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TOTAL
MARKS

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NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2023

GEOGRAPHY: PAPER II

EXAMINATION NUMBER

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Time: 1½ hours

100 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 20 pages, a topographic map extract, a contoured aerial photograph and an equipment sheet. Please check that your question paper is complete.
2. Write your examination number in the blocks above.
3. Read the questions carefully.
4. **Answer ALL the questions in the spaces provided on this question paper.**
5. Carefully study the 1:50 000 topographic map extract 2527CA, 2527CB, 2527CC, 2527CD RUSTENBURG / OLIFANTSNEK and the contoured aerial photograph. The area covered by the contoured aerial photograph is marked with a pink block on the topographic map extract. The conventional symbols are not on the map extract but included on page 2.
6. The topographic map extract has grid lines with markings A to I and 1 to 6 that can be used to identify locations by grid reference.
7. The completed question paper must be handed to the invigilator at the end of the examination. The topographic map extract and the contoured aerial photograph may be retained by the school for future use.
8. The equipment sheet can be used instead of a ruler and a protractor not brought to the examination venue. It may also be used for rough work. There is a fold mark indicating where it should be folded. A magnifying glass and calculator may be used.
9. It is in your own interest to write legibly and to present your work neatly.
10. ONE blank page (page 20) has been included at the end of the paper. If you run out of space for an answer, use this page. Clearly indicate the number of your answer should you use this extra space.

