NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2025

GEOGRAPHY: PAPER II

MARKING GUIDELINES

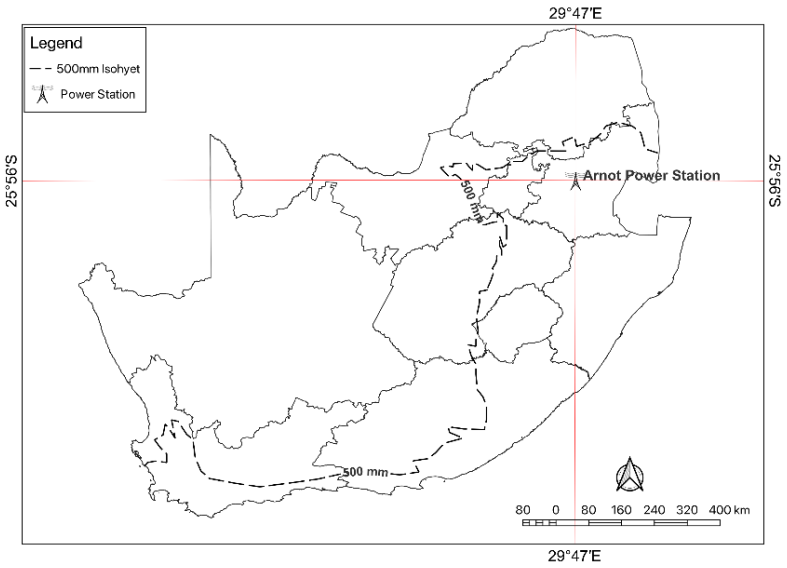
Time: 1½ hours 100 marks

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.

QUESTION 1 FLUVIAL GEOMORPHOLOGY, MAP SKILLS, GIS

Figure 1: Location map



Fact File: Arnot Power Station and Rietkuil

- Rietkuil was a sheep and maize farm, but the Arnot Mine developed in the area in 1971 because of coal deposits found 40 m underground.
- The Arnot Power Station is currently operating at 47% capacity and is due to have two units decommissioned in 2026. This is due to the age of the station and unsustainable maintenance issues.
- Gauteng and greater parts of Mpumalanga are accessible via the N4, which is 20 km away. Eskom-trained pilots to fly from the airfield in Rietkuil.

[Source: Examiner's adaptation]

Refer to the location map in Figure 1 above and the topographic map extract to answer the following questions.

