NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2023

GEOGRAPHY: PAPER II

MARKING GUIDELINES

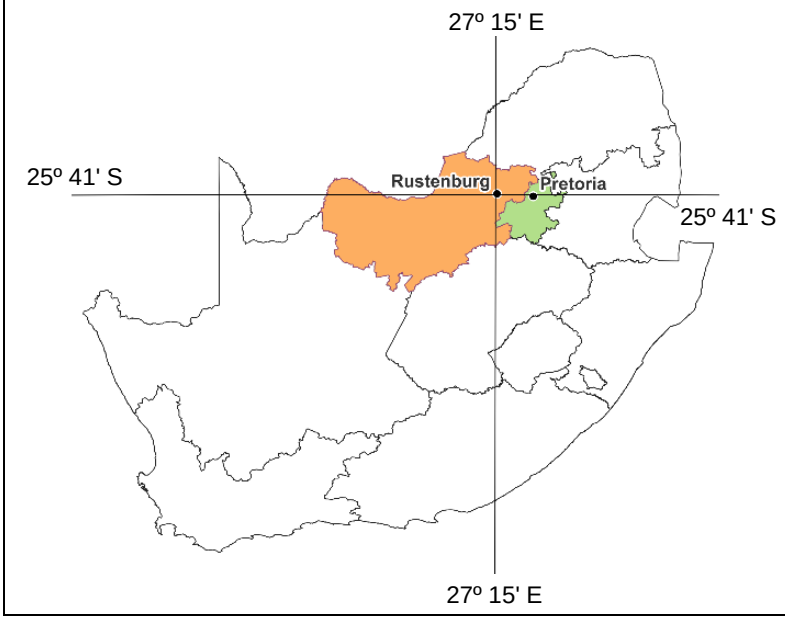
Time: 1½ hours 100 marks

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: Rustenburg / Olifantsnek

- Olifantsnek and Rustenburg lie approximately 120 kms from Pretoria. The two areas are separated by the Magaliesberg Mountains with the Hex River flowing through a poort in the mountains.
- Rustenburg is a service centre for surrounding areas.
- The dominant primary sectors are mining and farming, with tourism and manufacturing identified as sectors ensuring a sustainable future for the area.

[Source: Examiner]

Refer to the location map in Figure 1, the topographic map extract and the contoured aerial photograph to answer the questions that follow.

1.1 Rustenburg and Olifantsnek are found in …. (province).

Gauteng	
Mpumalanga	
North West	X
Limpopo	

1.2 Pretoria is located …. of Rustenburg and Olifantsnek.

north	
south	
east	X
west	

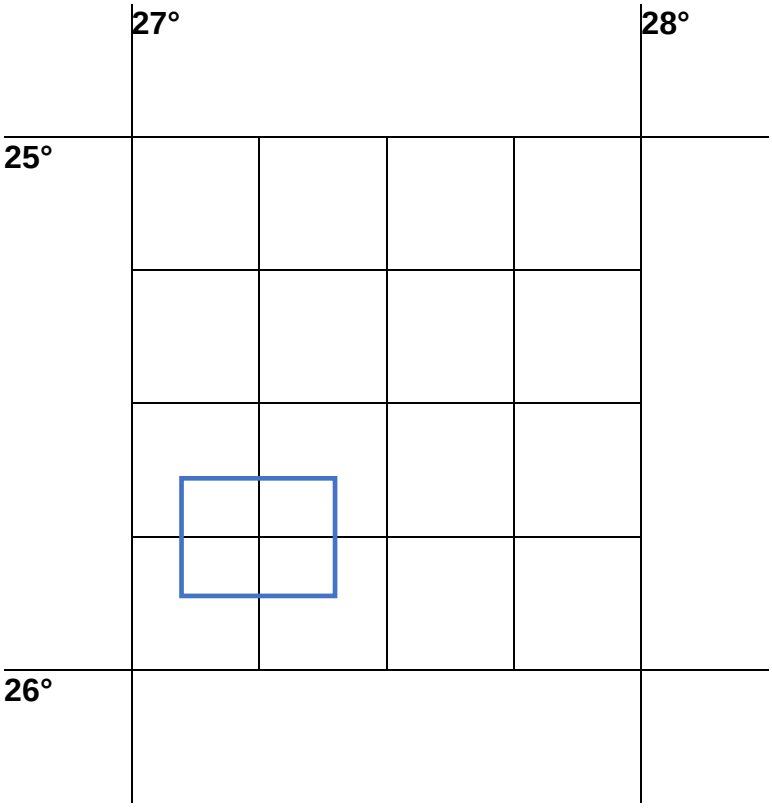
1.3 What is the likely conventional symbol shown in Photograph 1 located in H2?

