.

(4)

[100]

QUESTION 2 CLIMATE, WEATHER AND GEOMORPHOLOGY

2.1 Synoptic Weather Map Analysis

Study Figure 6, a synoptic weather map dated 2021-05-31. Read the accompanying Fact File.

Fact File

Media Release: Wet and very cold week ahead for South Africa

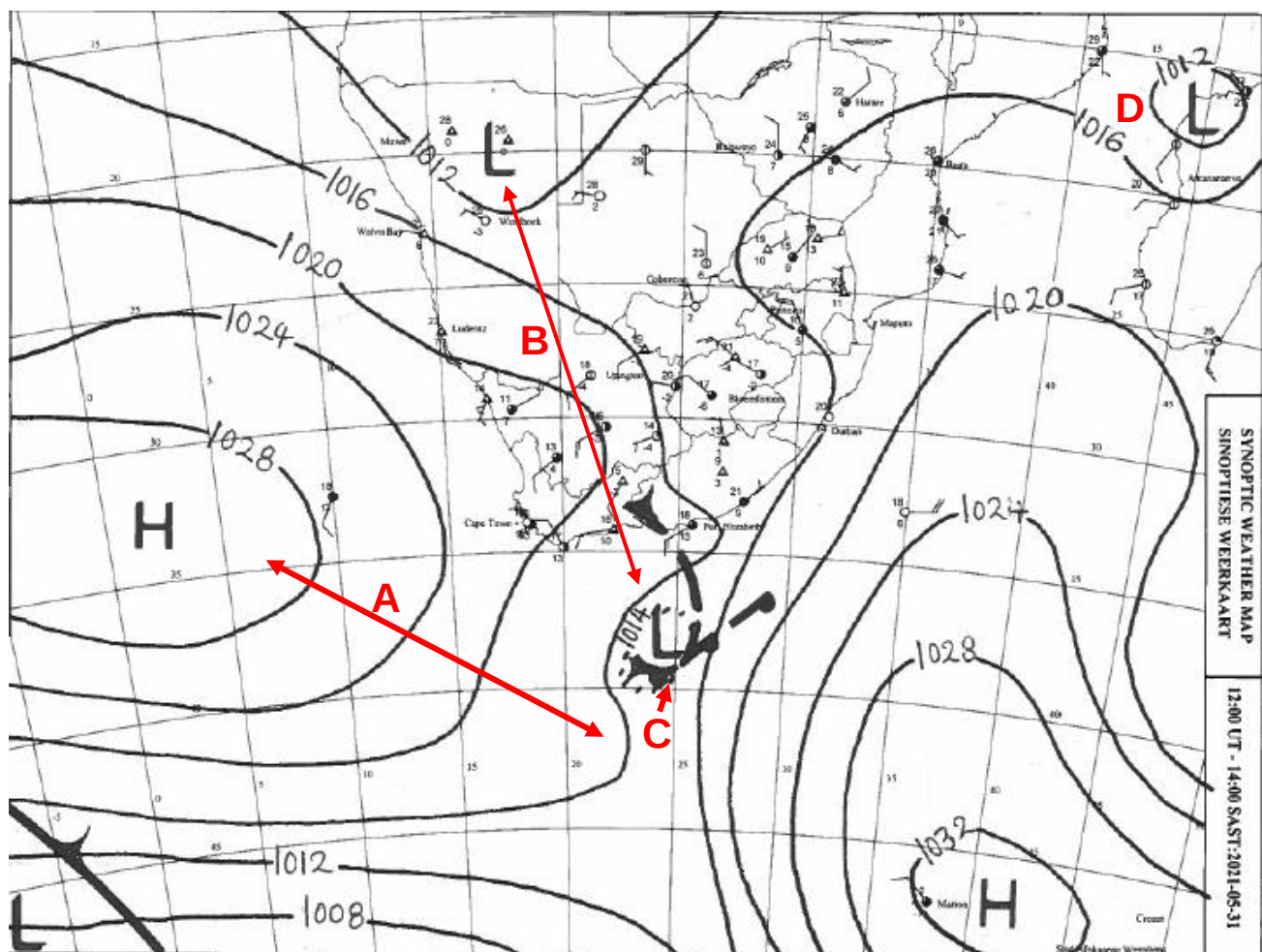
31 May 2021

A week of very cold temperatures is expected across most of South Africa from today (Monday), lasting well into the coming weekend. The cold temperatures follow in the wake of a cold front that moved over the eastern parts of the country on Sunday evening, sustained by the development of a **cut-off low-pressure system** over the south-eastern parts of the country.