**FOR MARKERS'
USE ONLY**

Question	1	2	3	4	Total
Marks	32	25	21	22	100
Obtained					

Topographic map symbols

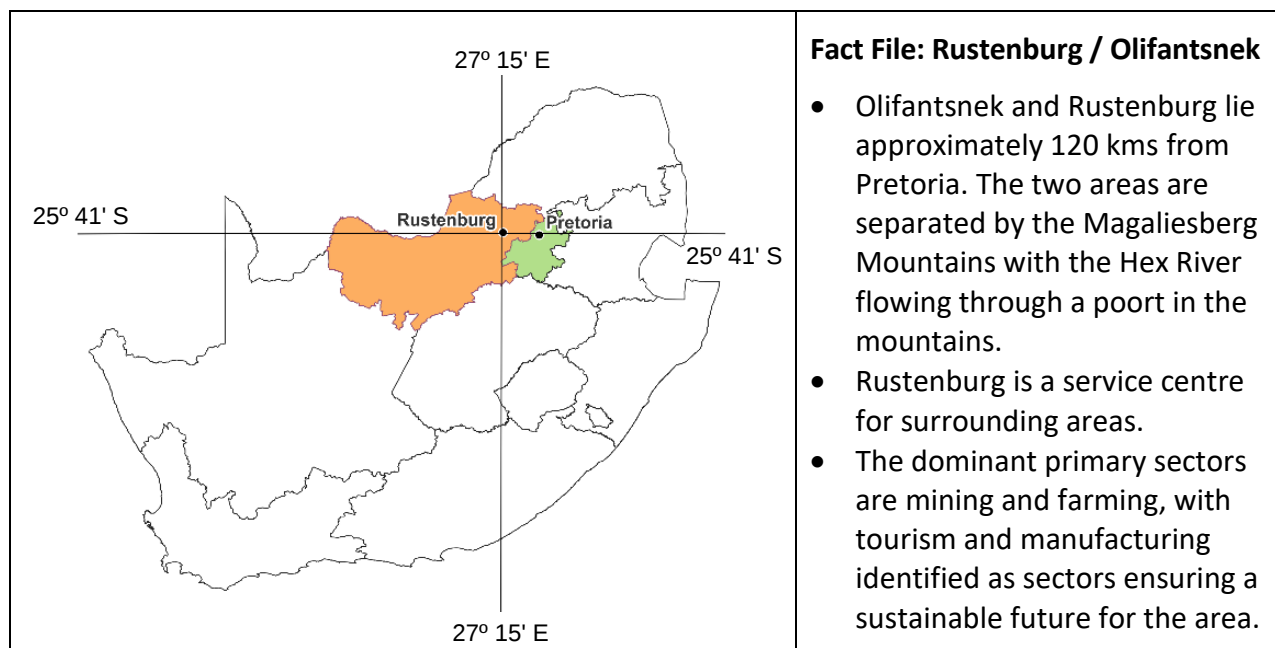
Topographic map symbols

National Freeway; National Route	
Arterial Route	
Main Road	
Secondary Road; Benchmark	
Other Road; Bridge	
Track and Hiking Trail	
Railway; Station or Siding	
Other Railway; Tunnel	
Embankment; Cutting	
Power Line	
Built-up Area (High, Low Density)	
Buildings; Ruin	
Post Office; Police Station; Store	
Place of Worship; School; Hotel	
Fence; Wall	
Windpump; Monument	
Communication Tower	
Wind Turbine; Wind Farm	
Satellite Antenna; Solar Panel Array	
Trigonometrical Station; Marine Beacon	
Lighthouse and Marine Light	
Cemetery; Grave	
International Boundary and Beacon	
Provincial Boundary	
Protected Area	
Perennial River	
Perennial Water	
Non-perennial River	
Non-perennial Water	
Dry Watercourse	
Dry Pan	
Marsh and Vlei	
Pipeline (above ground)	
Water Tower; Reservoir; Water Point	
Coastal Rocks	
Prominent Rock Outcrop	
Erosion; Sand	
Woodland	
Cultivated Land	
Orchard or Vineyard	
Recreation Ground	
Row of Trees	
Mine Dump; Excavation	

Topografiesekaartsimbole

Topografiesekaartsimbole

Nasionale Deurpad; Nasionale Roete	
Hoofverkeersroete	
Hoofpad	
Sekondêre Pad; Hoogtemerk	
Ander Pad; Brug	
Dowwe Pad en Voetslaanpad	
Spoorweg; Stasie of Sylyn	
Ander Spoorweg; Tonnel	
Opvulling; Deurgrawing	
Kraglyn	
Beboude Gebied (Hoë, Lae Digtheid)	
Geboue: Murasie	
Poskantoor; Polisiestasie; Winkel	
Plek van Aanbidding; Skool; Hotel	
Draadheining; Muur	
Windpomp; Monument	
Kommunikasietoring	
Windturbine; Windplaas	
Satellietantenna; Sonkragplaas	
Peilbaken; Seevaartbaken	
Vuurtoring en Seevaartlig	
Begraafplaas; Graf	
Internasionale Grens en Baken	
Provinsiale Grens	
Bewaringsgebied	
Standhoudende Rivier	
Standhoudende Water	
Nie-standhoudende Rivier	
Nie-standhoudende Water	
Droë Loop	
Droë Pan	
Moeras en Vlei	
Pyplyn (bo die grond)	
Watertoring; Reservoir; Waterpunt	
Kuslynrotse	
Prominente Klipbank	
Erosie; Sand	
Beboste Gebied	
Bewerkte Land	
Boord of Wingerd	
Ontspanningsterrein	
Ry Bome	
Mynhoop; Uitgrawing	

QUESTION 1 FLUVIAL GEOMORPHOLOGY, MAP SKILLS, GIS**Figure 1 – Location map**

[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	
Limpopo	

(1)

1.2 Pretoria is located of Rustenburg and Olifantsnek.

north	
south	
east	
west	

(1)