Photograph 1 – Conventional symbol in H2

[Source: Examiner]

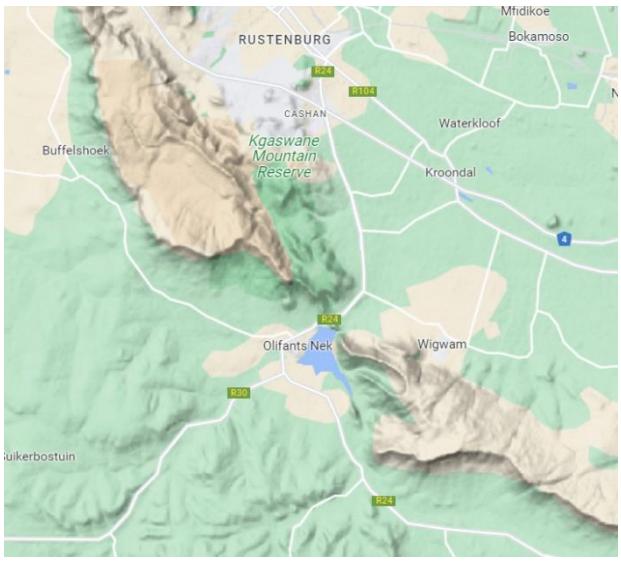
Windpump	
Benchmark	X
Monument	
Spot height	

1.4 Use a rectangle to mark the location of the map (2527CA, 2527CB, 2527CC, 2527CD) on the grid below.



1.5 Study the fact file below.

Fact File: Magaliesberg Mountains



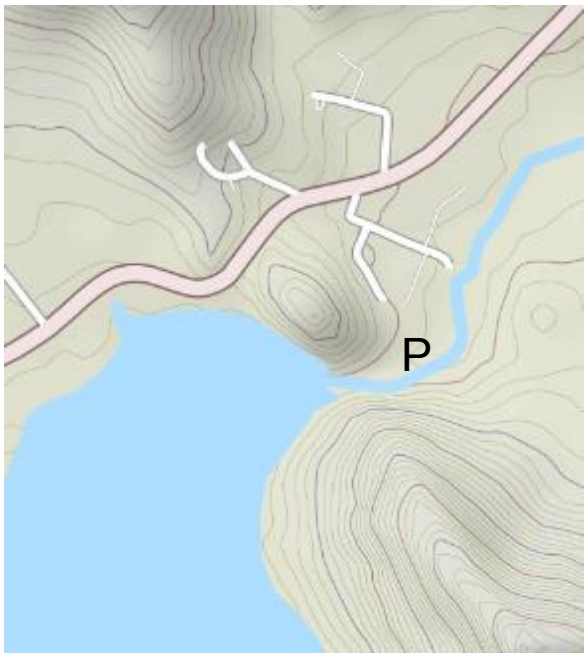
[Source: Google Maps]

- The range was formed two billion years ago, and resultant faulting has formed a few poorts that dissect the ridge.
- The Hex River and many other non-perennial streams have developed on these faults over time.
- Abstraction is also creating scenic kloofs in the range.

Hint: A poort is a deep, narrow valley. There is an example in F/G 4.

