GEOGRAPHY: PAPER I

Time: 3 hours   200 marks

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.

QUESTION 1   INTEGRATED QUESTION: THE WATERBERG BIOSPHERE AND LEPHALALE

1.1   Climate 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. 1.1.0 A.
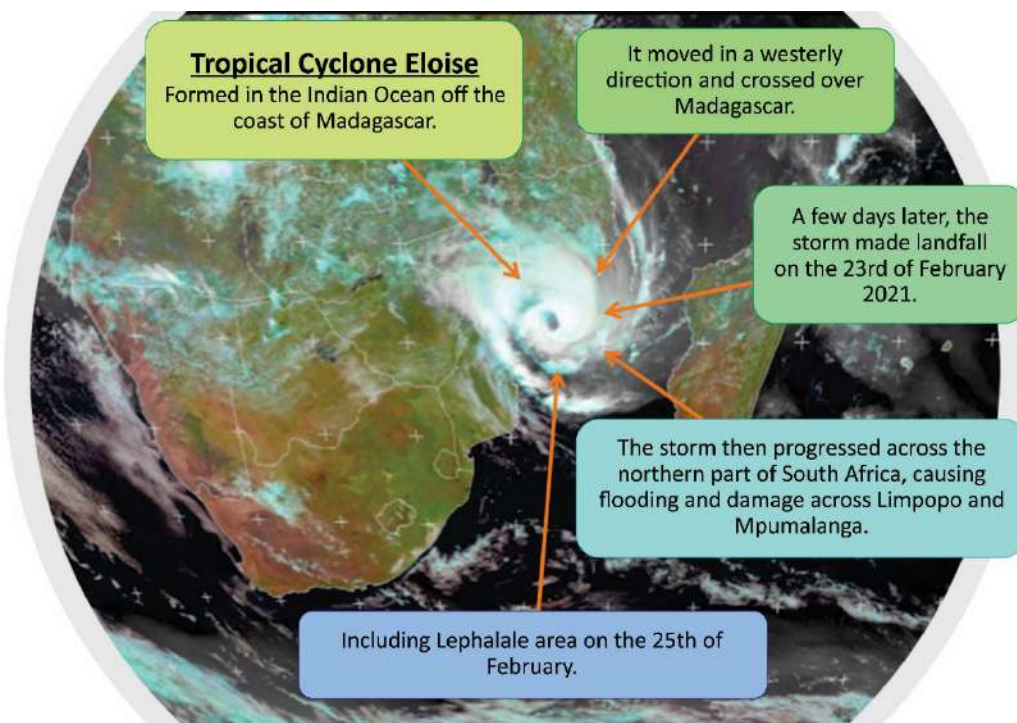
Column A		Column B
1.1.1	A measure of the reflectivity of a surface.	A. Frost pocket
1.1.2	A line on a map connecting points having the same amount of rainfall.	B. Aerosols
		C. Cyclone
1.1.3	Polluted air above a city, prevented from rising by an inversion.	D. Dew point
1.1.4	The temperature to which air must be cooled for water vapour to condense.	E. Ridge
		F. Albedo
1.1.5	An elongated area of high atmospheric pressure.	G. Sensible heat
		H. Pollution dome
		I. Isohyet
		J. Rainfall variability

(5)

1.2   Tropical cyclones

Study Figure 1; an infographic about the day Tropical Cyclone Eloise made landfall.

Figure 1

Tropical Cyclone Eloise
Formed in the Indian Ocean off the coast of Madagascar.

It moved in a westerly direction and crossed over Madagascar.

A few days later, the storm made landfall on the 23rd of February 2021.

The storm then progressed across the northern part of South Africa, causing flooding and damage across Limpopo and Mpumalanga.

Including Lephalale area on the 25th of February.

[Source: Adapted from Afriwx]

1.2.1   Identify TWO features in Figure 1 that prove it is a tropical cyclone.   (2)

1.2.2   Give ONE piece of evidence that Tropical Cyclone Eloise is in its mature stage.   (1)

1.2.3   Name TWO impacts that Tropical Cyclone Eloise had when it made landfall.   (2)

1.2.4   Describe how typical tropical cyclones form.   (4)

1.2.5   Identify ONE reason tropical cyclones affect the eastern side of continents.   (1)

1.2.6   Explain why tropical cyclones have a larger socio-economic impact on Mozambique than on a country like Japan or the USA.   (4)

1.3   **Tropical cyclones**

Study Figure 2; rainfall estimates (in mm) from the impact of Tropical Cyclone Eloise across South Africa, particularly the Lephalale area.
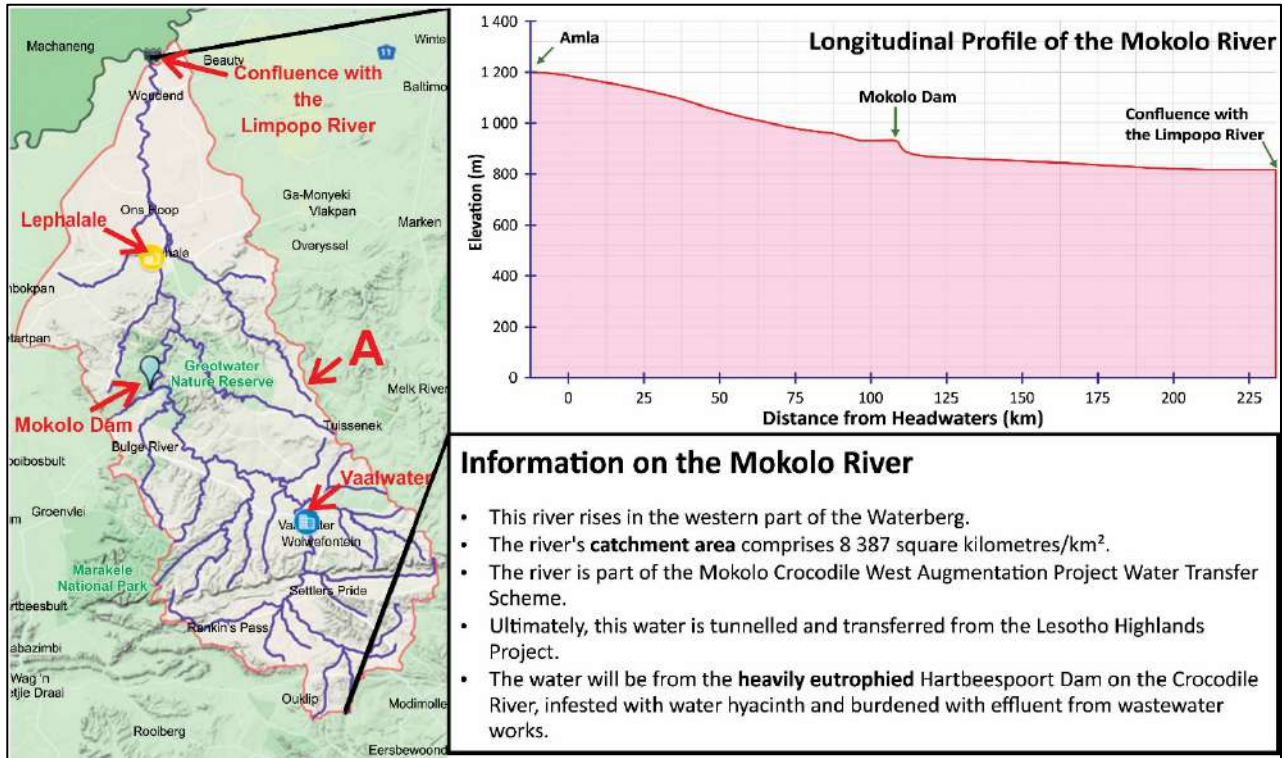
Figure 2
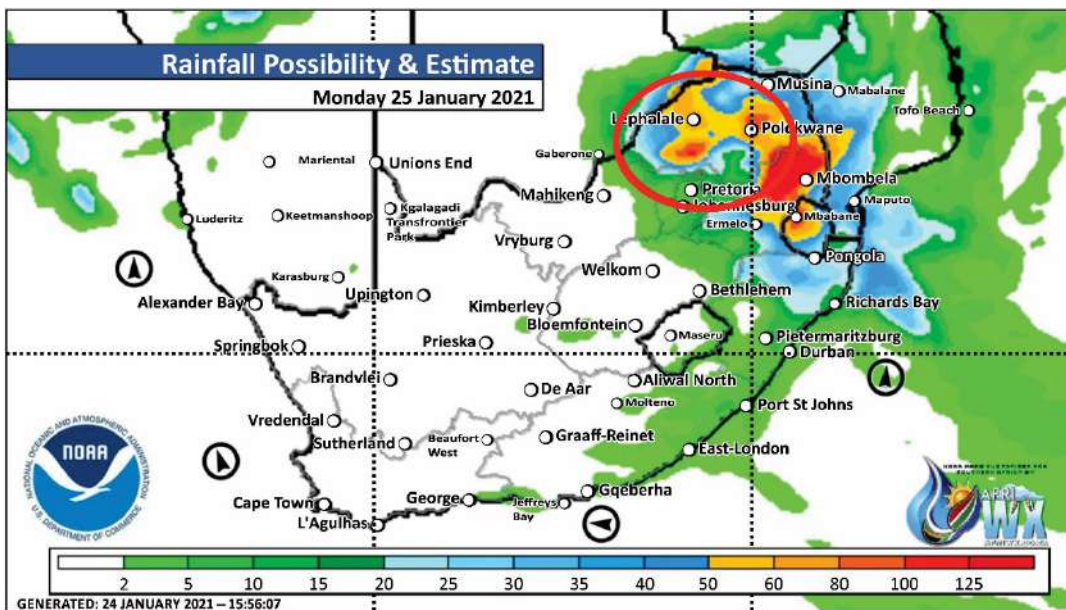
[Source: NOAA and Afriwx]