1.1 The Arnot Power Station and Rietkuil are found in _____ (province). (Tick the correct option)

Kwa-Zulu Natal	
Gauteng	
Mpumalanga	**X**
North West	

1.2 Two countries border South Africa to the east of the Arnot Power Station and Rietkuil.
(Choose the correct answer)

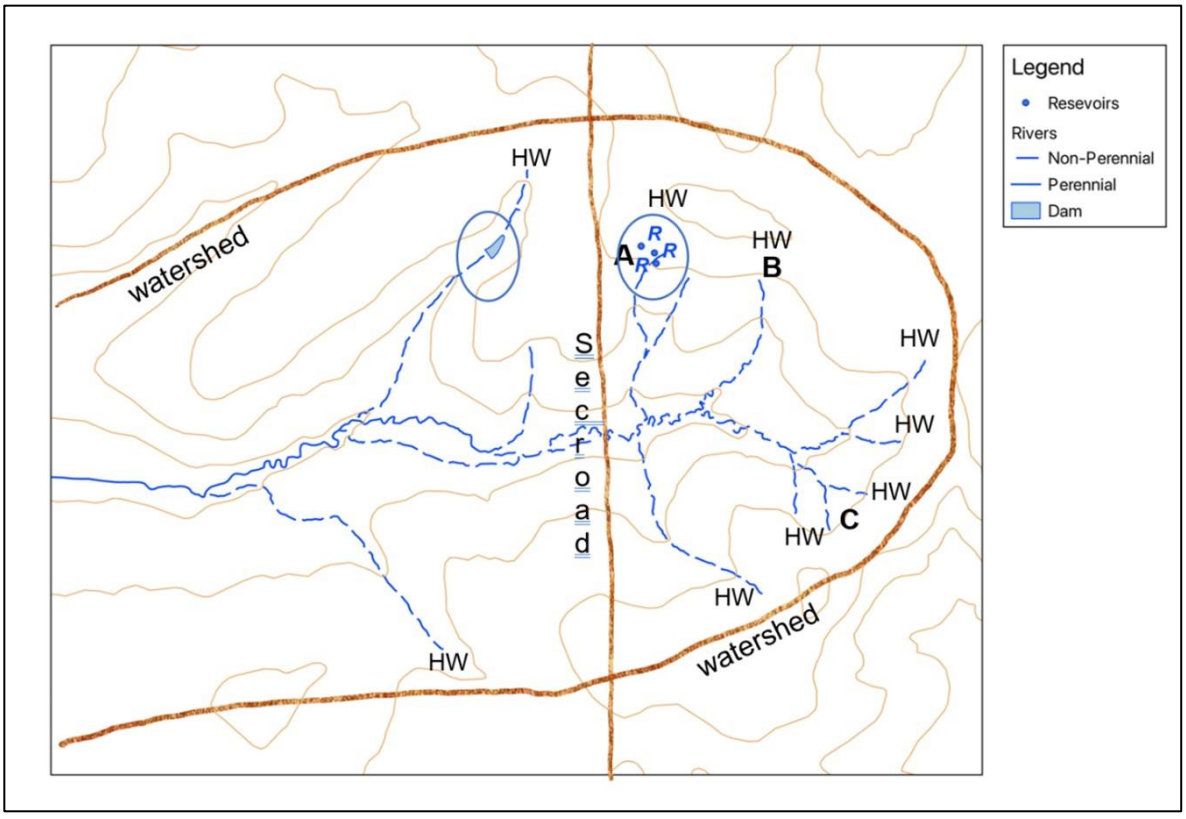
Mozambique and Madagascar	
Eswatini and Zimbabwe	
Lesotho and Eswatini	
Mozambique and Eswatini	**X**

1.3 Gauteng is accessible via the N4 in a _____ direction from Rietkuil.
(Tick the correct option)

southerly	
northerly	
easterly	
westerly	**X**

1.4 Study Figure 2 below. The area covered by this is indicated on the map by a thickened red line. Please note that some fluvial information from the topographic map extract has been purposely left out of Figure 2.

Figure 2: GIS-generated map of a drainage basin



[Source: Examiner's adaptation]

Complete the following questions on Figure 2's map above.

1.4.1 Draw in the secondary road.

1.4.2 On Figure 2, circle TWO different methods of water storage.

1.4.3 Using a clearly labelled line, draw in the watershed of the rivers in this drainage basin.

1.4.4 With the use of the letters 'HW', label any TWO of the rivers' headwaters.

1.4.5 (a) What is the approximate height of the reservoirs at A?
(Tick the correct option)

1600 m	
1660 m	
1680 m	
1700 m	**X**

(b) What is the contour interval used in Figure 2?
(Tick the correct option)

5 m	
10 m	
20 m	**X**
40 m	

1.5 There are two options in Figure 2 for river capture to take place over time, namely B or C. Study Figure 2 in conjunction with the topographic map extract.

1.5.1 Choose the most likely option (B or C in Figure 2) for river capture to occur.
(Tick the correct option)

B	
C	**X**

1.5.2 Explain your choice in Question 1.5.1 above.

There is a small river on the other side of the watershed at C, which could be captured. If there is sufficient rainfall and more flow on the side of C, it could capture the river on the other side. There is no other river close to B.

1.6.1 Identify FOUR characteristics of these rivers in Figure 2. Circle the correct options below.

Exotic	Periodic	Dendritic	Radial
Fine texture	Coarse texture	Upper course	Lower course

1.6.2 Tabulate the stream order of this network in Figure 2.

Stream order number	1	2	3
Number of streams	12	3	1

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QUESTION 2 CLIMATE, MAP SKILLS

Study the Fact File below before answering the questions that follow.

Fact File: Wheat farming in Rietkuil (such as Nooitgedacht Farm in E7, E8, F7 and F8 on the topographical map extract)

Wheat farming is still prominent in this area despite the development of the Arnot Power Station.