1.5.1 Indicate with a **P** on Figure 2 where a poort may have formed.

Figure 2 – OpenStreetMap of F/G 5



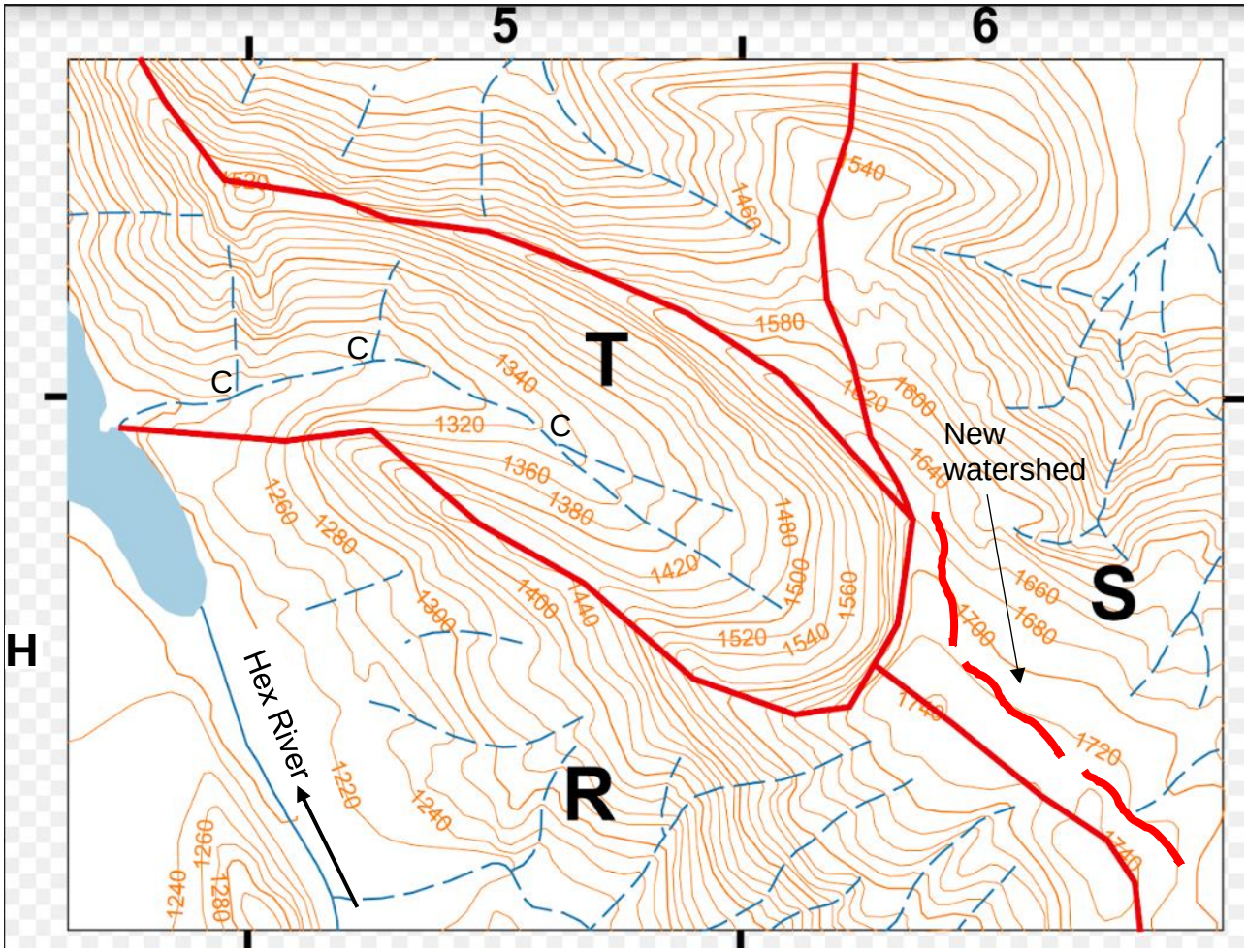
[Source: OpenStreetMap]

1.5.2 Circle the correct words to make the following sentence true.

The drainage in this area is **superimposed / antecedent**. This is because the landscape is **older / younger** than the rivers that flow over it.

1.5.3 Study Figure 3.

Figure 3 – GIS-generated map of G/H 5/6



[Source: Examiner adapted]

(a) Define the term *abstraction*.

Abstraction refers to the shifting of the watershed by headward erosion. Erosion by itself is not acceptable. 2 points needed here.

Complete (b), (c) and (d) on Figure 3 above.

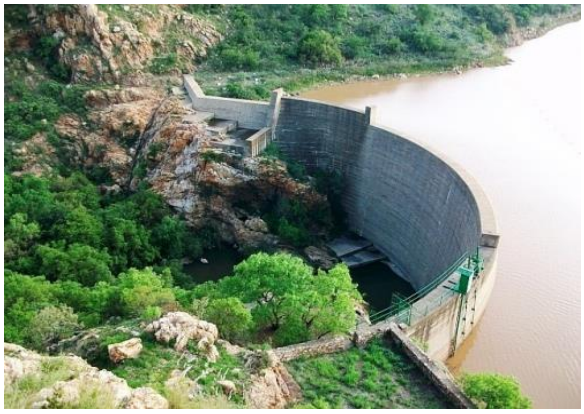
(b) The streams of drainage basin **R** cause more headward erosion than the streams of drainage basin **S**. On Figure 3, draw your own dashed line to show the new watershed between basins **R** and **S**. Label it 'new watershed'.