1.3.1   Which province will be most affected by the storm?   (1)

1.3.2   How much rain is predicted in Lephalale?   (1)

1.3.3   Explain why the storm will have lost most of its energy when it reaches Lephalale.   (2)

1.3.4   How can remote sensing aid in the tracking and studying of tropical cyclones?   (4)

1.4 Catchment and river management

Study Figure 3; an infographic about the Mokolo River System.

Figure 3

Information on the Mokolo River

- This river rises in the western part of the Waterberg.
- The river's **catchment area** comprises 8 387 square kilometres/km².
- The river is part of the Mokolo Crocodile West Augmentation Project Water Transfer Scheme.
- Ultimately, this water is tunnelled and transferred from the Lesotho Highlands Project.
- The water will be from the **heavily eutrophied** Hartbeespoort Dam on the Crocodile River, infested with water hyacinth and burdened with effluent from wastewater works.

[Source: Produced by Examiner]

1.4.1 State whether the following statements are TRUE or FALSE. Write only the number of the question and whether it is True or False, e.g. (g) False.

    (a) The Mokolo River has a graded profile. (1)

    (b) The Mokolo Dam is a temporary base level of erosion. (1)

    (c) The Limpopo River is a tributary of the Mokolo River. (1)

    (d) The river system has a high drainage density. (1)

    (e) The drainage pattern for the Mokolo River is dendritic. (1)

1.4.2 Explain the following terms highlighted in Figure 3:

    (a) *catchment area* (1)

    (b) *heavily eutrophied* (1)

1.4.3 Identify feature **A** in Figure 3. (1)

1.4.4 Why is feature **A** not a fixed feature? (2)

1.4.5 Use Figure 3 to determine the stream order of the Mokolo River. (2)

1.4.6 Explain the relationship between stream order and …

(a) length of streams. (2)

(b) the size of the drainage basin. (2)

1.4.7 Explain TWO ways in which water catchment and the flow of a river system are affected by human activity. (4)

1.4.8 Explain TWO hydrological changes that the Mokolo Dam would have on the river system. (4)

1.5 **Rural settlements**

Study Figure 4; a topographic map extract and information on the settlement of Vaalwater.

Figure 4
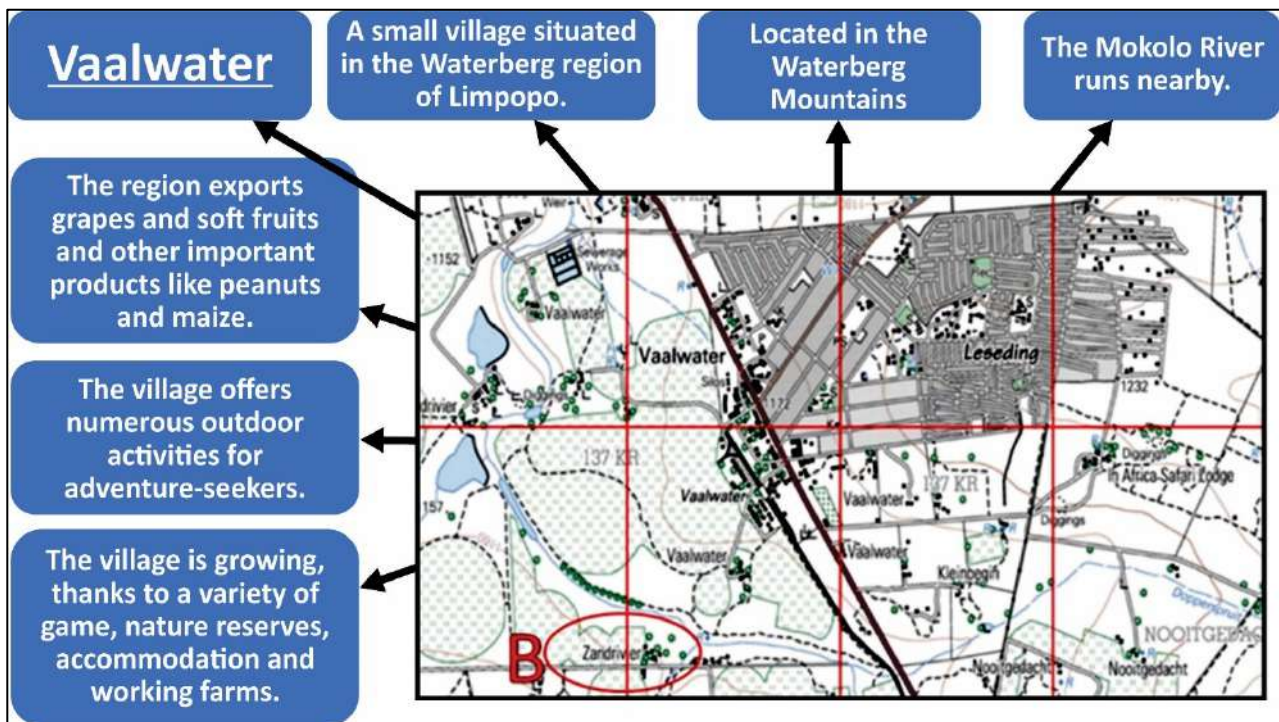
[Source: <www.waterberg-information.co.za>]

1.5.1 Use TWO words from the block below to describe the settlement at Zandrivier (labelled **B**).

isolated farmstead	**city**
commercial farm	**subsistence farming**

(2)

