



INTERNATIONAL SECONDARY CERTIFICATE EXAMINATION
MAY 2024

GEOGRAPHY: PAPER II

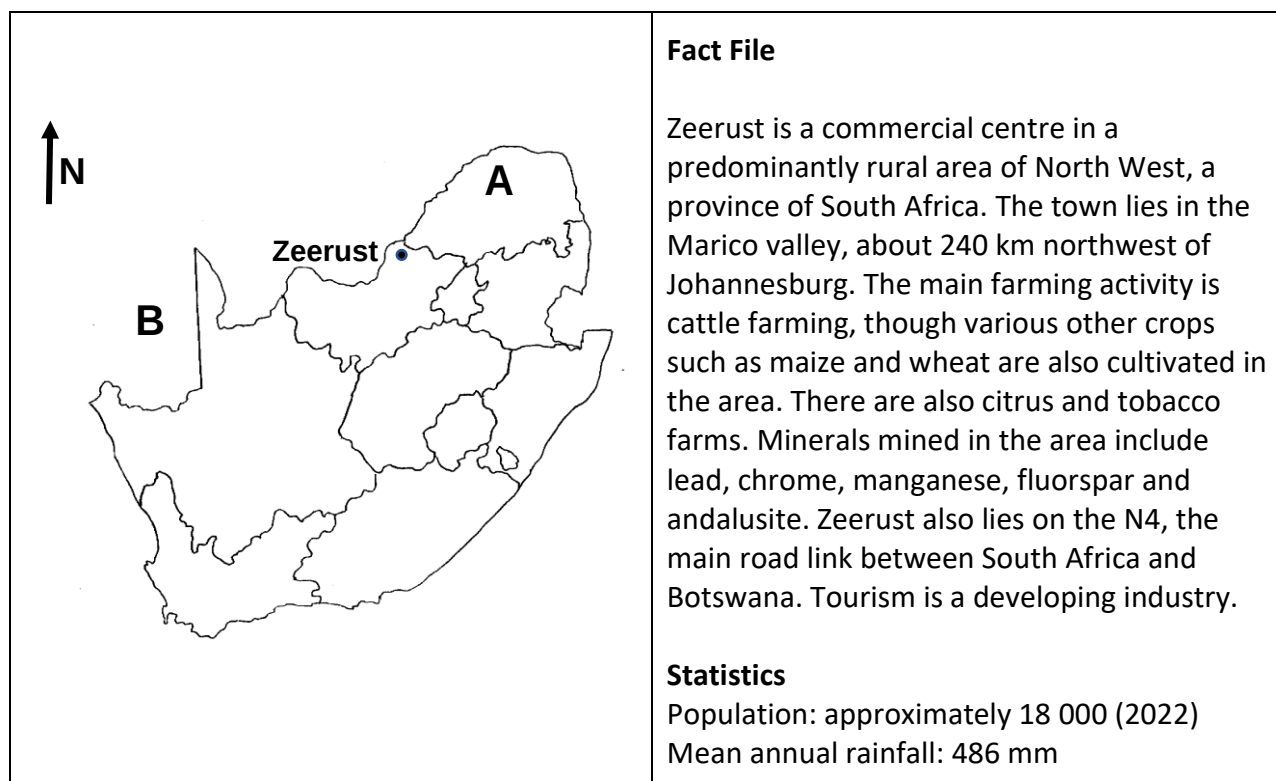
MARKING GUIDELINES

Time: 1½ hours

100 marks

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

Figure 1 – Location map of Zeerust[Adapted from: <<https://en.wikipedia.org/wiki/Zeerust>>]**QUESTION 1 ATLAS USE, MAP ORIENTATION AND TECHNIQUES**

1.1 Refer to Figure 1, a location map, as well as the topographic map extract 2526CA ZEERUST (Map 1) to answer the following questions. Tick (X) the correct box.

1.1.1 The province labelled **A** on the location map above is ...

Free State.	
Gauteng.	
Limpopo.	X
Mpumalanga.	