(c) Label any confluence in drainage basin **T** with the letter **C** on Figure 3.

(d) Label the Hex River on Figure 3. Show clearly (with an arrow) the direction of flow of this river.

1.5.4 Study the fact file below and answer the questions.

Fact File: Olifantsnek Dam

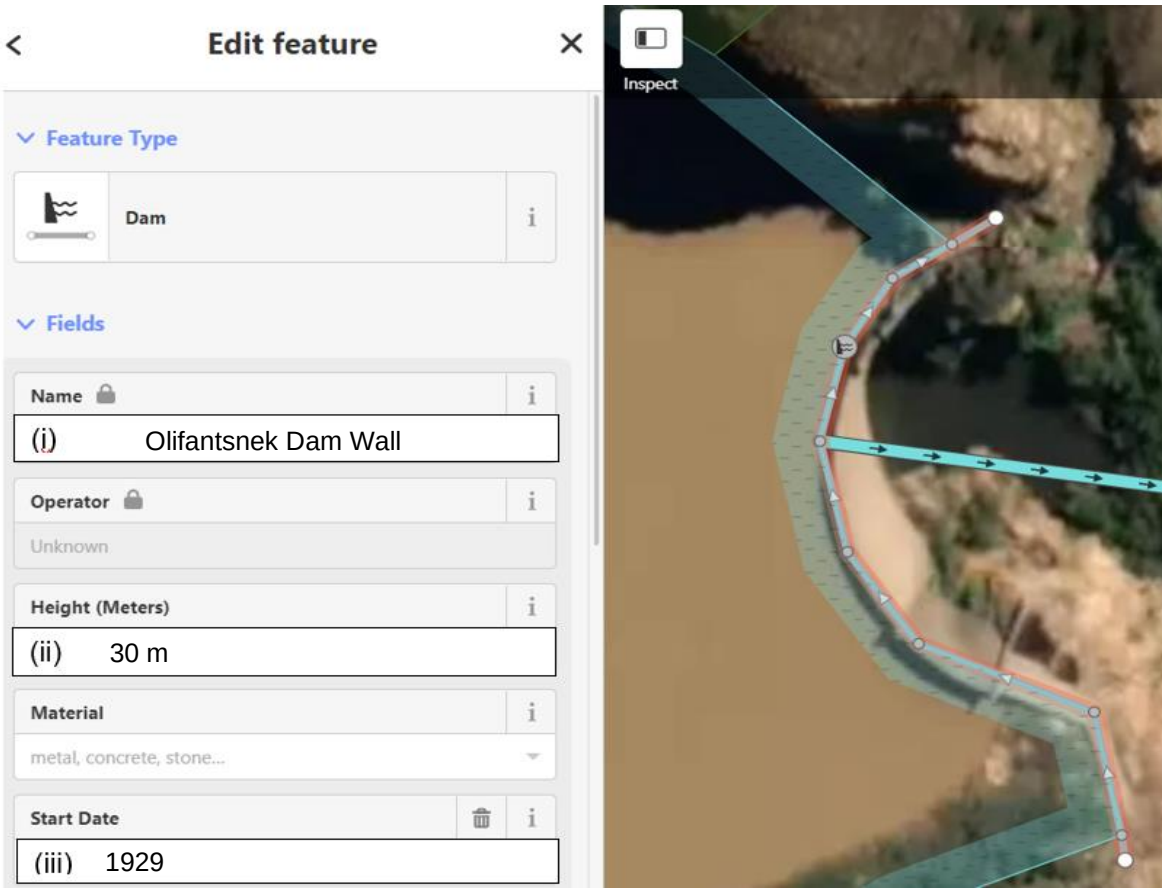


- The Olifantsnek Dam was built in 1929, originally for water storage. However, it is severely silted up and polluted and is now used mainly by fishermen and yachters.
- The dam wall has a height of 30 m.

[Source: <https://www.mountainpassessouthafrica.co.za/> and Examiner adapted]

(a) OpenStreetMap is in edit mode. Using the topographic map as reference, complete the missing information of the dam and dam wall in the attribute table in Figure 4.