1.5.2 Outline TWO differences between an isolated farmstead and a village. (2)
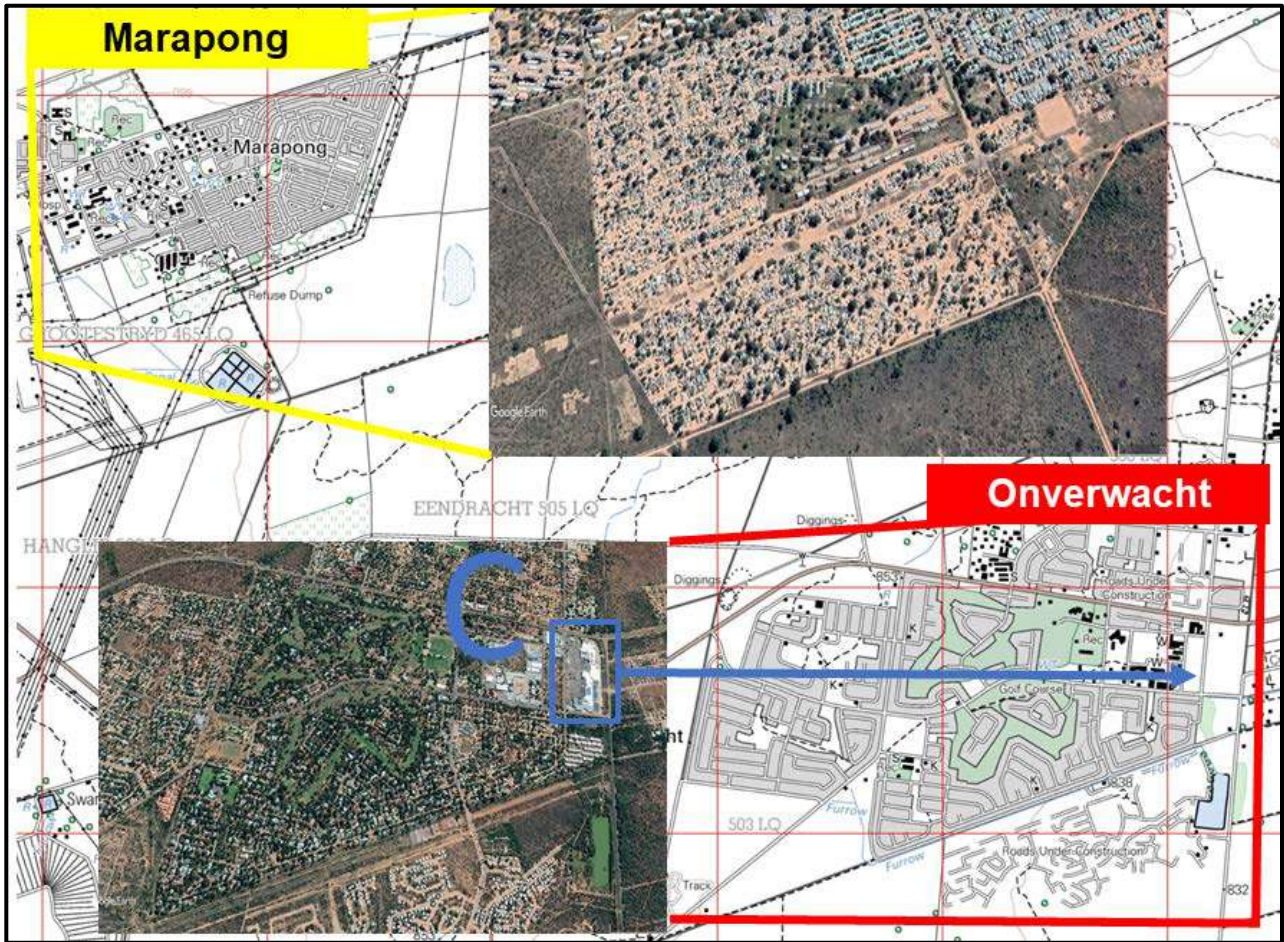
1.5.3 Identify TWO pieces of evidence that prove there is commercial farming in the area. (2)

1.5.4 Identify TWO site factors for Vaalwater. (2)

1.6   **Urban hierarchies**

Study Figure 5; a map extract of the Lephalale area.

Figure 5

[Source: Image by Examiner]

1.6.1   Compare the settlements of Marapong and Onverwacht. Use the following subheadings:

- Road surface
- Amount of vegetation
- Number of possible visible services   (6)

1.6.2   Examine TWO possible reasons for the difference between the two settlements.   (4)

1.7   **Urban hierarchies**

Figure 6 is a Google Earth image of Lephalale Mall, marked as **C** in blue on Figure 5.

Figure 6

[Source: Adapted from Google Earth]

1.7.1   Which ONE of the three businesses has the lowest order of goods?   (1)

1.7.2   Why does Capitec Bank have the largest range?   (2)

1.7.3   Why is Wimpy's location based on *functional convenience*?   (2)

1.8   **Structure of the economy**

Read Fact File 1 and study Figures 7, 8 and 9

FACT FILE 1

- The Lephalale area comprises three urban nodes, namely Lephalale, Onverwacht and Marapong.
- The surrounding area has both commercial and communal mixed farming.
- An industrial area is also slowly developing near Onverwacht.
- Two major power stations, Medupi and Matimba, are located next to the Grootegeluk Coal mine.
- Economic activities in the area:
    – Cattle, goat and ostrich farms.
    – Game farming (the estimated number of game farms in Lephalale is 510).
    – Many types of crop farming production.

Figure 7: Advert for one of the many game farms and lodges around the Lephalale area
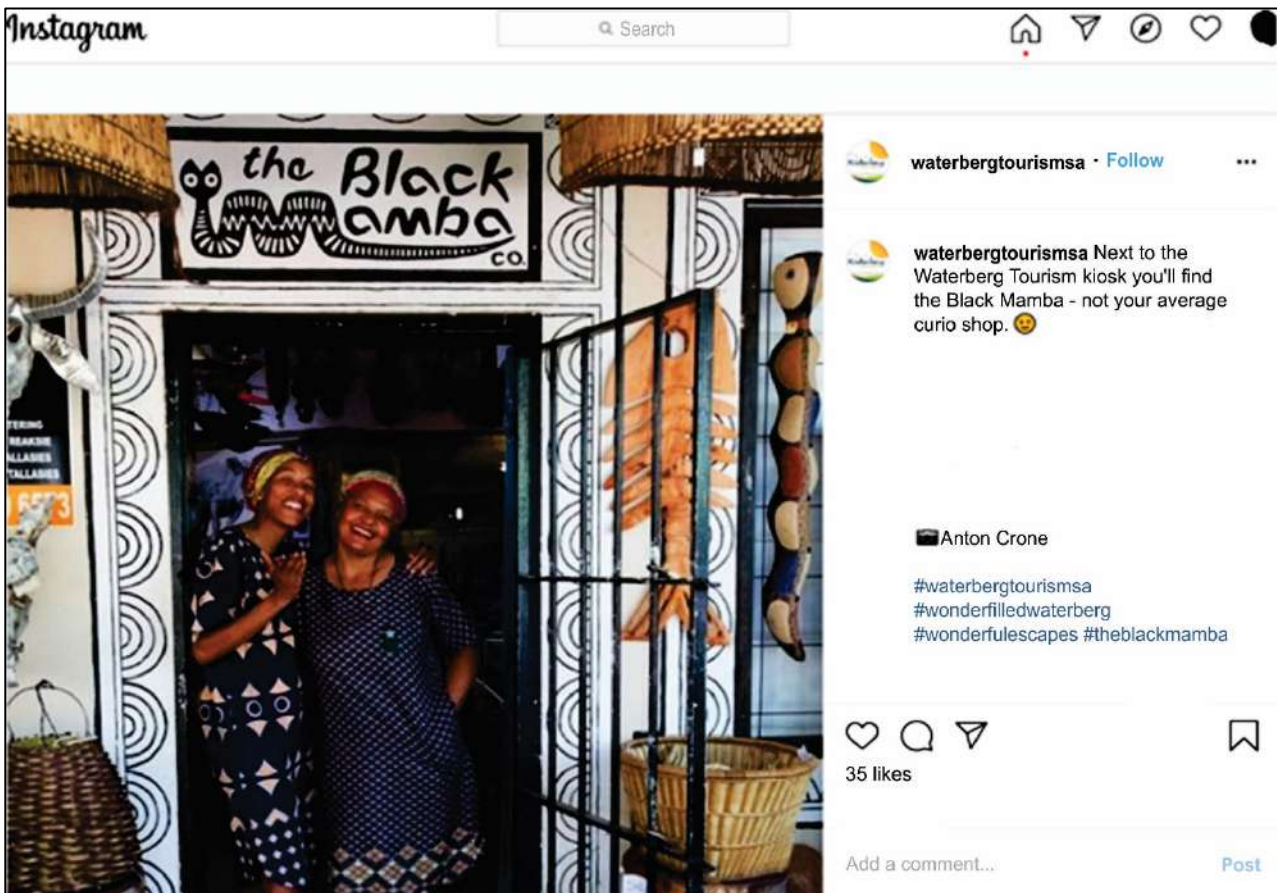

