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SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

GEOGRAPHY P2

JUNE 2021

MARKING GUIDELINES

MARKS: 75

These marking guidelines consist of 16 pages.

RESOURCE MATERIAL

1. An extract from topographic map 3419AC HERMANUS
2. Orthophoto map 3419 AC 20 HERMANUS
3. **NOTE:** The resource material must be collected by schools for their own use.

INSTRUCTIONS AND INFORMATION

1. Write your EXAMINATION NUMBER and CENTRE NUMBER in the spaces on the cover page.
2. Answer ALL the questions in the spaces provided in this question paper.
3. You are provided with a 1 : 50 000 topographic map (3419AC HERMANUS) and an orthophoto map (3419 AC 20 HERMANUS) of a part of the mapped area.
4. You must hand the topographic map and the orthophoto map to the invigilator at the end of this examination session.
5. You may use the blank page at the end of this question paper for all rough work and calculations. Do NOT detach this page from the question paper.
6. Show ALL calculations and formulae, where applicable. Marks will be allocated for these.
7. Indicate the unit of measurement or compass direction in the final answer of calculations, e.g. 10 km; 2,1 cm; west of true north.
8. You may use a non-programmable calculator.
9. You may make use of a magnifying glass.
10. The area demarcated in RED and BLACK on the topographic map represents the area covered by the orthophoto map.
11. The following English terms and their Afrikaans translations are shown on the topographic map:

ENGLISH

Diggings
Onrus Mountain
Golf Course
River
Sewerage Works
Estate
Salt Pan
Nature Reserve

AFRIKAANS

Uitgrawings
Onrusberge
Gholfbaan
Rivier
Rioolwerke
Landgoed
Soutpan
Natuurreservaat

GENERAL INFORMATION ON HERMANUS

Hermanus lies along Walker Bay on the south coast of the Western Cape. It is located about 115 km southeast of Cape Town and is connected to the Mother City by the R43 highway (or coastal R44 scenic route) and the N2 freeway.

Hermanus has a Mediterranean climate with warm summers. It receives roughly 520 mm of rainfall per annum, the majority of which falls during the winter months of June to August in the form of frontal precipitation. Summer and winter months are characterised by strong south-easterly and north-westerly winds respectively.

The town of Hermanus occupies a flat plain between the mountains and the sea. Subsequent lowering of the sea level led to the formation of the cliffs which dominate the coastline.



[Source: <http://en.wikipedia.org/wiki/hermanus>]

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1 : 50 000 topographic map 3419AC HERMANUS as well as the orthophoto map 3419 AC 20 HERMANUS of a part of the mapped area. Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) in the block next to each question.

1.1 Hermanus is situated in ...

- A the Northern Cape.
- B the Eastern Cape.
- C the Western Cape.
- D Gauteng.

✓

C

1.2 The main type of rainfall received in Hermanus during winter is ...

- A orographic.
- B convection.
- C frontal.
- D advection.

✓

C

1.3 The way in which height is indicated at 34°19'08"S 19°08'48"E on the topographic map is a ...

- A contour line.
- B benchmark.
- C spot height.
- D trigonometrical station.

✓

B

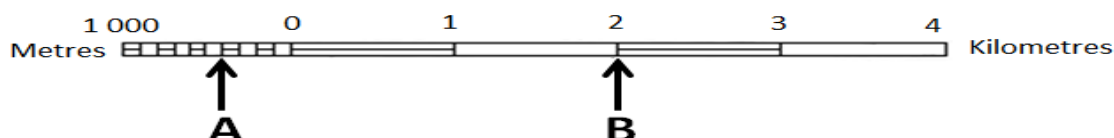
1.4 The general direction of flow of the Leeurivier (river) in block **C9** on the topographic map is in a ... direction.