Figure 4 – OSM edit mode



(b) Give ONE example from this attribute table and explain why data standardisation is important.

Height – metres is a standard unit of measurement of height. (Two points need to be mentioned here)

(c) OpenStreetMap uses *crowdsourced* open data. How does this impact on OpenStreetMap's data security?

Confidentiality of information becomes a problem when people share. Info is not regulated. Because anyone can enter info there is a compromise of security.

Hint: Crowdsourcing involves obtaining information from a large group of people who submit their data via the Internet.

1.5.5 Give TWO possible reasons for the dam being 'severely silted up and polluted'.

Runoff from surrounding agricultural land has led to silt in the dam. It is polluted as the river flows through suburban areas where litter is a problem. Farmers may also use products that contribute to pollution.

1.5.6 Circle the correct words to make the following sentences true.

(a) The Hex River will be **abstracted** / **rejuvenated** as it leaves the Olifantsnek Dam.

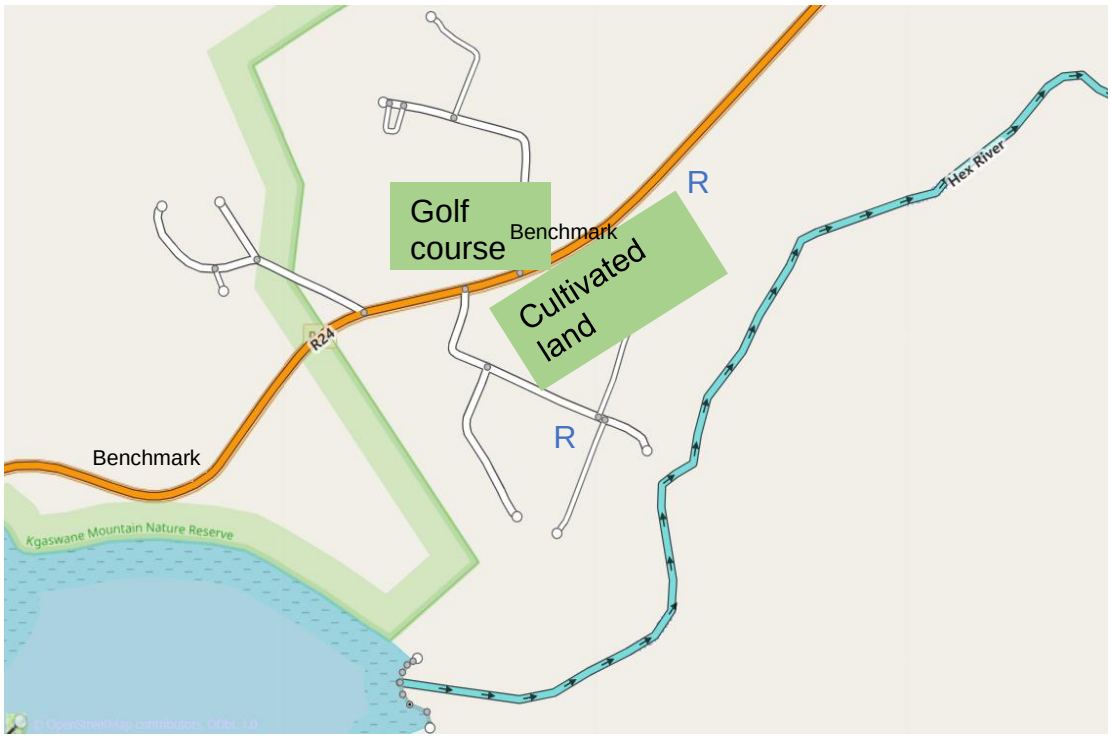
(b) The Olifantsnek Dam is an example of a **temporary** / **permanent** base level of erosion.

1.6 Figure 5 shows an incomplete map of OSM data for the Olifantsnek Dam and surrounds.

You have been tasked to *digitise* Figure 5 using current information from the topographic map (F4). At least FOUR new features must be added to the map in Figure 5.

Complete this by adding these to the map below.

Figure 5 – Incomplete map of OSM data for Olifantsnek (F4)



- **Golf course**
- **Orchards and vineyards (most of the area south of the R24)**
- **Various reservoirs (max of 2)**
- **Various benchmarks**
- **Rows of trees (max of 2)**
- **Various buildings**
- **Hiking trail**

QUESTION 2 CLIMATE, MAP SKILLS

2.1 Refer to the 1 : 20 000 contoured aerial photograph (marked with the pink-coloured block on the topographic map extract) to answer these questions.