[<https://www.vaalwater-info.co.za>]
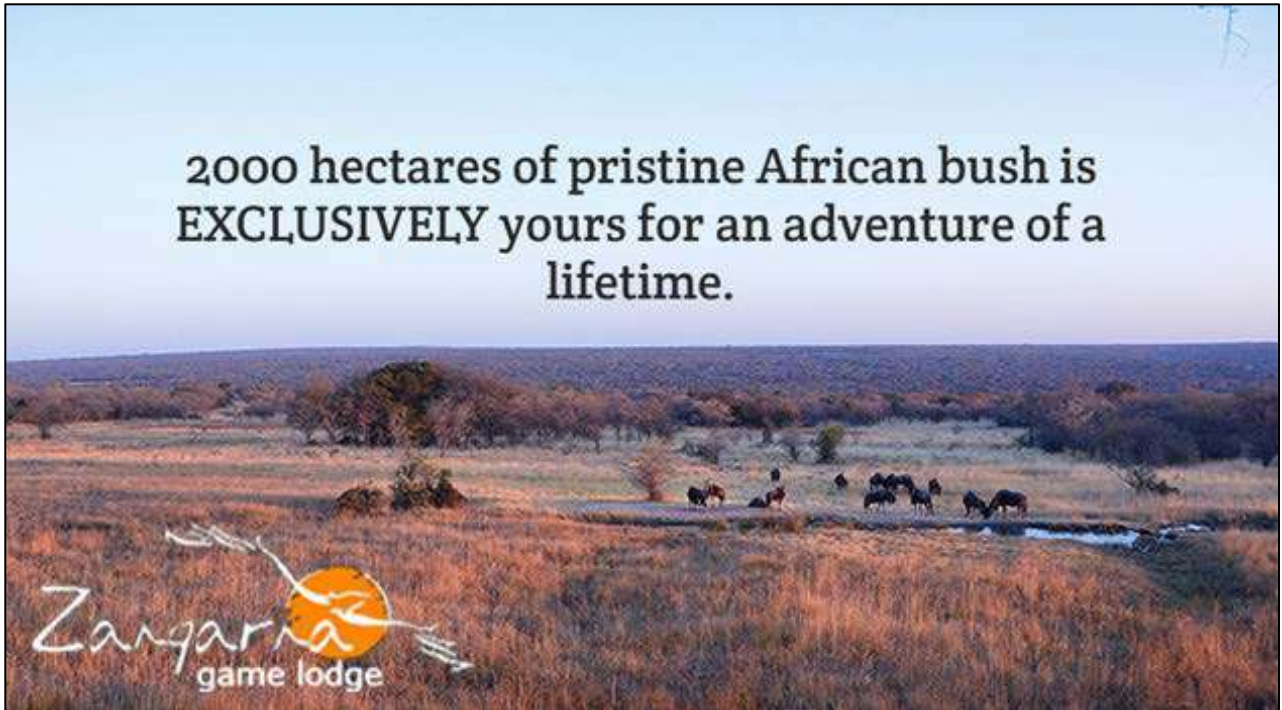
Figure 8: The position of the coal mines and power stations
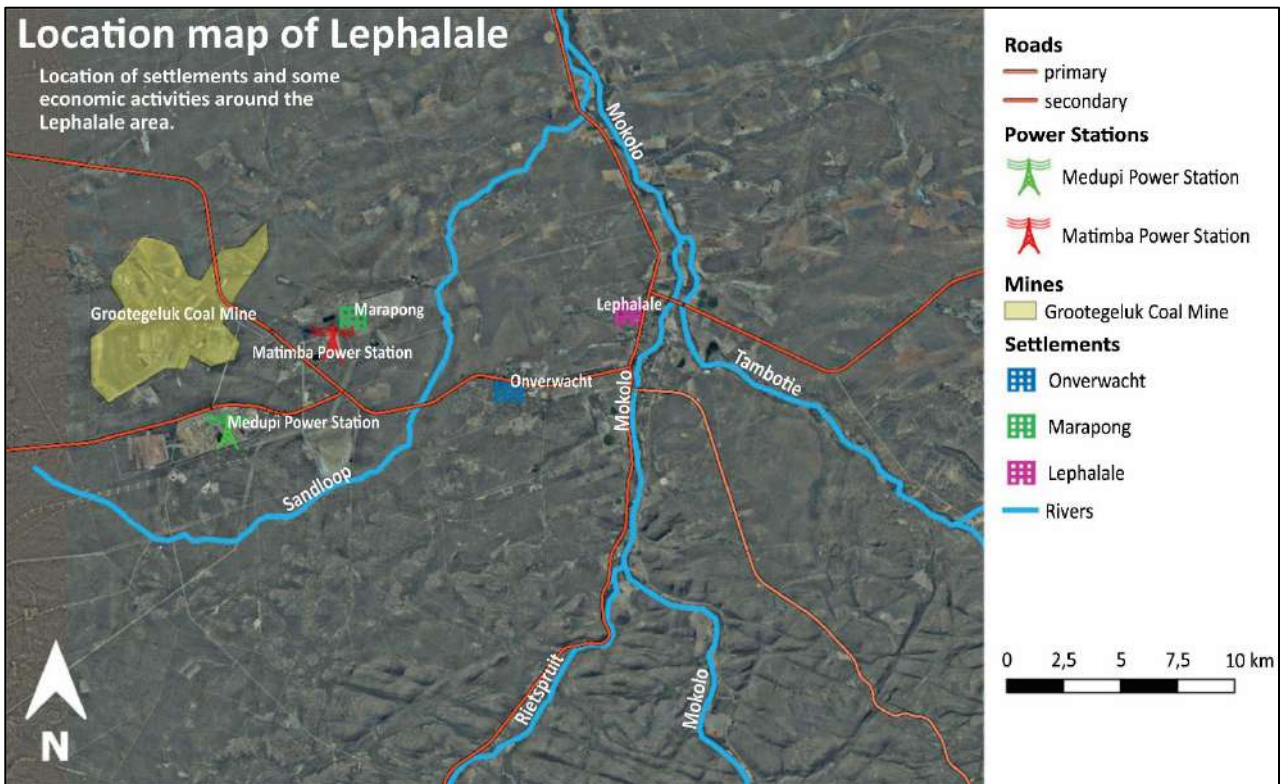
[Source: Produced by Examiner]

Figure 9: An Instagram post by Waterberg Tourism

[Source: Instagram Waterberg Tourism]

   1.8.1   Discuss ONE positive way tourism affects the informal sector.   (2)

   1.8.2   Explain TWO ways in which tourism uplifts women within the economy.   (4)

   1.8.3   You are asked to write a report for the Limpopo Provincial Government, in which you evaluate economic development in the Lephalale and greater Limpopo regions.

- Explain how the mines and the power stations will cause *rural depopulation*.

- Analyse how the *game farms could benefit* the region *socio-economically*.

- Describe the *importance of the mines and the power stations* to the economy of Limpopo.

- Evaluate the *hindrances to economic development* that is faced by Limpopo.

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

| CRITERIA	MARKS
Writing skills • Take into consideration structure and presentation. • Use of brief introduction and conclusion. • Logical discussion and use of sub-headings.	**4**
Content knowledge • Correct use of geographical terminology and concepts. • Adherence to topic and sub-headings.	**12**
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 provided. • If appropriate, reference must be made to familiar / local or other examples.	**4**

(20)

100 marks

QUESTION 2   CLIMATE, WEATHER AND GEOMORPHOLOGY

2.1   **Subtropical anticyclones and associated weather conditions**

Figure 10 shows the changes in temperature and wind speed near Gqeberha in March 2020.