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

Photograph 1 – Conventional symbol in H2

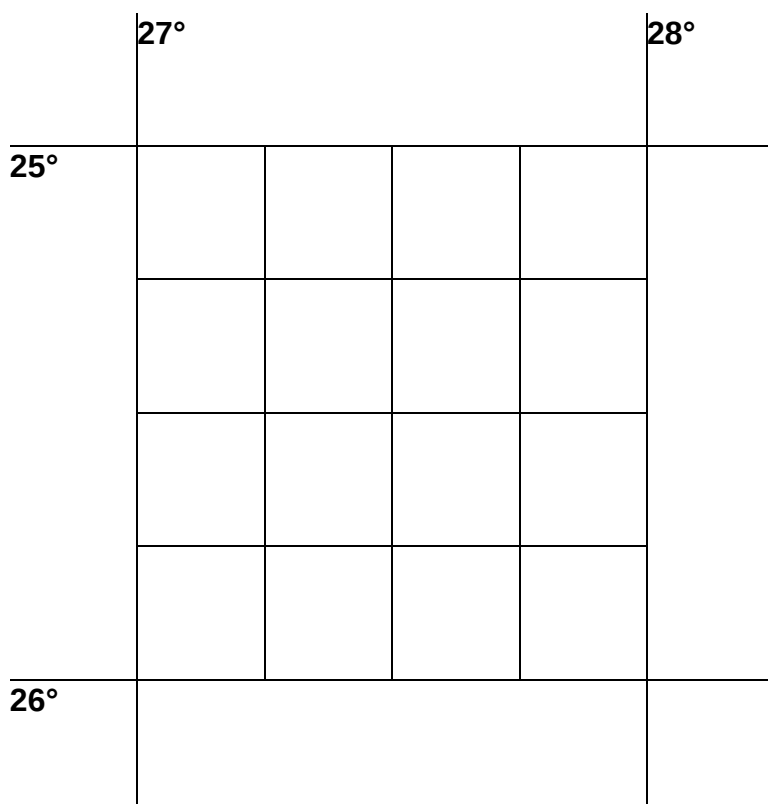


[Source: Examiner]

Windpump	
Benchmark	
Monument	
Spot height	

(1)

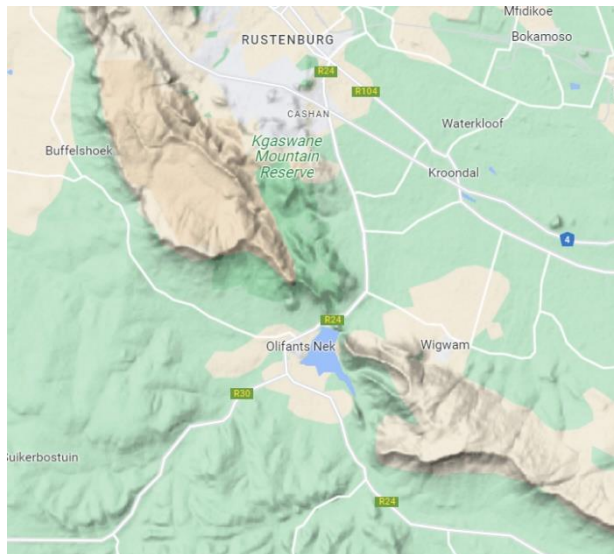
- 1.4 Use a rectangle to mark the location of the map (2527CA, 2527CB, 2527CC, 2527CD) on the grid below.



(4)

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]