1.1.2 The country labelled **B** on the location map above is ...

Botswana.	
Eswatini.	
Lesotho.	
Namibia.	X

1.1.3 Identify the feature at 25° 32' 21" S and 26° 04' 33" E.

Cemetery	X
Church	
Hospital	
School	

1.1.4 The length of the Rifle Range in A5 is ... metres.

0,95	
95	
950	X
1 900	

1.2 1.2.1 Calculate the present-day magnetic declination for the topographic map extract 2526CA ZEERUST (Map 1) given the following information for the map.

Magnetic declination is 18° 04' west of True North (2020). The mean annual change is 06' westwards.

Difference in years: **3 years (2023) / 4 years (2024)**

Total change: **06' × 3 = 18' (2023) / 06' × 4 = 24' (2024)**

Magnetic declination in 2024: **18° 28' west of True North**

Calculations:

18° 04' + 24' = 18° 28' (2024)

For 2023

18° 04' + 18' = 18° 22'

1.2.2 (a) Select the correct answer.

The true bearing of the communication tower at spot height 1467 (A6) from the trigonometrical station 119 in C9 is ...

30°.	
60°.	
120°.	
300°.	X

- (b) (i) Are the two points referred to in Question 1.2.2 (a) intervisible?

Yes	X
No	

- (ii) Provide ONE reason for your answer to Question 1.2.2 (b) (i).

Spot height 1 467 is higher than the trigonometrical station 119; there is no high land in between blocking the line of vision.

1.3 Orthophotograph Analysis

Refer to the orthophoto map extract, 2526CA Zeerust (Map 2), as well as the topographic map extract 2526CA ZEERUST (Map 1) to answer the following questions.

- 1.3.1 Identify the land-use of the areas labelled **C** and **D** on the orthophoto map. State a reason for their location.

	Land-use	Reason for location
C	<i>Sewerage works</i>	<i>Outskirts of town / rural-urban fringe Close to river</i>
D	<i>Light / industrial area</i>	<i>Outskirts of town / close to railway Away from residential areas / large buildings – needs open space There is a shop in the precinct</i>

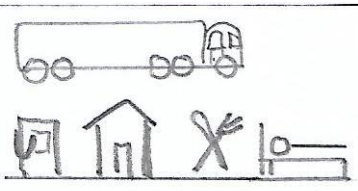
- 1.3.2 What activity is taking place at **E** on the orthophoto map?

Quarrying or mining / this is an excavation.

- 1.3.3 Explain how you would identify a river course on an aerial photograph / orthophoto map.

- **Irregular lines / curving lines.**
- **Darker in colour – winding course.**
- **Look for the tree line – woolly texture.**

- 1.3.4 The site labelled **F** on the orthophoto map is the newly constructed Zeerust Truck Stop. Design a map symbol that could be used to indicate such a feature on the map.

Truck Stop / Port	Map symbol 
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Accept suitable symbol.

- 1.3.5 Calculate the area (in square metres) of the Truck Stop (**F**), marked by a green block on the orthophoto map extract 2526CA ZEERUST (Map 2).

Show your workings as set out below:

- (a) Length of Truck Stop: **220–230 m**
- (b) Width of Truck Stop: **190–220 m**
- (c) Area of the Truck Stop: **41 800 m² to 50 600 m²**
- (d) Given that 1 hectare (ha) = 10 000 m², work out how many hectares the Truck Stop is.

Area: **4,18 to 5,06 ha**

Calculations

- (a) $2,2 / 2,3 \text{ cm} \times 100 = 220 / 230 \text{ cm}$
- (b) $1,9 \text{ to } 2,2 \text{ cm} \times 100 = 190 \text{ to } 220 \text{ cm}$
- (c) $41\,800 \text{ m}^2 \text{ to } 50\,600 \text{ m}^2$
- (d) $41\,800 \text{ m}^2 / 50\,600 \text{ m}^2 \div 10\,000 \text{ m}^2$
 $= 4,18 \text{ to } 5,06 \text{ ha}$