Figure 10
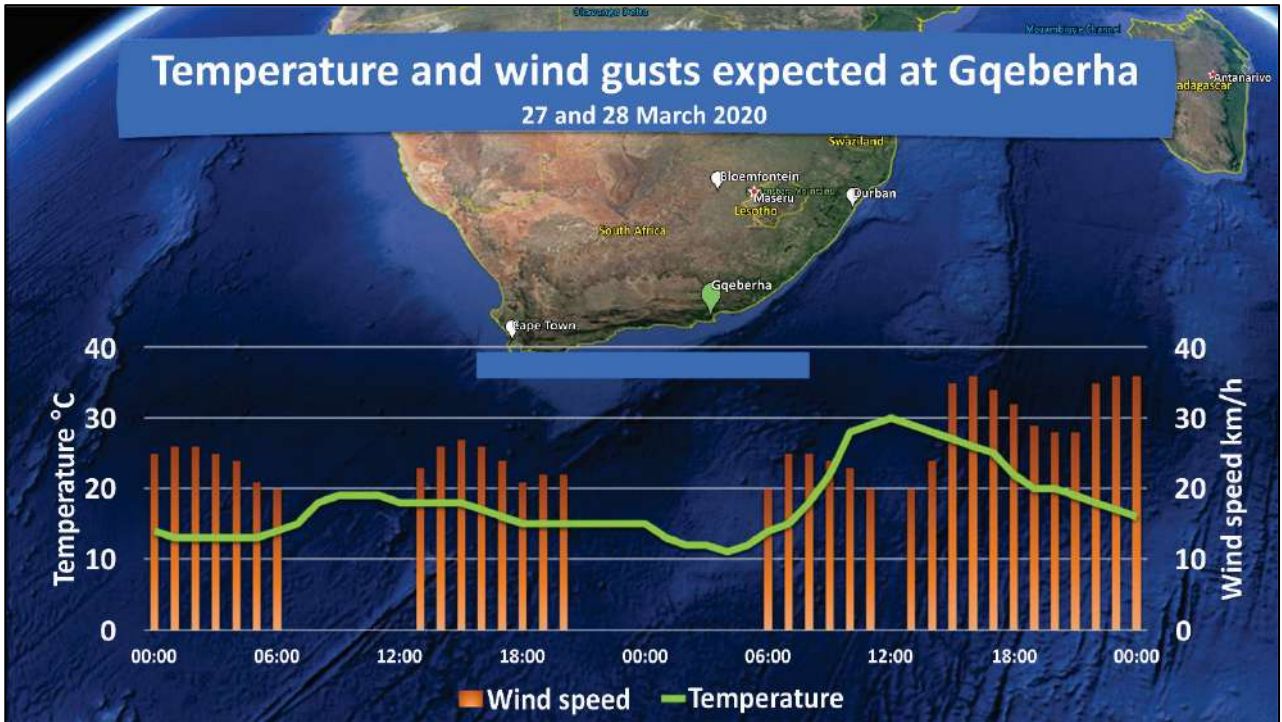
[Source: ASKMeteo]

Selecting the correct answer in each instance, write the number of the question and the letter corresponding to your answer, e.g. 2.1.0 A.

2.1.1 The highest temperature for Gqeberha on 28/03/2020 is ...

A   20 °C
B   25 °C
C   27 °C
D   30 °C   (1)

2.1.2 The highest expected wind speed is …

A   34 km/h
B   35 km/h
C   36 km/h
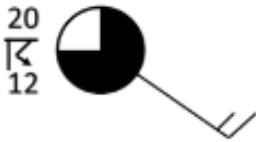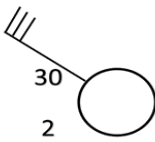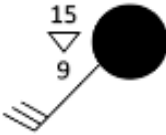D   37 km/h   (1)

2.1.3 The wind being experienced at Gqeberha is known as a ...

A   berg wind.
B   monsoon.
C   typhoon.
D   jet stream.   (1)

2.1.4 This wind is formed through …

      A   rising air over the interior.
      B   the low pressure forming over warm water.
      C   air descending the escarpment.
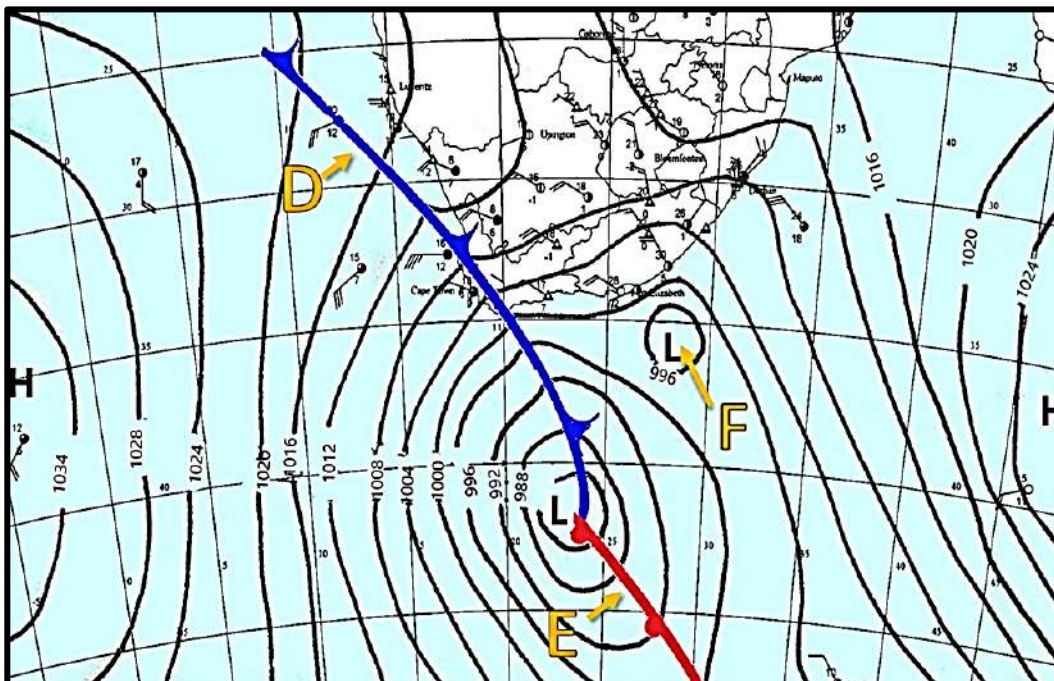   D   air descending within a valley at night.   (1)

2.1.5 A typical weather station for this type of wind is …

A   C

B   D   (1)

2.2   Mid-latitude cyclones

Study Figure 11; a synoptic chart of a mid-latitude cyclone moving over Cape Town.

Figure 11

[Source: Adapted from SAWS]

2.2.1 Name the fronts at **D** and **E**.   (2)

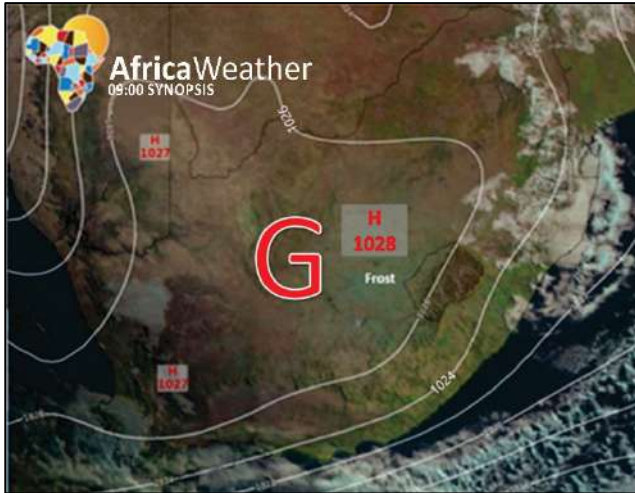2.2.2 Name the type of low pressure at **F**.   (1)

2.2.3 Write a tweet describing the weather conditions to be expected as front **D** impacts Cape Town.   (4)
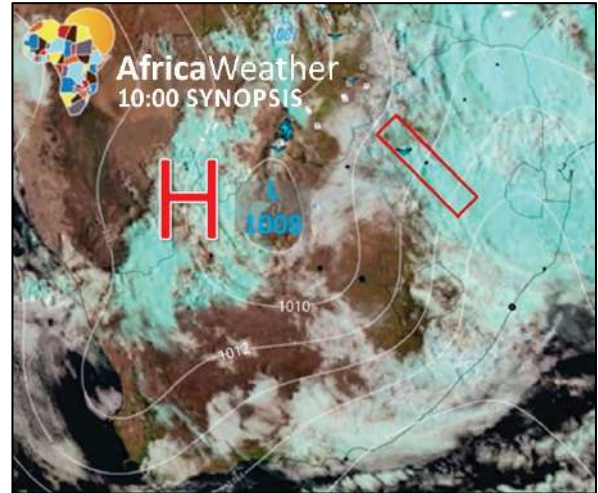
2.3 **Subtropical anticyclones and associated weather conditions**

Study the two synoptic maps, Figures 12 and 13, showing two different seasons over South Africa.