Wheat requires 600 mm of water per year for successful farming practice.

[Source: Examiner's adaptation]

2.1 Using TWO pieces of map evidence, explain why the mapped area could be described as having *seasonal rainfall*.

The many non-perennial rivers are evidence that rain only falls in the wet season (summer). There is lots of evidence of water storage being used, indicating there are periods where there is no rain (i.e. the dry season / winter). Irrigation - Canal Windpumps

2.2 Give ONE piece of evidence from Figure 1 (the location map on page 3) and ONE piece of evidence from the topographical map to explain why wheat farming is still possible in this area.

Explain the evidence from Figure 1.

The area lies to the east of the 500 mm isohyet, which indicates sufficient rainfall and irrigation for wheat farming.

Explain the evidence from the topographical map.

A lot of flat land (lack of contours) for extensive wheat farming to take place. There is also some perennial water evident, but more evidence of storage (dams / reservoirs, etc.) that farmers use.

2.3 There is a yellow line drawn from the Arnot Mine, through the power station, and past Rietkuil to Nooitgedacht.

Three temperatures were recorded at 06h00 on a winter's day. They were 9°C, 6°C, and 4°C. Complete the table below to explain where each temperature was recorded.

	Nooitgedacht	**Rietkuil**	**Arnot Power Station**
2.3.1 Circle the correct temperature recorded for each.	9°C 6°C (4°C)	(9°C) 6°C 4°C The correct answer depended on the explanation below	9°C (6°C) 4°C The correct answer depended on the explanation below
2.3.2 Provide a reason for your chosen temperature in each case.	**This area is the furthest out from the urban area, fewer artificial sources of heat.**	**Rietkuil is a built-up area and is likely to have more artificial sources of heat, making it a little warmer.**	**This is the power station, and the steam from the cooling towers will make this area the warmest.**

(1 mark per choice and reason)

2.4.1 The mapped area is generally very flat, favouring development. Calculate the gradient from the southernmost body of water (at the purification plant) in D4 (at the Mine) to the farmhouse at Nooitgedacht in D9.

(a)	Difference in height	1710 – 1630 = 80 m
(b)	Distance between the southernmost body of water (at the purification plant) in D4 to the farmhouse at Nooitgedacht in D9	8200 m to 7850 m
(c)	Gradient	1: 98 to 196
Calculations: Marks awarded for the process if incorrect above		

2.4.2 (a) Would Nooitgedacht Farm (D9) be visible from the Arnot Mine (C4)?
(Tick the correct option)