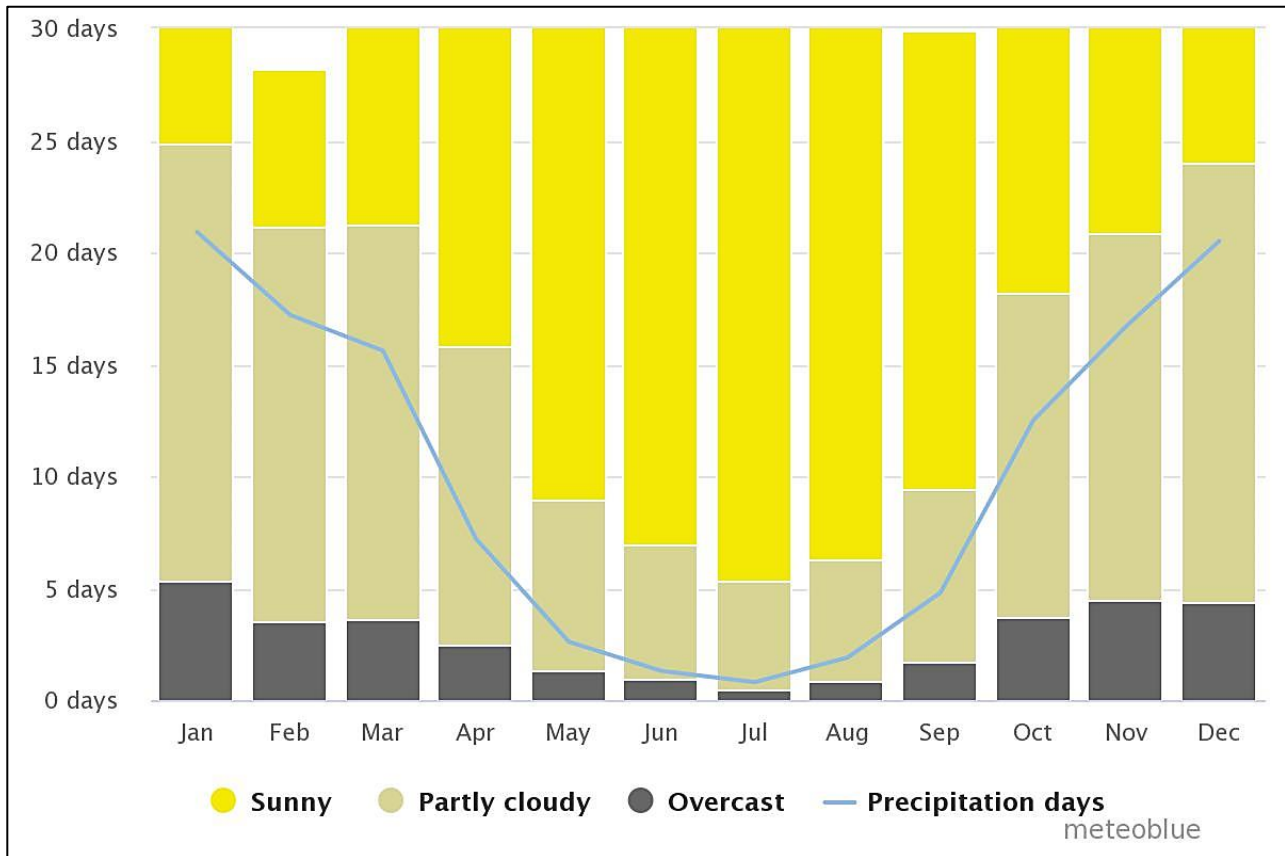
Note: measurements must be checked on the final map.

Allow a range for the answers.

QUESTION 2 THE PHYSICAL GEOGRAPHY OF THE ZEERUST AREA

Refer to Figure 2.

Figure 2 – Graph of the number of sunshine hours and precipitation in Zeerust.



[Source: <https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/zeerust_south-africa_937136>]

2.1 Climate

2.1.1 State the month that experiences the following:

- (a) Most sunny days: **July**
- (b) Most overcast days: **January**

2.1.2 (a) During which season does Zeerust experience most of its rainfall?