Figure 12

Figure 13

[Source: AfricaWeather]

2.3.1 Name the weather systems at **G** and **H**. (2)

2.3.2 Identify the seasons in Figures 12 and 13. (2)

2.3.3 Provide ONE reason for your answer in Question 2.3.2. (2)

2.3.4 Explain why there is a lack of cloud cover in Figure 12. (2)

2.4 **Valley climate**

Photograph 1 shows a frost pocket at the bottom of a valley on a clear morning.

Photograph 1

[Source: Examiner's photograph]

2.4.1 Name the season in which a frost pocket is most likely to occur. (1)

2.4.2 Draw a diagram to explain how this frost pocket is formed. (4)

2.5   **Fluvial processes**

Figure 14 shows a river capture event in the Eastern Cape, along the Kouga River.

Figure 14

COLOUR KEY

1. **Kouga River**

2. **Joubertskraal River**

3. **Witteklip River**

4. **Kaapsedrif River**
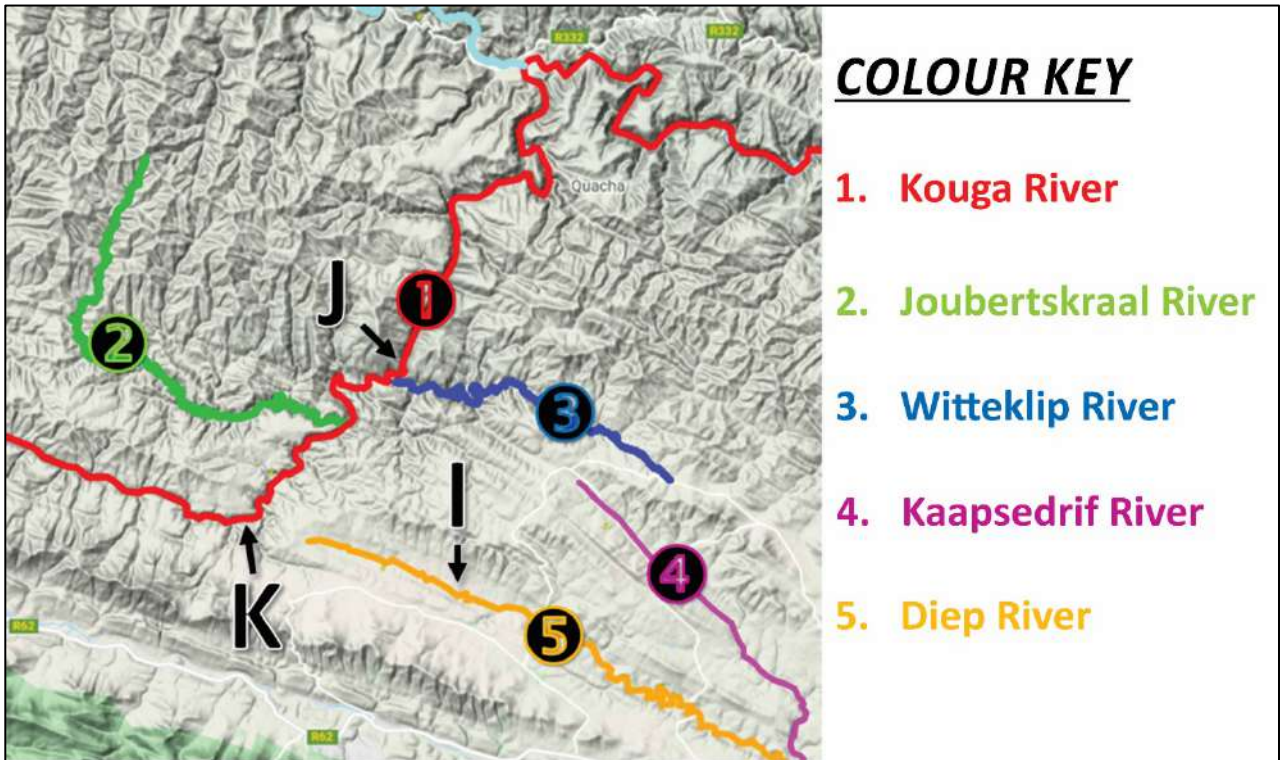
5. **Diep River**

[Source: Map adapted by Examiner]

2.5.1   Select the terms in brackets that will make the statements TRUE. Write only the question number and the corresponding term, e.g. (d) river.

(a)   The Diep River (**I**) is known as the (captive / misfit / captor) river.   (1)

(b)   The Kouga River (**J**) is known as the (captive / misfit / captor) river.   (1)

(c)   The feature labelled **K** is known as the (elbow of capture / wind gap / knickpoint).   (1)

2.5.2   Suggest TWO characteristics that the Kouga River would need to capture another river.   (2)

2.6   **Fluvial processes**

Photograph 2 is a photograph of a river channel near the Simonstown area.

Photograph 2

[Source: Examiner's photograph]

2.6.1   Using evidence from the photograph, prove that the following are true.

(a)   The river is in the *upper course*.   (1)

(b)   The river is carrying mostly *bedload*.   (1)

(c)   At this point, the river's most likely erosional process is *attrition*.   (1)

2.6.2   Why is flash flooding likely to happen at this point of the river?   (1)

2.6.3   How does the channel *size* and *shape* affect stream discharge?   (4)

2.7   **Fluvial processes**

Figure 15 is a diagram of a typical flood plain of a river.

Figure 15
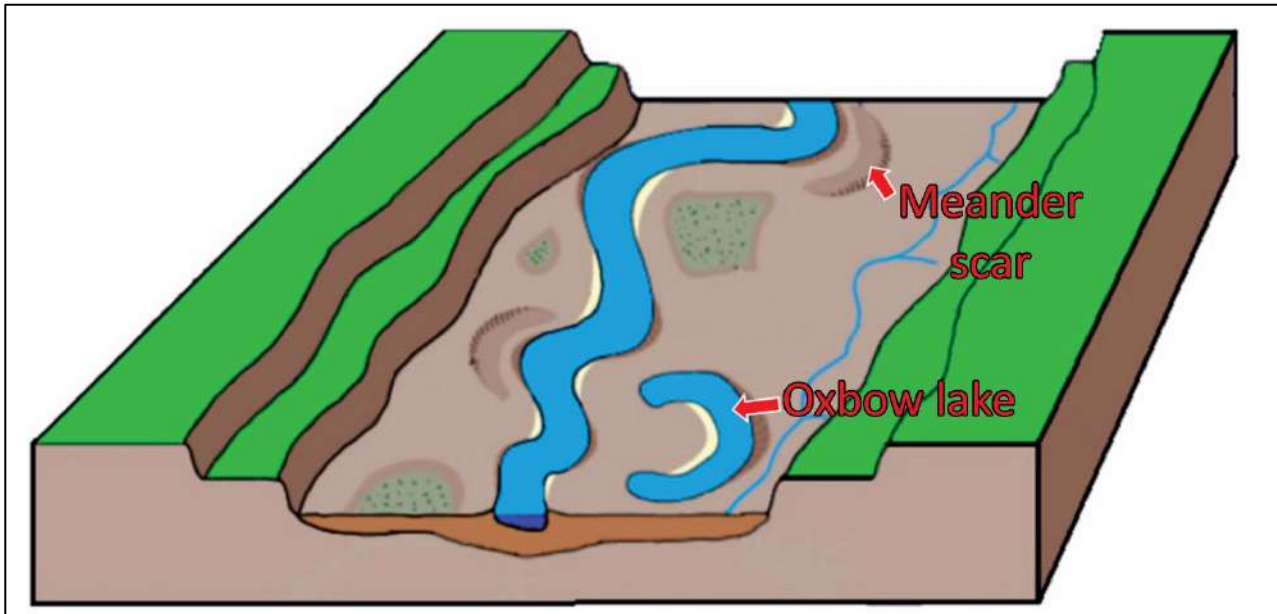
[Source: Image adapted by Examiner]