The cut-off low-pressure system will be responsible for most of the **adverse weather conditions** expected over the next three days. This includes snowfall accumulation of between 5 cm and 15 cm over Lesotho and the southern Drakensberg mountains in the Eastern Cape.

[Source: www.weathersa.co.za]

Figure 6: Synoptic weather map dated 2021-05-31



[Source: South African Weather Service]

2.1.1 Identify the pressure features indicated by the red arrows labelled **A** and **B**.

A: _____

B: _____
(2)

2.1.2 State the stage of development of weather system **C**.

(1)

2.1.3 Identify the low-pressure cell at **D**.

(1)

2.1.4 (a) Define a *cut-off low-pressure system*.

(2)

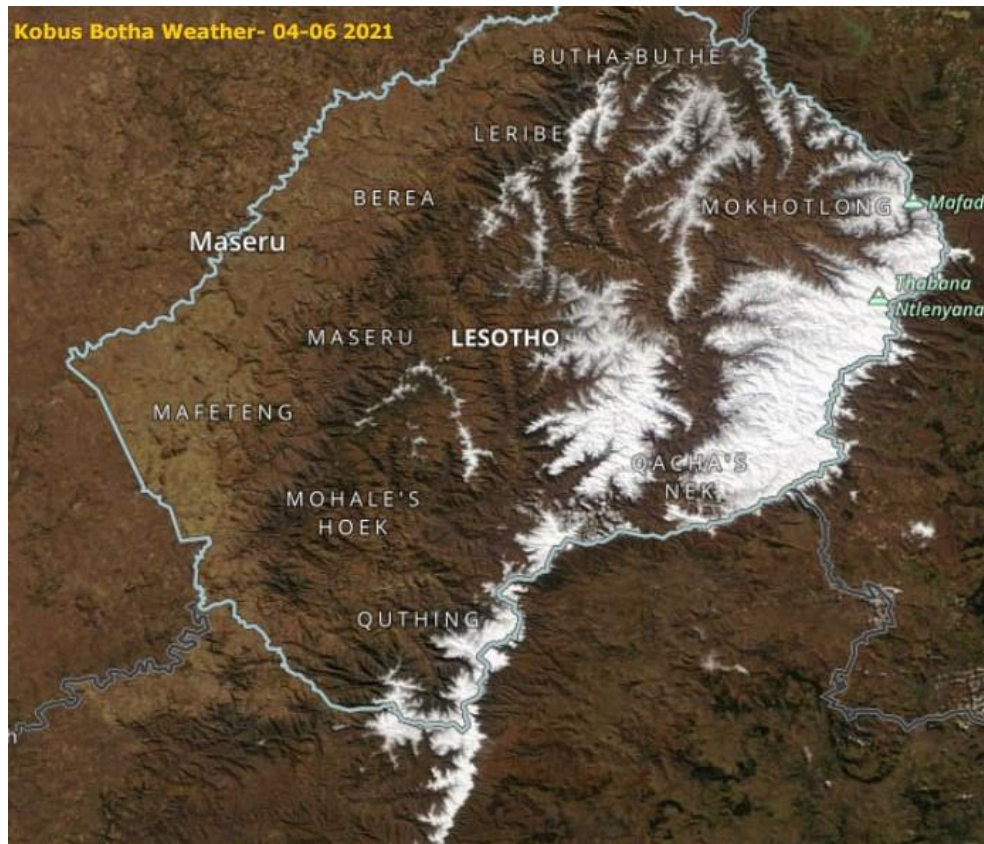
(b) Explain why weather system **C** is referred to as a cut-off low-pressure system on this synoptic weather map.