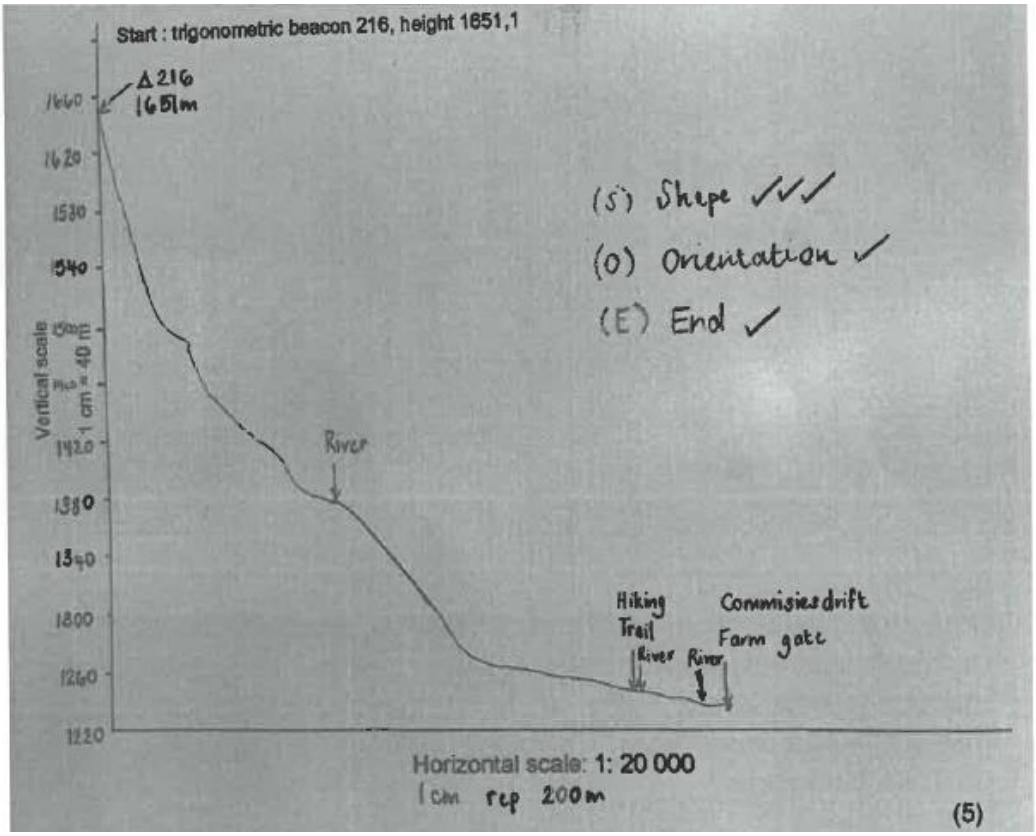
2.1.1 Using the contoured aerial photograph, draw a cross section from trigonometric beacon 216 to Commissiesdrift farm gate (as shown in Photograph 2 on the following page). The gate can be found at the end of the red arrow on the contoured aerial photograph. Use a vertical scale of 1 cm = 40 m.

Marks will be allocated as follows: end point, correct orientation and shape.

Vertical scale

1 cm = 40 m

Start: trigonometric beacon 216, height 1651,1



Horizontal scale: 1: 20 000

2.1.2 On your cross section above, indicate the following:

(a) At least TWO river crossings.

(b) At least ONE footpath.

2.1.3 Calculate the vertical scale of this cross section.

1 : 4000 (can accept 1 cm = 4 000 cm)

Calculations:	**1 cm = 40 m** **1 : (each m has 100 cm so 40 × 100) 4 000**

2.1.4 Calculate the vertical exaggeration of this cross section.

The cross section has been vertically exaggerated **12,5** times.

Calculations:	**VE = HS / VS** **1 : 20 000 / 1 : 4 000** **= 5 times**	**(1 method mark if incorrect vs is used)**

2.2 Study Photograph 2.

Photograph 2 – Commissiesdrift farm gate

2.2.1 In which season was Photograph 2 taken?

Summer

2.2.2 Name the area that this farm gate and fence are protecting.

Magaliesberg Protected Natural Environment (not nature reserve alone)

2.2.3 Calculate the gradient from trigonometric beacon 216 to Commissiesdrift farm gate (use the white line on the contoured aerial photograph as a reference).