- A northerly
- B southerly
- C north-westerly
- D south-easterly

✓

A/C

1.5 The distance from **A** to **B** on the line scale below is ... meters.



- A 2 600
- B 2 400
- C 2,6
- D 2,4

✓

B

1.6 The true bearing from the place of worship **1** to the school **2** on the orthophoto map is ...

- A 38°
- B 55°
- C 235°
- D 252°

✓

C

1.7 Man-made feature **3** on the orthophoto map is a ...

- A communication tower.
- B windpump.
- C secondary road.
- D monument.

✓

A

1.8 The orchards and vineyards at **M** in block **C10** on the topographic map are most likely frost resistant, because they are found in/on the ...

- A north-facing slope.
- B south-facing slope.
- C valley floor.
- D shadow zone.

✓

C

1.9 The high-lying area at **N** in block **D7** on the topographic map is a/an ...

- A confluence.
- B interfluvium.
- C tributary.
- D watershed.

✓

B

1.10 The main characteristic of the streams in block **D8** on the topographic map:

- A Erosion dominates
- B Water flows in sheets
- C Deposition dominates
- D Wider channels are found

✓

A

1.11 The dominant stream pattern in block **H8** on the topographic map is ...

- A radial.
- B rectangular.
- C trellis.
- D dendritic.

✓

D

1.12 The main activity that causes an environmental injustice in block **B5** on the topographic map is ...

- A farming.
- B fishing.
- C hiking.
- D excavating.

✓

D

1.13 The main factor that influenced the dispersed pattern of the settlement at **4** on the orthophoto map is the ...

- A gradient.
- B protected area.
- C bridge.
- D other road.

✓

A

1.14 The physical (natural) features responsible for the linear shape of the built-up areas in blocks **J10**, **K9** and **K10** on the topographic map is due to the ...

- A arterial route and power line.
- B coastal rocks and mountain.
- C arterial route and mountain.
- D power line and mountain.

✓

B

1.15 New Harbour at **5** on the orthophoto map is an example of a ... economic activity.

- A primary
- B secondary
- C tertiary
- D quaternary

✓

C

(15 x 1)

[15]

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

2.1 Refer to the topographic map.

Calculate the magnetic declination for 2021. Show ALL calculations. Marks will be awarded for calculations. Clearly indicate the direction in relation to true north in the final answer.

Difference in years: $2021 - 2014 = 7 \checkmark$ years

Mean annual change: $6' \checkmark W$

Total annual change: $6' \times 7 = 42' \checkmark$

Mean magnetic declination for 2021: $25^{\circ}28'$
 $+ \checkmark 42'$
 $= 25^{\circ}70'$
 $= 26^{\circ}10'$ west of true north \checkmark (5 x 1) (5)

2.2 Refer to the topographic map.

2.2.1 Calculate the average gradient from trigonometrical station 31 (O) in block I4 to benchmark 36.4 (P) in block J5. Show ALL calculations. Marks will be awarded for calculations.

Formula: **Average gradient** = $\frac{\text{vertical interval (VI)}}{\text{horizontal equivalent (HE)}}$

Formula: Gradient = $\frac{481.2 - 36.4 = 444.8 \checkmark m}{2.5 \checkmark cm \times 500 = 1250 \checkmark m}$ *Range of measurement*
(2.4 cm – 2.6 cm)
Range in meters
(1 200 m – 1 300 m)

= $\frac{444.8}{1250} \checkmark$ (Substitution)

= $\frac{444.8}{444.8} : \frac{1250}{444.8}$ (calculation)

= $\frac{1}{2.81}$ *Range of gradient*
(1 : 2.69 – 1 : 2.92)
(5 x 1)

= 1 : 2.81 \checkmark

(5)

- 2.2.2 (a) Why did the gradient calculated in QUESTION 2.2.1 limit the construction of a road between **O** (in block **I4**) and **P** (in block **J5**) on the topographic map?