(2)

2.2 Satellite Image Analysis

Study Figure 7, a satellite image that shows accumulated snow indicated in white.

Figure 7: Satellite image, Lesotho 04-06-2021



[Source: weatherphotos.co.za]

- 2.2.1 Explain why high-lying areas over the interior of southern Africa experience snow in winter.

(2)

- 2.2.2 With reference to the Fact File on page 16 and Figure 7, evaluate the reliability and validity of the source material with respect to the adverse weather conditions.

(4)

2.3 Urban Climate

Study the images in Figures 8A and 8B. These represent street scenes in central Durban, KwaZulu-Natal, South Africa.

Figure 8A: Busy street scene in Durban CBD



[Source: dreamstime.com]

Figure 8B: Rooftop Garden in Durban CBD



[Source: sa-venues.com/francis-farewell-square]

2.3.1 Define the concept *urban heat island*.

(2)

2.3.2 State ONE source of artificial heating depicted in Figure 8A.

(1)

2.3.3 Contrast the temperature differences shown in Figure 8A and Figure 8B.

(4)

2.3.4 Select TWO features of the rooftop garden in central Durban (Figure 8B).

Outline how these features contribute to reducing the temperature in an urban area.

Feature 1: _____

Feature 2: _____

(4)

2.4 Flooding in Ladysmith, KwaZulu-Natal, South Africa

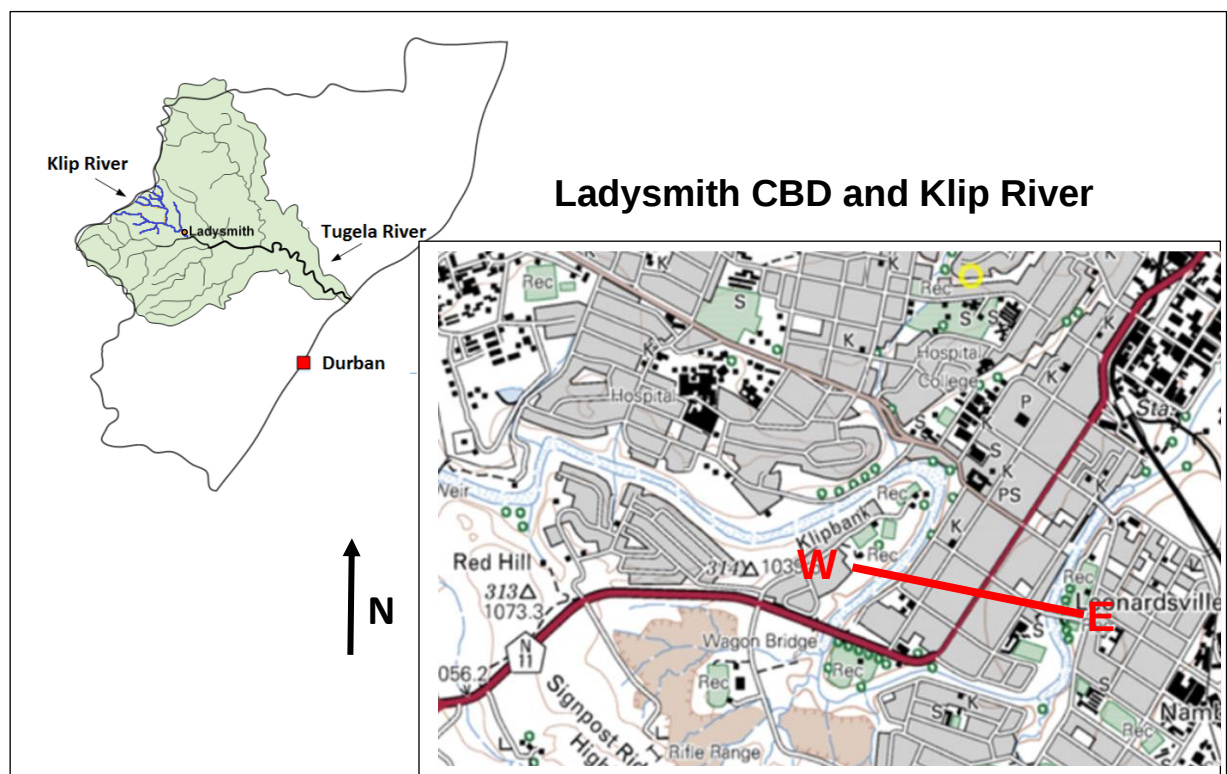
Read the Fact File and refer to Figure 9 and Figure 10.