Summer

- (b) With reference to Figure 2, provide ONE piece of evidence for your answer to Question 2.1.2 (a).

Number of precipitation and overcast days are the highest from October to March, i.e. summer in the Southern Hemisphere.

2.2 Fluvial Geomorphology

Refer to the topographic map extract 2526CA ZEERUST (Map 1) and the orthophoto map extract 2526CA ZEERUST (Map 2).

- 2.2.1 Name the perennial river that flows into the Klein Maricopoort Dam from the southwest (C7).

Klein Marico River

- 2.2.2 Using geographical evidence (Map 1 and Map 2; Figure 2), verify why most of the tributaries in the area are non-perennial.

Western section of South Africa – less rainfall / average rainfall is 486 mm (Fact File).

Very little vegetation cover evident / farming only along the perennial river courses.

- 2.2.3 The dam lies in a poort of a river. Provide TWO descriptive phrases that would describe the geomorphological characteristics and TWO characteristics that relate to the economic importance of a poort.

	Geomorphological characteristics	Economic importance
1.	Long narrow valley	Good for damming water / storage
2.	Steep-sided slopes	Accessibility – transport routes
3.	River flows in one direction through the poort	Construction of transport routes through a barrier as the river has cut through
4.	Known as a water gap	

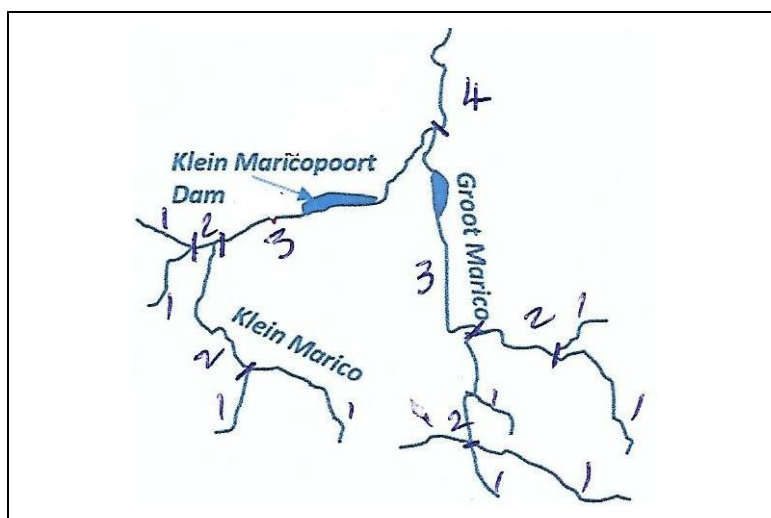
Glossary

*poort – a narrow pass through mountains

Credit acceptable points.

- 2.2.4 Study Figure 3 below, which shows the upper catchment areas of the Klein* and Groot** Marico rivers. Only the perennial rivers have been drawn.

Figure 3 – The Klein and Groot Marico River Catchment areas



*Klein – small

**Groot – large

- (a) Order the streams in Figure 3. Complete the table below.

Order	1st	2nd	3rd	4th
Number of tributaries	10	4	2	1

- (b) Explain the law of stream orders, describing the relationship between stream order and the number of streams. Use the data / information recorded in the table above.

The higher the stream orders, the fewer the number of tributaries. Vice versa acceptable.

- (c) Select the correct answer. The drainage density of this catchment area (Figure 3) is:

Low	C
Fine	
Dense	
High	

- (d) Suggest ONE reason for your answer to Question 2.2.4 (c) above.