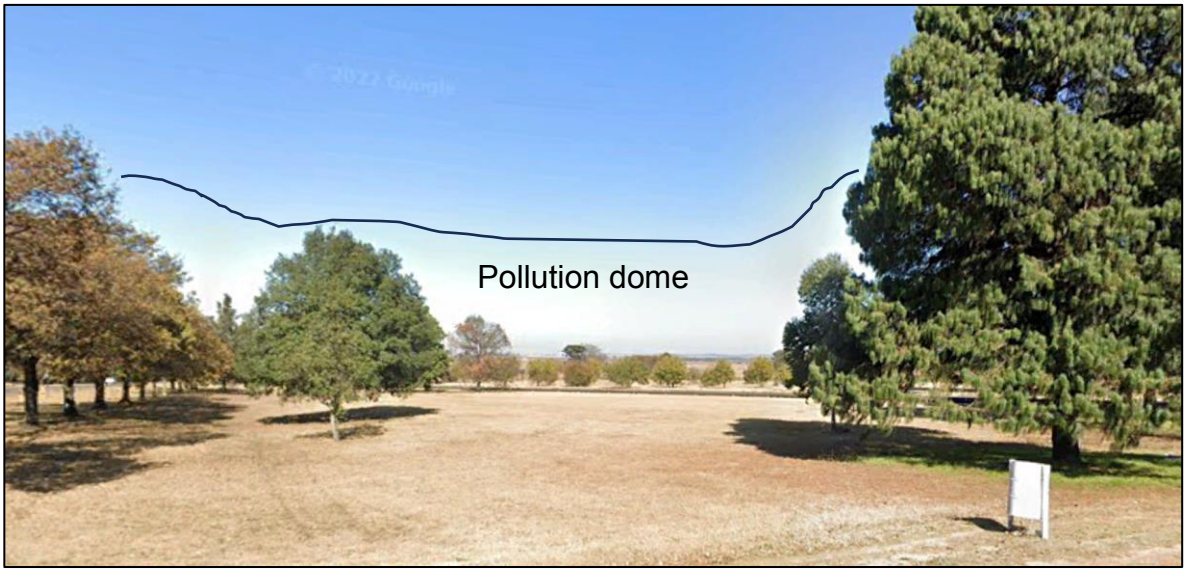
Yes	
No	**X**

(b) Explain your answer in 2.4.2 (a) above.

1700 m contour is also found midway between the two points, so there are features in the way.

2.5 Study Photographs 1, 2, and 3 that were taken in winter.

Photograph 1: Pollution dome over Rietkuil



[Source: Google Earth, street view]

Photograph 2: Cooling tower smoke from the Arnot Power Station

[Source: Google Earth, street view]

Photograph 3: Aerial image of the Arnot Power Station

[Source: NGI imagery]

2.5.1 (a) Approximately what time of day was Photograph 3 taken?
(Tick the correct option)

Morning	**X**
Midday	
Afternoon	

(b) State the reason for your choice in Question 2.5.1 (a) above.

Shadows are cast to the west, meaning the sun is in the east and is still rising.

2.5.2 Photograph 1 was taken mid-morning.

(a) Discuss TWO reasons why a pollution dome is visible in Photograph 1.

- **It is winter, and cooler air / inversion layer is lower, keeping the pollution close to the surface.**
- **The cooling towers, the mine, and the urban area all produce pollution, which is trapped as a dome.**

(b) Give ONE possible reason why the pollution dome is not evident in Photograph 2.

The wind may have picked up and dispersed the pollution dome. The day could be very warm, meaning the inversion layer is too high to 'trap' the pollution.

(c) List TWO issues for the residents of Rietkuil caused by the pollution.

Health issues / respiratory problems.
Lower land / house values.
Acid rain
Soil degradation
Poor visibility

2.5.3 Study the landing strip in D6 on the topographical map extract.

(a) Speculate on the landing strip's main use.
(Tick the correct option)

Flight school (Eskom pilots)	**X**
Wealthy residents	
Film set usage	
Commercial airline use	

(b) What bearing do pilots use when landing on the landing strip from a south eastern direction?
(Tick the correct option)

22°	
112°	
202°	
292°	**X**

(c) Determine the magnetic declination for 2025?

Map magnetic declination	20° 1' West of True North
Change in years from 2025–2023	**2 years**
Annual change	10' West per year
Magnetic declination for 2025	**20° 21'**
Calculations: **20° 1' + 20' = 20° 21'**	

(d) Explain the impact of the pollution dome on pilots' ability to land their aeroplanes.

Reduced visibility due to the pollution will make it difficult or impossible for pilots to land without sophisticated landing instruments.

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QUESTION 3 SETTLEMENT, MAP SKILLS

3.1 In December 2019, three applicants submitted an application to the Director General of the Department of Rural Development and Land Reform. Read the extract below and answer the questions that follow.

Figure 3: Extract from Government Gazette (December 2019)

Property:

No.	Property Description	Locality (District)	Current Title Deed No	Current Owner	Bonds and Restrictive Conditions (Interdicts)
1	Portion 15 (Remaining Extent) of the farm Rietkuil No.397 Registration Division I.S	Lekwa Local Municipality (Gert Sibande)	T7839/1974	W & F Lyons Pty Ltd	K3025/1979RM K4432/1999RM

[Source: Government Gazette]

3.1.1 What land reform is most likely being referred to?
(Tick the correct option)

Land redistribution	**X**
Land restitution	

3.1.2 Consider the extent of natural resources in this area and describe ONE problem that could be encountered during the reform process above.