2.7.1   What is the difference between an oxbow lake and a meander scar?   (1)

2.7.2   Did river erosion or deposition initially form the oxbow lake?   (1)

2.7.3   Examine the role that erosion and deposition has in the formation of floodplains and meanders.   (4)

2.7.4   List TWO economic benefits of a floodplain.   (2)

2.7.5   Examine TWO impacts of agriculture on a floodplain and river system.   (4)

50 marks

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

3.1   **Settlement terminology**

Choose a term from Column A that matches the description in Column B. Write only the letter next to the question number in the answer book, e.g. 3.1.0. H.

Column A		Column B	
3.1.1	Blight	A	An area in cities to stop development and the expansion of a city.
3.1.2	Greenbelt	B	A town that provides shopping and service centres for the surrounding region.
3.1.3	Suburbanisation	C	A city which dominates all other urban places.
3.1.4	Market town	D	The settlement shape responsible for the greatest accessibility to a settlement.
3.1.5	Bridging point	E	When people, factories, offices and shops move out from the central cities and into the suburbs.
		F	A settlement where a river can be crossed and becomes a trading centre.
		G	Run-down and abandoned buildings.

(5)

3.2   **Urban settlement issues**

Study the tweet (Figure 16), by Eyewitness News, about an incident in an informal settlement in South Africa.

Figure 16
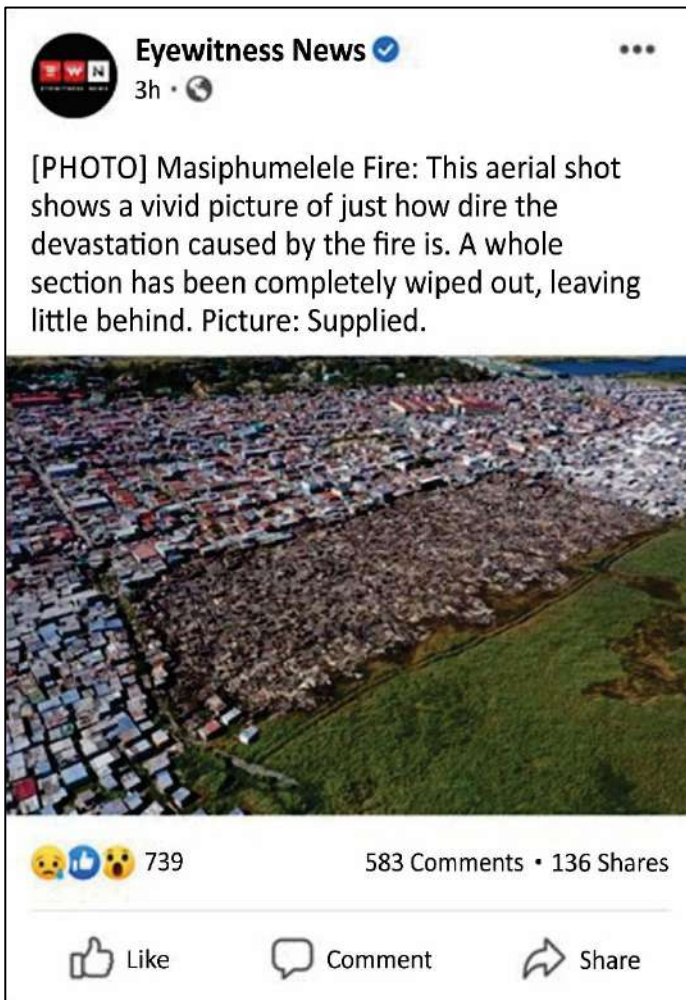
[Source: Twitter/EWN]

3.2.1 Explain why fires are such a major threat in informal settlements.   (2)

3.2.2 How does rural-urban migration influence the growth of informal settlements in South Africa?   (1)

3.2.3 Evaluate TWO reasons why it is challenging to solve the problems experienced in informal settlements.   (4)

3.3   **Urban settlement issues**

The building in Photograph 3 is a building close to the CBD of Sandton, in the zone of transition.

Photograph 3

[Source: Examiner's photograph]

3.3.1   Explain *invasion and succession*.   (1)

3.3.2   Why are the land values so high within the zone of transition, when the buildings look run down?   (2)

3.3.3   Discuss the impact that *gentrification* has on the current residents of a renewed area.   (2)

3.4   **Urban structure and patterns**

Read the following fact file about the new development, Cornubia, near Umhlanga.

Fact File: Cornubia

- Strategically located:
  - Next to the suburbs of Mount Edgecombe and Umhlanga <u>new town</u>
  - Approximately 17 kilometres from the CBD of Durban
  - 7 kilometres south of King Shaka International Airport
  - Along the N2 highway
- Cornubia is transforming the physical and socio-economic landscape of the province.
- This <u>all-inclusive urban node</u> is a place where business, lifestyle and retail activities thrive; a fully integrated concept of mixed-use and mixed-income.
- There has been swift uptake of commercial and industrial sites, such as the N2 <u>business estate</u>.

[Source: <https://cornubia.co.za & www.portfolio-property.com>]

3.4.1 Explain the following terms:

(a) *new town*   (1)

(b) *all-inclusive urban node*   (1)

(c) *business estate*   (1)