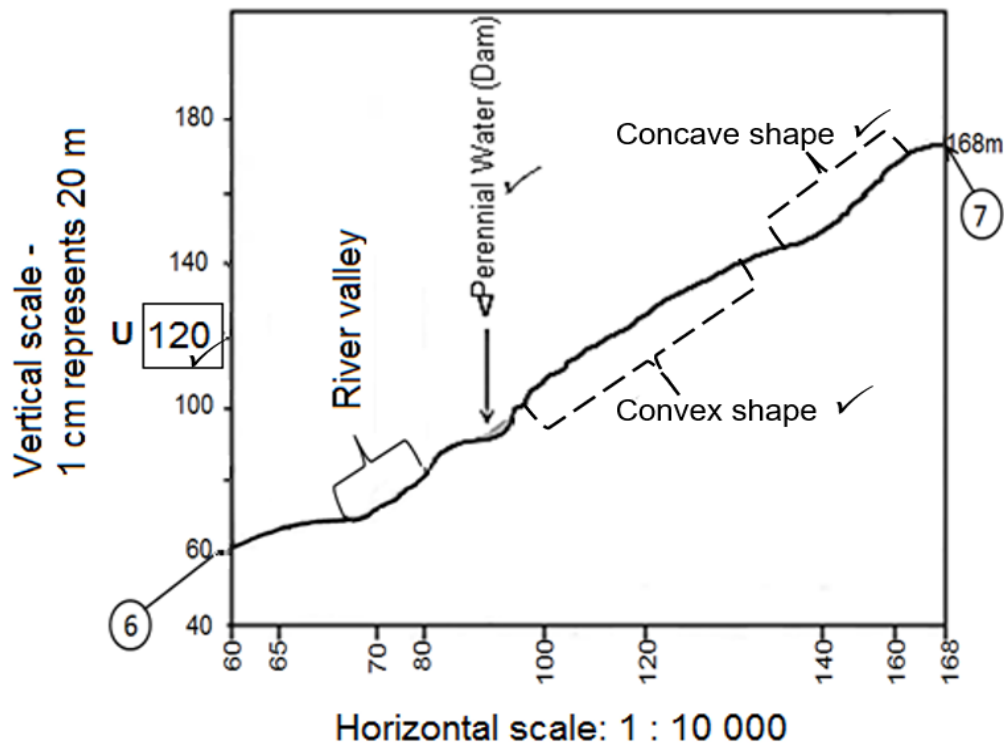
The gradient is too steep for the construction of roads ✓
(1 x 1) (1)

- (b) How did engineers construct the R43 from block **I4** to block **J5** to overcome the challenge in your answer to QUESTION 2.2.2(a)?

The road was constructed along the gentle area/easy to drive along the gentle slope ✓
Road avoided the steep/hilly area. ✓
It follows the shape of the contours ✓
Road built along the foot of the mountain ✓
Around the mountain ✓
(Any ONE) (1)

- 2.3 The block below represents a vertical and horizontal scale, as well as the heights of the contour lines from **6** to **7** on the orthophoto map.

Use the block below for ALL answers to QUESTION 2.3.1.



- 2.3.1 (a) Indicate the height of **U** on the vertical scale of the above cross-section.

Refer to vertical scale on the cross-section ✓ (1 x 1) (1)

- (b) Complete the above cross-section which represents an area from **6** to **7** on the orthophoto map by using the given contour heights on the horizontal scale.

Refer to the cross-section and allocate marks for:

- *The shape as indicated on the cross-section ✓✓ (2 x 1) (2)*

- (c) Identify man-made feature **V** on the cross-section.

Refer to cross-section ✓ (1 x 1) (1)

- 2.3.2 Calculate the vertical exaggeration of the cross-section drawn in QUESTION 2.3.1(b). Show ALL calculations. Marks will be awarded for calculations. Clearly indicate the unit of measurement in the final answer.

Formula: **Vertical exaggeration** = $\frac{\text{vertical scale (VS)}}{\text{horizontal scale (HS)}}$

$VS = 1 \text{ cm represents } (20 \times 100 = 2\,000) \text{ cm}$

$VS = 1 : 2\,000$ ✓

$HS = 1 : 10\,000$ ✓

OR

$VS = \frac{1}{2\,000}$ ✓ and $HS = \frac{1}{10\,000}$ ✓

$VE = \frac{1:2\,000}{1:10\,000}$ ✓ (For correct substitution of values)

OR

$$= \frac{\frac{1}{2\,000}}{\frac{1}{10\,000}} \quad \checkmark$$

$$\frac{1}{2\,000} \times \frac{10\,000}{1}$$

5 times ✓

(4 x 1)

(4)
[20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Refer to the topographic map.