Fact File

- The Qedusizi Dam is on the Klip River, upstream from Ladysmith.
- During the 110 years up to 1998, when the Qedusizi Dam was completed, 29 serious floods occurred. Minor flooding occurred almost every year.
- The worst flood in 30 years was in 1996, and it led to R500 million in damages and the evacuation of 400 families.
- The Central Business District (CBD) is located on the floodplain of a river meander (Figure 9).
- 'The Qedusizi Dam was constructed in October 1998 by the Department of Water Affairs and Forestry in an effort to reduce the risk of flooding in the low-lying area of Ladysmith,' according to the Mayor of Alfred Duma Municipality, Zama Sibisi.
- Taking this into account, the mayor explains that the Tideflex Valves installed at various strategic points along the Klip River have proven to be effective, as there appears to be no water backflow from the river.
- The flooding of the streets in the CBD's lower-lying areas was caused by stormwater outlets being unable to discharge into the Klip River due to the extremely high river levels.

[Source: <<https://newcastillian.com/2022/01/18/ladysmith-mayor-questioned-over-state-of-dams-slucice-gates-following-floods>>]

Figure 9: Location map of Ladysmith and topographic map extract to show the position of Ladysmith CBD in relation to the Klip River



[Source: SAGTA Map Downloader & NGI]

2.4.1 Read the following statements. Determine if each statement is True or False.

(a) The Tugela River is a tributary of the Klip River. _____ (1)

(b) The Klip River rises in the Drakensberg. _____ (1)

(c) Ladysmith CBD is located on an interfluve. _____ (1)

2.4.2 Refer to Figure 9 and Figure 10.

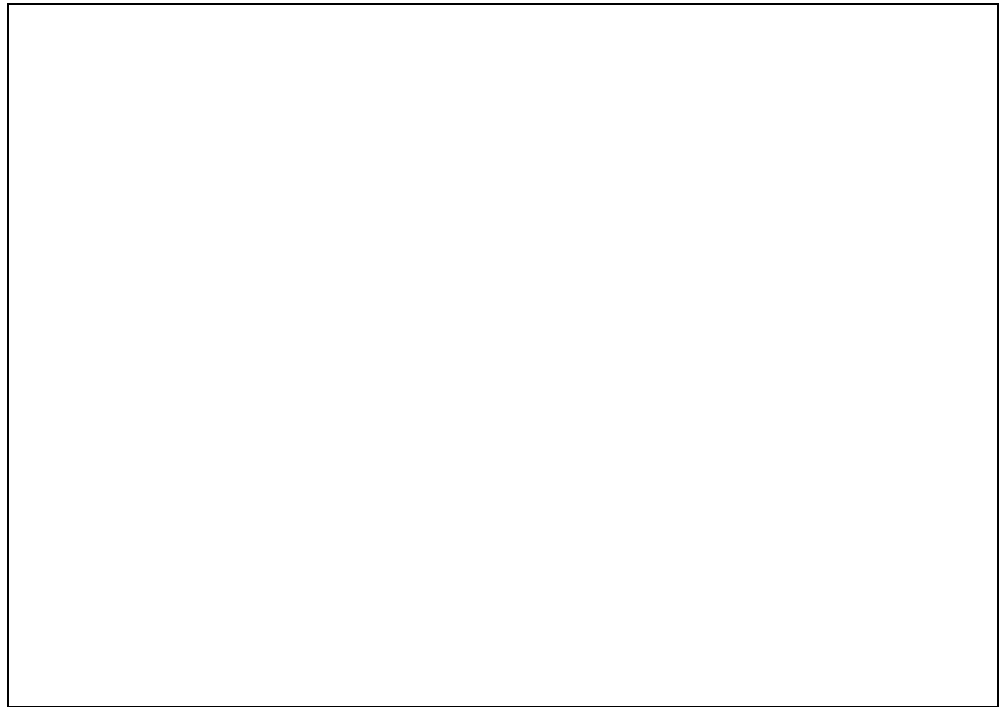
Figure 10: An aerial view of the southern CBD of Ladysmith during a flood