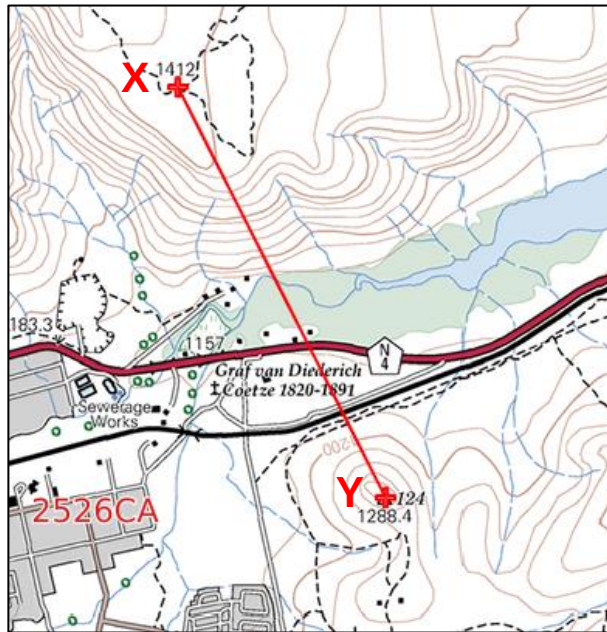
- **Very few first-order streams in the area / thus drainage density is coarse.**
- **Low rainfall / porous rocks.**

Consider relevant factors.

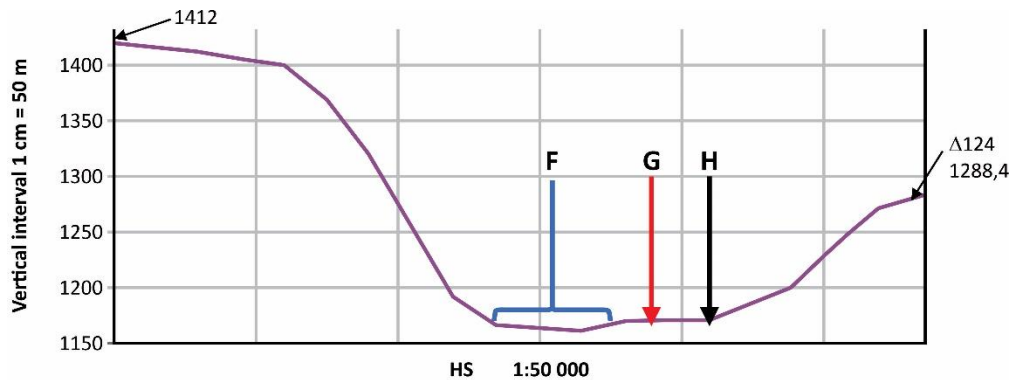
2.3 Relief Features in the Zeerust Area

Refer to Figure 4A, Figure 4B and the cross section drawn from X (Spot height 1412) to Y (Trigonometrical station 124) (B7–C7 on Map 1).

Figure 4 – An extract from Map 1 showing the cross-section line X–Y



Cross section from X to Y



- 2.3.1 (a) Identify the features (F–H) that have been labelled on the cross section.

F: Klein Marico River / river valley / floor / floodplain

G: N4

H: Railway

- (b) Correctly label the start and end points (the features labelled X and Y) on the cross section above.

2.3.2 Calculate the vertical scale of the cross section on page 9.

1 : 5 000

2.3.3 Work out the vertical exaggeration of the cross section on page 9.

VE: 10 times

Calculations

2.3.2 $50 \text{ m} = 50 \times 100 = 5\,000 \text{ cm}$

2.3.3 $\frac{1: 5\,000}{1: 50\,000} = \frac{\text{BIG}}{\text{SMALL}} = \frac{50\,000}{5\,000} = 10$

QUESTION 3 SETTLEMENT

3.1 Refer to the topographic map extract 2526CA ZEERUST (Map 1), as well as the orthophoto map extract 2526CA ZEERUST (Map 2) to answer the following questions. Tick (X) the correct box.

3.1.1 The town of Zeerust may be classified as a ... settlement.

break-of-bulk	
central place	X
mining	
specialised	

3.1.2 The predominant street pattern in Zeerust is ...

organic.	
haphazard.	
grid.	X
cobweb.	

3.1.3 The rural farming landscape surrounding Zeerust shows a ... settlement pattern.

dispersed	X
nucleated	
patchwork	
small holding	

3.2 Locate the Ramosa Riekert Holiday Resort (E8).

3.2.1 Suggest THREE types of adventure activities that could be undertaken at this resort.

1. **hiking trails**
2. **mountain biking**
3. **quad biking**

Other: zipline

Accept suitable adventure activities.