(a) Difference in height

Start height	1 651,1 m
End height	**Between 1221–1230 m**
Difference in height	**Between 421,1–430,1 m**
Distance between two points	2 220 m

(b) Gradient

1 : 5,2 – 1 : 5,3

Calculations:	Gradient = Vertical Rise (430,1 m) or (421,1 m) Horizontal Equivalent (2 220 m) = **1 : 5,2 or 1 : 3,5 (allow a method mark here)**

(c) Gradient is calculated as an average. How does the cross section you drew differ from an average-gradient calculation?

There are some uniformly gentle parts to the slope and then some much steeper parts so averaging out gives it a different perspective. Gradient as an average gives a straight-line gradient shape whereas in reality it is not straight.

(d) Citrus is grown on the north-facing slopes of the Magaliesberg. Using map evidence, explain a climatological reason for this.

North-facing slopes are warmer and thus promote the growth of citrus. These slopes are protected against cold, frosty winters.

(e) Chicken farms are evident on the south-facing slopes on the topographic map extract and on the contoured aerial photograph.

(i) What climatological problem does this present to the farmer in winter?

Cold nights and mornings. Frost is acceptable.

(ii) Explain a possible solution to the problem the farmer might face in winter.

Heating of the chicken coops using lighting/heaters, etc. Insulating coops to keep them warm.

QUESTION 3 SETTLEMENT, MAP SKILLS

Study Figure 6.

Figure 6 – Rustenburg (B3/4/5)

3.1 3.1.1 Describe ONE area of land use visible in Figure 6 (highlighted in white) that has been significantly developed since the topographic map extract was produced.

Significant new housing development / high density / low-cost housing / residential area. Informal housing in not acceptable.

3.1.2 Explain a possible reason for this new development.

With the chrome mine and other associated beneficiation initiatives people needed housing, which led to rapid urban expansion.

3.2 Line X–Y (in the thick yellow line) has been drawn on the topographic map extract across blocks B1–5. Using the descriptions from A–F below, assign land uses to the different blocks.

A – high-income residential
B – rural / urban fringe
C – Waterkloof Chrome Mine
D – regional shopping centre
E – green belt
F – medium-income residential

Please note example:

Block	B1
Land use	C

Cross profile (B1–5)

Block	B1	B2	B3	B3	B4	R30 and N4	B5
Land use	**B**	**A**	**E**	**F**	**D**	**R30 and N4**	**C**

3.3 3.3.1 Rustenburg is a central place. There are numerous shopping nodes.

Complete the table below comparing two shopping nodes. Circle the correct answers.

Land use: Platinum Shopping Centre (in B4 and A in Figure 6)

[Source: Google Maps]

Sphere of influence	Threshold population	Urban function
(large)	500 people	(high order)
small	(100 000 people)	low order

Land use: Orange Grove Supermarket (E5)

[Source: Google Maps]

Sphere of influence	Threshold population	Urban function
large	(500 people)	(high order)
(small)	100 000 people	low order

3.3.2 (a) Calculate the distance between the two shopping nodes.

Distance in km: **accept 6,5–7,3 km**

Calculations: **14,6 cm = 7,3 km** **13 cm = 6,5 km** **Lots of leeway given here**

(b) Complete the table below.

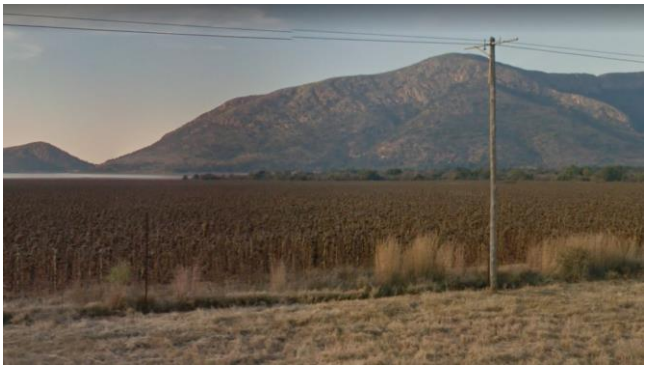
(i)	True bearing from the Platinum Shopping Centre (B4) to the Orange Grove Supermarket (E5): Circle the correct answer.	73º / 163º / 207º
	Magnetic declination	18º 37' west of true north for 2023
(ii)	Magnetic bearing (formula below) **181º 37' W of TN**	
Calculations: Magnetic bearing = true bearing + magnetic declination (163º + 18º 14' = 181º 37')		

QUESTION 4 ECONOMY, MAP SKILLS

Study the fact file on the economy of the mapped area.