[Source: Al-Imdaad Foundation]

Refer to the line **W–E** on Figure 9.

- (a) Draw a transverse section of the Klip River from W to E to show the river channels and the southern Ladysmith CBD. Indicate the water table (base flow) of the river on the diagram.



(4)

- (b) Suggest TWO reasons why this part of the Ladysmith CBD is regularly flooded after heavy rains.

(4)

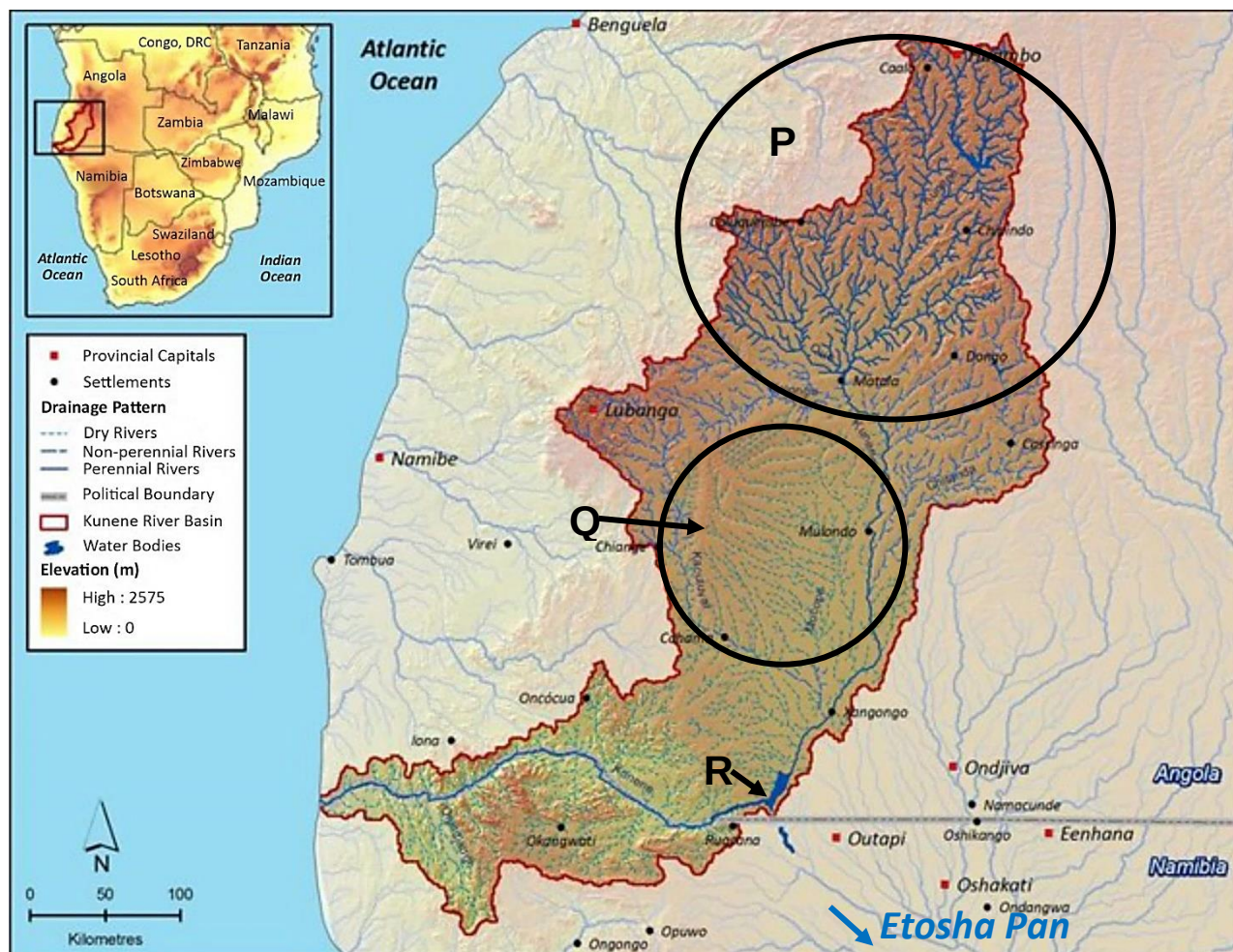
- (c) Recommend ONE preventative measure the Alfred Duma (Ladysmith) Municipality could take to eliminate flooding in this area.