3.2.2 Provide ONE well-reasoned answer to support your suggestions in Question 3.2.1 on page 11.

Reason: **Lots of tracks / footpaths around.**

Very open and flat – easy to get around the resort.

Credit relevant reasons.

QUESTION 4 ECONOMIC ACTIVITIES AND GIS**4.1 Zeerust Solar Park**

Refer to Figure 5 below. This is a satellite image of the Zeerust Solar Park. Read the infographic on the Zeerust Solar Park provided in Figure 6. The area is marked off with a red block on the topographic map extract 2526CA ZEERUST (Map 1), in E4 and E5.

Figure 5 – Satellite image of Zeerust Solar Park



[Source: Google Earth]

4.1.1 Identify the constructed features labelled **P** and **Q** above.

P: R49 / road

Q: water tank / reservoir

4.1.2 In which economic sector would the Zeerust Solar Park be classified?

Production of energy – secondary

Could accept: Supply of electricity (as a service) – tertiary

- 4.1.3 Provide ONE site factor and ONE situational factor for the location of this solar park.

Site: Flat land / open space / no relief to cause shadows / allows for direct heating.

Suitable climate.

Situation: Close to power lines / grid.

Road's accessibility.

Close to Zeerust.

- 4.1.4 (a) In which direction are the solar panels facing?

northwards

- (b) Provide ONE reason for your answer.

Receives most direct sun rays for latitude / best solar direction in Southern Hemisphere / direct heating.

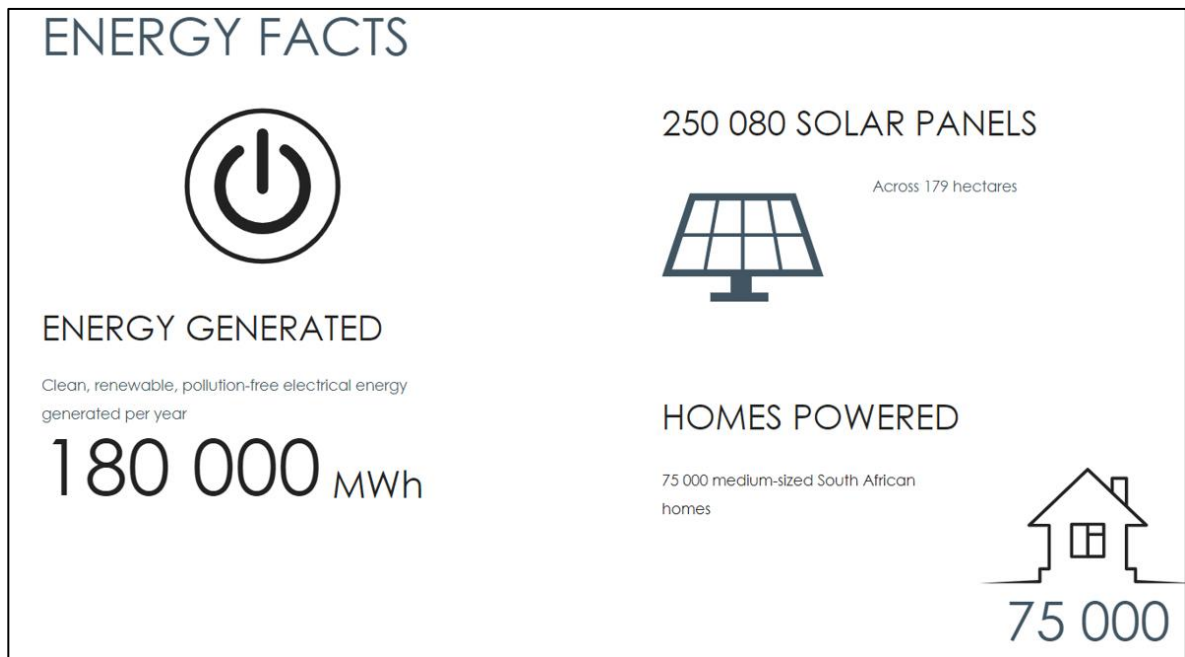
- 4.1.5 Using map evidence (Map 1) together with Figure 5 on page 12, provide TWO pieces of evidence to show that sound environmental principles are being used for this energy project.