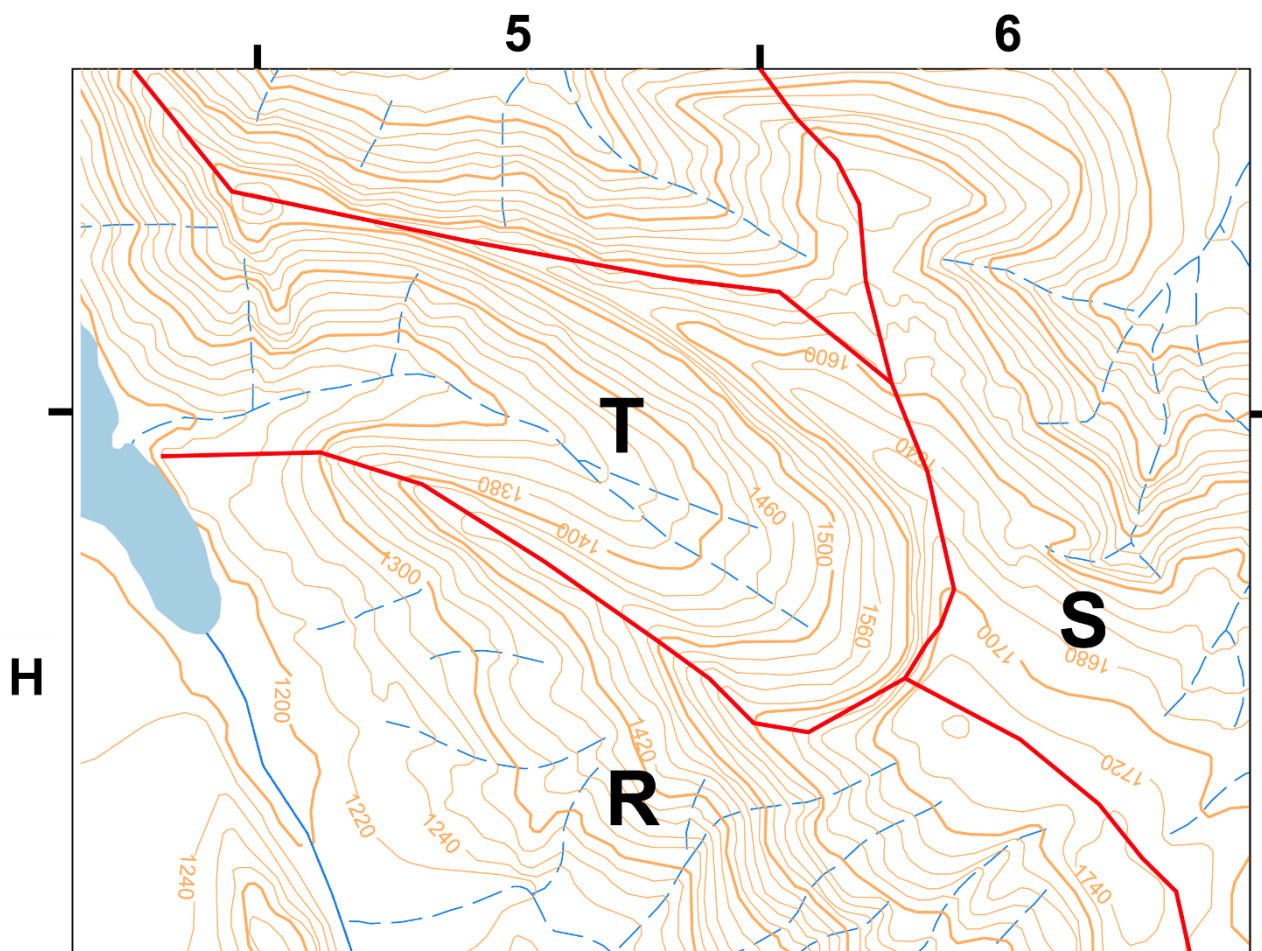
(2)

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.

(2)

1.5.3 Study Figure 3.

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

[Source: Examiner adapted]

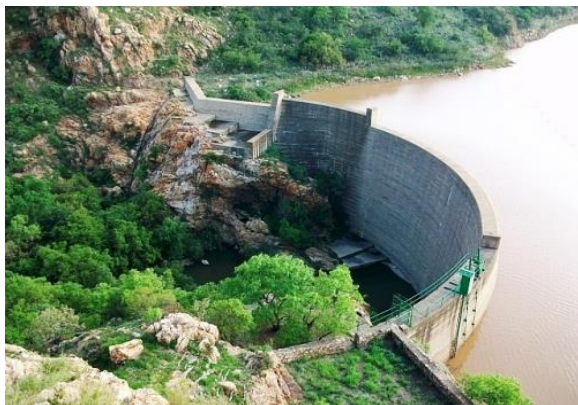
- (a) Define the term *abstraction*.

(2)

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'. (2)
- (c) Label any confluence in drainage basin **T** with the letter **C** on Figure 3. (1)
- (d) Label the Hex River on Figure 3. Show clearly (with an arrow) the direction of flow of this river. (2)

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

<
Edit feature
×

Feature Type

Dam
i

Fields

Name i

(i)

Operator i

Unknown

Height (Meters) i

(ii)

Material i

metal, concrete, stone...

Start Date i

(iii)

🗑️

Inspect

(3)

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

(2)

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

(1)

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'.

- ---

- ---

(2)

- 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.