(2)

2.5 River Capture – Kunene River

Refer to Figure 11, showing the Kunene drainage basin (Angola and Namibia).

Figure 11: The Kunene drainage basin



[Source: http://www.kunene.riverawarenesskit.com/kunenerak_com/EN/RIVER/GEOGRAPHY/BASIN_LANDSCAPE.HTM]

2.5.1 The Kunene River used to flow into Etosha Pan, an area of inland drainage. Study the factors in the text box below. Select THREE factors that would have enabled river capture of the upper Kunene River to take place.

highly jointed rock	headward erosion	lateral erosion
change in sea level	gentle gradient	river at a lower altitude
steep gradient	porous rock	

1: _____

2: _____

3: _____

(3)

2.5.2 Refer to the areas labelled **P** and **Q** on Figure 11. Choose the correct term in bold to make the statement true.

- (a) The drainage density in area labelled **P** is **low / medium / high / coarse**. (1)

- (b) The type of drainage in the area labelled **Q** is **perennial / non-perennial / seasonal / dry rivers**. (1)

- (c) The feature labelled **R**, associated with river capture, is known as the **confluence point / elbow of capture / misfit stream / beheaded stream**. (1)

2.5.3 Using evidence from Figure 11, suggest how the flow regime of the captor river has changed after river capture took place.

(2)

2.5.4 Evaluate the benefits of river capture to the people living in the lower Kunene River region.

(4)

[50]

QUESTION 3 SETTLEMENT (RURAL AND URBAN) AND ECONOMIC GEOGRAPHY**3.1 Settlement Geography Terminology**

Select the correct option from the box below to complete each of the statements that follow.

rural depopulation	conurbation	CBD
break-of-bulk settlement	gap town	urbanisation
high-order functions	low-order functions	smart city
gentrification	urban blight	land redistribution

3.1.1 _____ is the process involving the renovation and upgrading of older buildings usually close to the inner city.

3.1.2 Medical specialists, architectural firms, jewellery designers and imported-sports car outlets are examples of _____.

3.1.3 A _____ is a technologically advanced settlement that uses different types of electronic methods, voice activation methods, artificial intelligence and sensors to collect specific data to improve services and systems in the settlement.

3.1.4 A continuously built-up area formed by the joining together of several, originally separate, expanding urban settlements is called a _____.

3.1.5 A _____ is a settlement situated at the entrance to a physical barrier like a mountain range. (5)

3.2 Rural Settlements

Study Figure 12 and Figure 13, both illustrating rural settlements in southern Africa.

Figure 12: Rural settlement



[Source: Dreamstime.com]

Figure 13: Rural settlement



[Source: Tebatso Manaka]

Complete the table below:

	Figure 12	Figure 13	Mark allocation
Type of rural settlement classified according to size			(2 × 1) (2)
Settlement pattern			(2 × 1) (2)
Settlement density			(2 × 1) (2)
Factors influencing site of settlement			(2 × 2) (4)

(10)

3.3 Contemporary Urban Developments

Read the Fact File about Conradie Park, a new urban development in Cape Town, Western Cape, that opened in 2022. Figure 14 illustrates a section of Conradie Park.