Claim disputes over availability of resources / cost of claim being a problem due to resources / willing buyer / seller principle.
Lack of capital to invest

3.2 The Arnot Power Station's site was chosen because of several factors. Using the hints below, explain these factors.

Hint	Explanation
Relief of land	**Flat land to build mining infrastructure.**
Availability of resources	**A seam of coal was discovered 40 m below the surface, making extraction easier, etc.**
Availability of water	**Rietkuilspruit (perennial river) and other non-perennial streams, meant water was available for cooling processes.**

3.3 Study the following aerial photograph of Rietkuil.

Photograph 4: Aerial photograph of Rietkuil

[Source: Examiner's adaptation]

3.3.1 Choose THREE words below that best describe the settlement of Rietkuil and circle them.

Planned	Village	Large sphere of influence
Unplanned	Town	Small sphere of influence

3.3.2 Identify FIVE land uses / features evident (D to H) in Photograph 4 above.

D	**Slimes dam**
E	**Race track**
F	**Runway**
G	**Row of trees / Road / Secondary Road**
H	**Refuse dump**

3.3.3 Is the golf course at **I** an 18- or 9-hole golf course?

9 holes

3.4.1 There are six cooling towers evident in Photograph 3 that are not shown on the topographical map. As a cartographer, choose the most appropriate symbol from the options below to complete the topographical map correctly.
(Tick the correct option)

	
	**X**
	

3.4.2 Choose the most correct position for the southern cooling towers.

Latitude		**Longitude**	
25° 56' 30" S		29° 47' 24" E	
25° 56' 53" S	**X**	29° 47' 30" E	**X**
25° 57' 45" S		29° 47' 36" E	
25° 47' 50" S		29° 48' 36" E	

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QUESTION 4 ECONOMY, MAP SKILLS

4.1 Refer to the fact file in Question 1 (page 3) and the topographical map extract.

4.1.1 Give ONE site factor favouring the original sheep and maize farming function of Rietkuil (before the Arnot Power Station was developed).

Flat land / some available water

4.1.2 Classify mining into its correct economic sector.
(Tick the correct option)

Quaternary	
Tertiary	
Secondary	
Primary	**X**

4.1.3 Choose TWO characteristics of the mining industry in relation to the Arnot Mine and circle them.

Heavy industry	**Light industry**	**Raw-material orientated industry**	**Market-orientated industry**	**Ubiquitous industry**

4.1.4 Residents of Rietkuil are concerned that the town will become a 'ghost town' in the next 20 years. Is this concern justified? Give a reason for your answer.

Yes – the power station and mine's longevity is limited due to the mine not producing coal for Eskom any more.

No – even though the longevity of both the mine and power station is questionable, technologies advancements mean industry could become ubiquitous. Farming could possibly still sustain the community.

4.2 Study the trees evident in D5 / D6. What do you think is the *most likely* purpose of these trees?
(Tick the correct option)

Aesthetic value	
Water management	
Prevent noise and dust from mine	**X**
Sunlight optimisation	

4.3 Study the slimes dam in E6.

4.3.1 What is the purpose of the slimes dam?

Water management / environmental protection / facilitation of sustainable mining practices.
Store run-off
Store chemicals
Mine tailings

4.3.2 Describe the immediate danger if the slimes dam collapses.

Flooding and danger to life.

4.3.3 What is the purpose of the water reservoirs directly situated outside the slimes dam?

Infrastructural optimisation and management – multiple water storage offers logistical benefits such as water distribution, treatment and maintenance / diversification of water resources.

Having other forms of storage close by can help with risk mitigation if a dam collapses.

Having other dams close by can serve as a buffer protecting the area from water contamination.

4.3.4 State the measure in place to protect the residents of Rietkuil from a slimes dam collapse, as evident on the map.

A retaining wall.
Buffer
Lower than the residents

4.3.5 A prefeasibility study on the commercial viability of the Arnot mine in 2016 found several areas that can be further profitably mined for the thermal coal market.

Two options were proposed below for a new slimes dam for the second mining phase. Complete the table fully by providing reasons for or against your choice of area.

Block	**Would this site be appropriate?** ***(circle the correct option)***	**Reasons for your answer.**
F3	**No**	**There is already an open cast mine here. The area would not be stable.**
A5	**Yes**	**The flat area allows for the development of slimes dam. There is a supply of water close by. The mine is close by.**

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Total: 100 marks