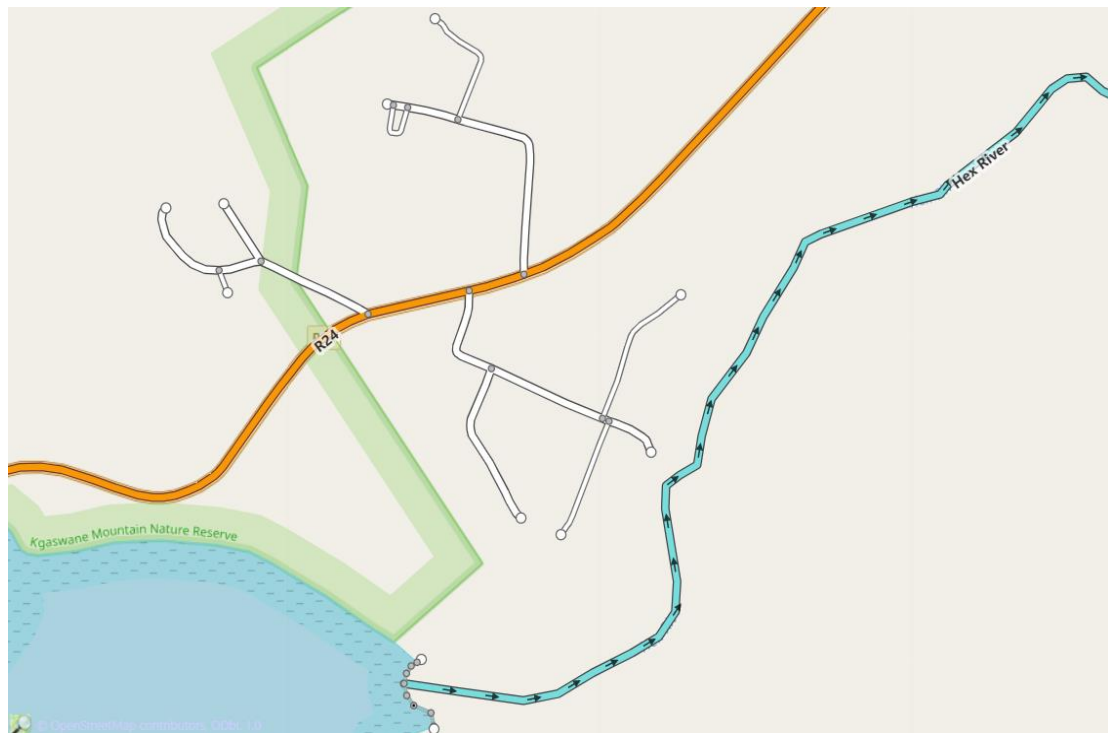
(2)

- 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)



(4)
[32]