3.4.2 Provide TWO situational factors that would attract development in this area.   (2)

3.4.3 Explore TWO benefits this development would have for the Umhlanga region.   (4)

3.5   **Economic terminology**

Choose a term from Column A that matches the description in Column B. Write only the letter next to the question number in the answer book, e.g. 3.5.0. h.
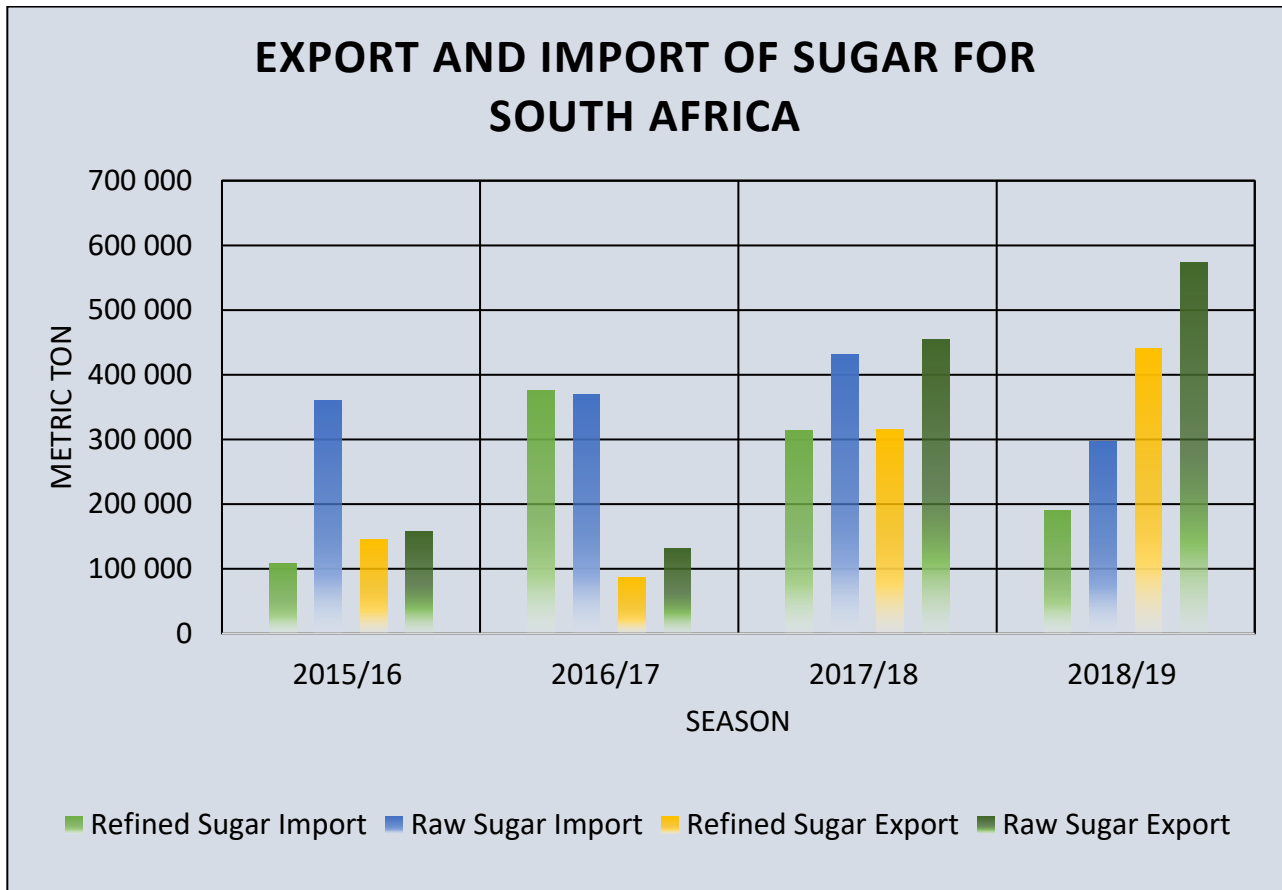
Column A		Column B	
3.5.1	Indirect taxation	A	Located all over the geographical area without concentration in one area.
3.5.2	Commodity	B	Over-concentration of industries in a few core areas.
3.5.3	Deregulation	C	A comparatively homogeneous product that can typically be bought in bulk.
3.5.4	Footloose industries	D	Located where one means of transport is replaced by another.
3.5.5	Raw material-oriented	E	Removing legal restrictions on the amount of competition, the sorts of business done, or the prices charged within a particular industry.
		F	High-tech industries that are located anywhere due to improved technology.
		G	Located close to the source of raw materials, as it produces perishable goods.
		H	The levying of tax on goods and services, rather than income or profits.

(5)

3.6   **Agriculture**

Study Figure 17 below; about the importing and exporting of sugar cane in South Africa.

Figure 17

EXPORT AND IMPORT OF SUGAR FOR SOUTH AFRICA

[Bar graph showing METRIC TON (y-axis, 0 to 700 000) vs SEASON (x-axis). Seasons: 2015/16, 2016/17, 2017/18, 2018/19. Categories: Refined Sugar Import, Raw Sugar Import, Refined Sugar Export, Raw Sugar Export]

■ Refined Sugar Import ■ Raw Sugar Import ■ Refined Sugar Export ■ Raw Sugar Export
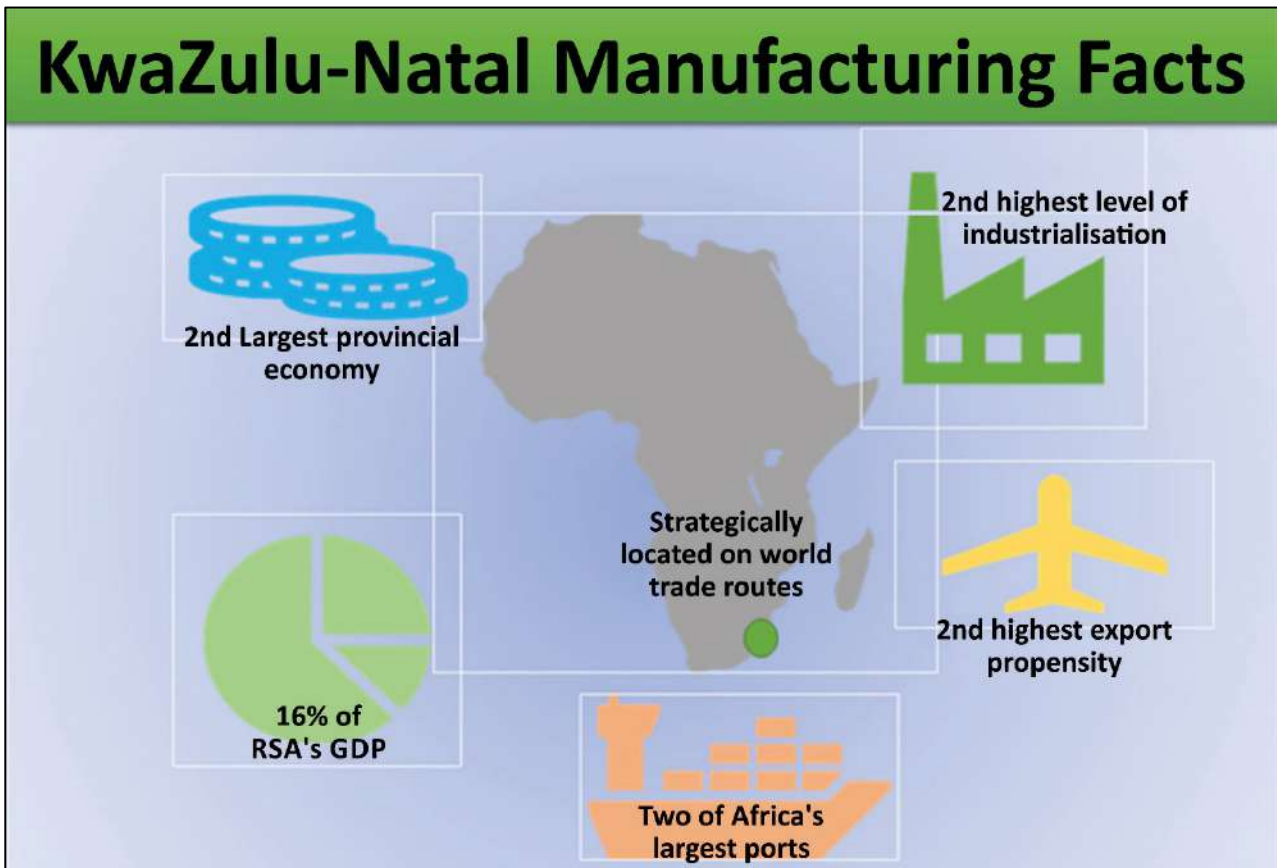
[Source: <https://apps.fas.usda.gov>]

3.6.1   Name ONE province where sugar is grown in South Africa.   (1)

3.6.2   Using sugar as your example, explain how the *value chain* works in industries.   (2)

3.6.3   Name TWO linked industries associated with the production of sugar.   (2)

3.6.4   Provide ONE possible environmental and ONE political factor to explain the low exports of refined sugar in 2015/16 and 2016/17.   (2)

3.6.5   Explain ONE economic factor that would affect the attempts to increase agricultural production, like sugar.   (2)

3.7   **Strategies for industrial development**

Study Figure 18; which shows some basic facts about the KwaZulu-Natal (KZN) economy.

Figure 18

[Source: manufacturingindaba]

3.7.1   List TWO factors that promote and TWO factors that limit economic development in KZN.   (4)

3.7.2   Explain ONE advantage that may result from *industrial agglomeration*.   (2)

3.7.3   Analyse TWO ways in which transport infrastructure influences the location of economic activity in KZN.   (4)

50 marks

Total: 200 marks