Fact File: Economy of Rustenburg / Olifantsnek

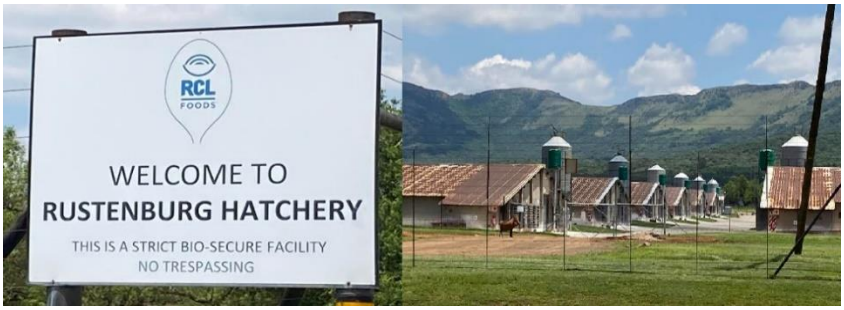
[Source: <https://samancorcr.com/>]



[Source: Google Maps]

[Source: <http://www.boschkrans.com/Oranges.asp>]

- Rustenburg is dominated by chrome and platinum mines. The mining sector is projected to last another 30 years, so economic diversification is critical for the area's survival. Manufacturing and tourism are also important.
- Wheat and poultry are also farmed here as shown in the adjacent photographs.
- The stretch of road between Olifantsnek Dam and Rustenburg was affectionately known as the 'golden mile' for the volumes of citrus fruit produced. Citrus grows more prolifically on warmer, north-facing slopes.



[Source: Examiner adapted]

4.1 4.1.1 Using the contoured aerial photograph of Commissiesdrift, calculate the area of one chicken coop (a red square has been drawn around one of them).

Hint: a chicken coop is a building where chickens are kept.

Length of chicken coop	accept 180–220 m (using either the inside or outside of red square)
Width of chicken coop	accept 180–220 m (using either the inside or outside of red square)
Area	accept 32 400–48 400 m^2
Calculations: **No method marks awarded here. 0,9–1,1 cm × 0,5 = 180–220 m**	

4.1.2 Circle the correct words to make the following sentences true.

(a) Chicken farming is an example of **intensive / extensive** farming and is done on a **large / small** scale. A block reference where chicken farms can be found is **F2 / H3**.

(b) Wheat farming is an example of **intensive / extensive** farming and is done on a **large / small** scale. A block reference where wheat is grown is **F2 / H3**.

4.2 Samancor Chrome proposed a new opencast mine be opened on the Waterkloof farm in block B5/6.

4.2.1 Give ONE valid site factor for the establishment of this mine.

Availability of natural resource.

4.2.2 Explain ONE situational factor in the establishment of this mine.

Close to N4 to Pretoria (transport) and to the R30 (transport). Close to urban areas for services or residences.

4.2.3 Describe ONE possible impact that the opencast mine will have on the Hex River (top right-hand corner of A6).

Pollution through throughflow of underground water/decrease the supply or quality of water.

4.2.4 Give THREE other impacts that this opencast mine could have on the surrounding area.

Could be positive or negative effects:
Noise pollution
Traffic congestion
Health issues
Air quality (emissions)
Loss of biodiversity
Negative visual issues
Potential damage to palaeontology and heritage sites
Trucks damaging roads (potholes)
Social impacts such as xenophobic violence/HIV could become a problem.
Economic impacts such as more jobs become available decreasing unemployment in the area/increase GDP of area.

4.2.5 Beneficiation from chrome mining in the manufacturing sector is seen as the leading sector to transform this municipality, ensuring the region's sustainability.

Discuss TWO beneficiation examples.

- **Used as a product in the steel industry (aluminium, copper, nickel – metal finishes. It is crushed, ground and separated in this process.)**
- **Used in wood preservation.**
- **Fibreglass products.**
- **Cement products.**
- **Corrosion control.**
- **Understanding the concept of beneficiation can be awarded a maximum of TWO marks if no examples are given.**
- **The examples should relate to chrome.**

Total: 100 marks