Fact File: Conradie Park

ABOUT CONRADIE PARK

State-of-the-art security system that includes biometric access control, CCTV and manned security. Access to the development is monitored by perimeter surveillance and licence plate recognition cameras.

Conradie Park is a new **mixed-income, mixed-use housing development** in Cape Town. The R3 billion, 22-hectare development – a partnership between developers Concor and the Western Cape Government – comprises more than 3 500 homes. It's located near main arterial routes and the Mutual and Thornton railway stations in Pinelands, Cape Town.

With plans for numerous businesses, private schools, crèches, **retail centre**, business hotel, medical facilities, doggy day-care, town square & community centre and a number of parks, the development is being marketed as an 'affordable, sustainable, self-contained town for the future'!

Conradie Park caters for all income and age groups.

[Source: Igrow Wealth; conradiepark.co.za- adapted]

Figure 14: Designer's impression: Residential block – Conradie Park

[Source: iGrow Wealth]

3.3.1 Explain the geographical meaning of these terms (in bold in the Fact File):

- (a) mixed-income, mixed-use housing development

(4)

- (b) retail centre

(2)

3.3.2 Is Conradie Park accessible? Justify your answer.

(4)

3.3.3 Suggest TWO reasons why Conradie Park can be classified as a *Post-modern* urban settlement.

(4)

3.4 Economic Geography Terminology

Match the descriptions in Column B with the correct terms in Column A. Write only the letter of your choice in the table below.

Column A	Column B
3.4.1 Spatial Development Initiative	A. Sector of the economy where high-level decisions are made by senior executives in government, industry, education, etc.
3.4.2 Supply chain	B. Purpose-built industrial estates linked to an international port or airport specifically designated for new investment by export-orientated industries.
3.4.3 Raw material	C. Manufacturing industry that has no strong locational preference, being neither resource- nor market-orientated.
3.4.4 Industrial Development Zone	D. Substances used in the primary production or manufacturing of goods.
3.4.5 Quinary economic sector	E. Economic activities concerned with the exchange and consumption of goods and services.
	F. A short-term investment strategy that aims to unlock the economic potential in specific locations using public resources to promote private sector investment in areas with high potential for economic growth.
	G. The network of all the people, organisations, resources, activities and technology involved in the production and sale of a product.

Answers

3.4.1	
3.4.2	
3.4.3	
3.4.4	
3.4.5	

(5)

3.5 Change of Location of Economic Activities

Read the Fact File on the closure of the Clover cheese factory.

FACT FILE: South Africa's biggest cheese factory closes

- South Africa's biggest cheese factory in Lichtenburg (North West) closed in 2021 and will move to Queensburgh, KwaZulu-Natal, where the company has an existing plant.
- The move will cost Clover R1,5 billion and result in 330 job losses.
- The factory closed due to ongoing poor service delivery – including electricity cuts, disruption to water supply, and poor road maintenance.
- The company had consultations with the Ditsobotla Local Municipality (Lichtenburg), but decided to close the factory as the problems persisted and impacted production.



[Source: Clover; IOL]

3.5.1 Into which economic sector would the following activities be classified?

- (a) cheese factory

_____ (1)

- (b) water/ electricity supply

_____ (1)

- (c) road maintenance.

_____ (1)

- 3.5.2 Predict the impact of the closure of the cheese factory on Lichtenburg. Elaborate on at least THREE points.

(6)

3.6 Formal and Informal Economic Sectors

- 3.6.1 Clarify the difference between a country's formal and informal economic sectors.

(4)

- 3.6.2 Suggest THREE reasons why the informal sector can be referred to as the *shadow economy*.

(3)

[50]

Total: 200 marks

ADDITIONAL SPACE (ALL QUESTIONS)

**REMEMBER TO CLEARLY INDICATE AT THE QUESTION THAT YOU USED THE
ADDITIONAL SPACE TO ENSURE THAT ALL ANSWERS ARE MARKED.**

[illegible]

[illegible]