- **A buffer strip created for the dams – LHS of the image.**
- **River courses protected by riparian vegetation – tree line evident / prevents erosion.**

Accept geographically relevant suggestions.

4.1.6 Refer to the infographic (Figure 6) below as well as the topographic map extract 2526CA ZEERUST (Map 1).

Figure 6 – Infographic on Zeerust Solar Park



[Source: <<https://zeerustsolar.co.za/solar-field/#fact-sheet>>]

- (a) Name the farm that the Solar Park is developed on.

**Kameeldoorn 271 JP
(Also De Rust, Vergenoegd, Montgomery's Hoop)**

- (b) How many homes can this Solar Park supply energy to?

75 000

- (c) Refer to Figure 2 (page 6) as well as Figure 6, the infographic. Evaluate the potential of the Zeerust Solar Park to be able to provide this area with all of their energy needs.

- **Population of Zeerust approximately 18 000 – so homes can be easily serviced.**
- **Very large area covered – good generation of solar energy.**
- **Plenty of space to expand.**
- **Suitable climate – good sunshine hours.**
- **Can support many more of the communities in the surrounding area.**

4.2 New N4 Bypass

Refer to the Fact File and Figure 7 below. Figure 7 shows the proposed alternative route for the N4.

Fact File Trans-Kalahari Corridor (N4)	
The Trans-Kalahari Corridor (TKC) is a road network spanning approximately 1 900 km across the territories of Botswana, Namibia and South Africa.	[<http://www.tkcmc.com/index.php/about-us>]
It starts in Gauteng in South Africa and continues through Rustenburg and Zeerust in North West and through Lobatse and Kanye in Botswana.	
The Zeerust Truck Stop is purely for diesel filling and a safe place for truckers to spend the night. There is a Wellness Centre on the premises as well. This is labelled F on the orthophoto map (Map 2).	

[Source: <<https://za.africabz.com/north-west/mbt-zeerust-truck-stop-23139>>]

Figure 7 – Proposed N4 bypass



[Adapted from Open Street Maps by Examiner]

- 4.2.1 Refer to Photograph 1 below. This shows a scene along the main street (N4) that runs through Zeerust.

Photograph 1 – Main street of Zeerust



[Source: <<https://www.facebook.com/snowreportsa>>]

- (a) Identify ONE traffic problem you notice in Photograph 1.

Parking on the pavement / traffic congestion / large vehicles blocking / preventing smooth traffic flow / size of vehicles.

- (b) Suggest ONE cause of this traffic problem.

Trucks stopping for services / food / accommodation (Queen's Villas).

- 4.2.2 Refer to the Fact File on page 15. Suggest why the new Zeerust Truck Stop is a solution to the problem identified in Question 4.2.1 (a) above.

Space to refuel / turn off / rest space / get refreshments / out of a congested area.

4.2.3 Refer to the topographic map extract 2526CA ZEERUST (Map 1) and Figure 7 on page 15.

- (a) Identify TWO GIS data sets of information the municipality would need to consider when proposing the new alternative route for the N4 to bypass the town of Zeerust.

1. Existing infrastructure

2. Terrain – relief

Other: river courses – need for water management.

Credit relevant / suitable suggestions.

- (b) Explain why the road construction company would use a buffer zone on either side of the proposed road when drawing up the plans for the bypass.

Safety / noise pollution / to avoid disputes / to negotiate with affected parties / compensation if necessary.

4.2.4 Comment on TWO disadvantages of this bypass road system for the businesses in the centre of Zeerust.

- **Lose the 'road' traffic or threshold population – sales go down.**
- **Lower sales at petrol stations.**
- **Reduces passing traffic – less congestion.**
- **Businesses may close due to decline in sales.**

Any suitable answer.

Total: 100 marks