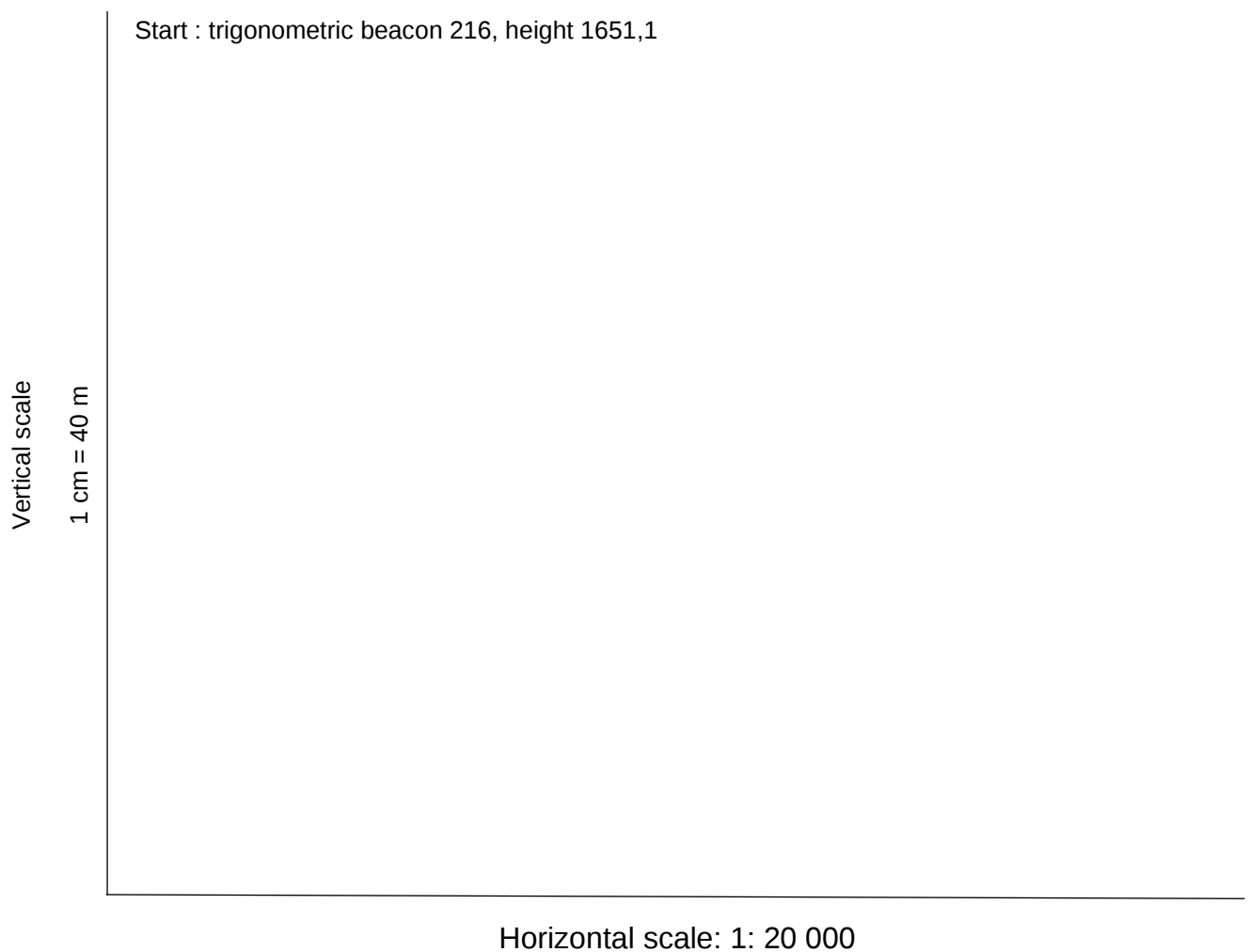
Q1 subtotal

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.



(5)

2.1.2 On your cross section above, indicate the following:

(a) At least TWO river crossings.

(b) At least ONE footpath.

(3)

2.1.3 Calculate the vertical scale of this cross section.

Calculations:

(2)

2.1.4 Calculate the vertical exaggeration of this cross section.

The cross section has been vertically exaggerated _____ times.

Calculations:

(2)

2.2 Study Photograph 2.

Photograph 2 – Commissiesdrift farm gate



2.2.1 In which season was Photograph 2 taken?

(1)

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

_____ (1)

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	_____ m
Difference in height	_____ m
Distance between two points	2 220 m

(2)

(b) Gradient

1 : _____

(2)

Calculations:

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

(2)

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

(2)

(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?

(1)

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

(2)
[25]

Q2 subtotal

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.

(1)

- 3.1.2 Explain a possible reason for this new development.

(2)

- 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						R30 and N4	

(6)

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

(6)

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

Distance in km: _____ (2)

Calculations:

(b) Complete the table below.

(i) True bearing from the Platinum Shopping Centre (B4) to the Orange Grove Supermarket (E5): Circle the correct answer.	73° / 163° / 207° (2)
Magnetic declination	18° 37' west of true north for 2023
(ii) Magnetic bearing (formula below) _____ (2)	
Calculations: Magnetic bearing = true bearing + magnetic declination	

[21]

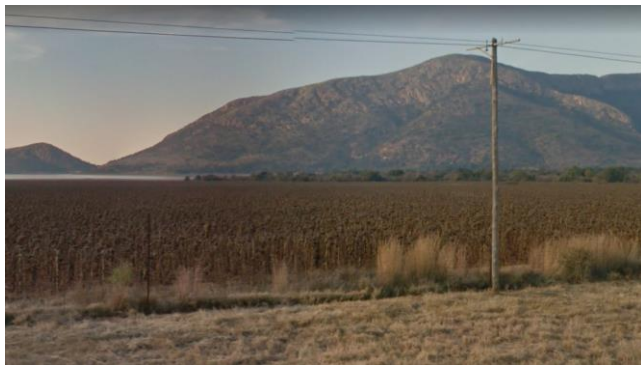
Q3 subtotal

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>>]



[Source: Examiner adapted]

- 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.

- 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	_____ m
Width of chicken coop	_____ m
Area	_____ m ²
Calculations:	

(4)

- 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**.

(6)

- 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.

(1)

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

(2)

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

(2)

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

(3)

- 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.

(4)
[22]

Q4 subtotal

Total: 100 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]