3.1.1 Does the mapped area generally receive seasonal or annual rainfall?

Answer: *Seasonal rainfall* ✓ (1 x 1) (1)

3.1.2 Give TWO pieces of evidence from the topographic map to support the answer to QUESTION 3.1.1.

Perennial water sources ✓ / *reservoirs* ✓ / *(storage) dams* ✓
Non-perennial rivers ✓
Evidence of irrigation ✓
Furrows ✓ / *centre pivot irrigation* ✓
(Any TWO) (2 x 1) (2)

3.2 Refer to the topographic map.

Hermanus is located between the ocean and a high-lying area (mountain).
A southerly wind blows during the day.

3.2.1 Is the southerly wind offshore or onshore?

Answer: *Onshore* ✓ (1 x 1) (1)

3.2.2 Explain your answer to QUESTION 3.2.1.

The wind blows from the sea/ ocean to the land ✓✓
The wind blows from the colder (HP) area to the warmer (LP) area ✓✓
(Any ONE) (1 x 2) (2)

- 3.3 Refer to the Botrivier (river) from block **C6** to block **D4** on the topographic map.
- 3.3.1 In which stage (course) of development is the Botrivier (river)?
- Lower course ✓*
(Accept Old/Plain stage) (1 x 1) (1)
- 3.3.2 Give ONE piece of evidence from the topographic map to support your answer to QUESTION 3.3.1.
- River meanders ✓✓*
Flat land/ Contour lines widely spaced ✓✓
Marsh and vlei ✓✓
Floodplain ✓✓
Wide channel (at the lower course) ✓✓
River flows into the lagoon/ mouth/ sea/ ocean ✓✓
(Any ONE) (1 x 2) (2)
- 3.3.3 How did the geomorphological process in this stage (course) of the river influence the crop farming in the area?
- Deposition of fertile/ alluvial soil in this stage of the river promotes crop farming ✓✓*
The flat area/flood plain promoted deposition ✓✓
Meandering in this stage slows down the river velocity encouraging deposition of fertile soil ✓✓
There is less erosion in this stage of the river, which is ideal for crop farming ✓✓
(Any TWO) (2 x 2) (4)
- 3.4 Refer to the land-use zone between Hawston and Fisherhaven in blocks **H3** and **H4** on the topographic map.
- 3.4.1 Identify the land-use zone between Hawston and Fisherhaven in blocks **H3** and **H4** on the topographic map.
- Rural-urban fringe ✓* (1 x 1) (1)
- 3.4.2 Give ONE piece of map evidence to support your answer to QUESTION 3.4.1.
- Presence of sewerage works ✓✓*
Recreational ground ✓✓
Diggings ✓✓
Cemetery ✓✓
It is on the outskirts of the low density built-up area of Hawston and Fisherhaven ✓✓
(Any ONE) (1 x 2) (2)

3.5 Refer to **9** on the orthophoto map.

3.5.1 Identify the street plan (pattern) at **9**.

Radial✓ (cobweb✓)

Accept Spider web ✓

(Any ONE)

(1 x 1) (1)

3.5.2 State ONE advantage of the street plan (pattern) at **9**.

There are fewer intersections

All major roads lead to/converge at the central/focal point ✓

It minimises traffic congestion ✓

It is a more attractive street plan (pattern) than the grid street plan (pattern) ✓

Easier flow of traffic ✓

(Any ONE)

(1 x 1) (1)

3.5.3 How did the street plan (pattern) at **9** develop?

Street plan developed around a central (focal) point ✓✓

The streets converge towards a focal point ✓✓

The streets diverge from a focal point ✓✓

(Any ONE)

(1 x 2) (2)

3.6 Refer to **10** on the orthophoto map which is an industrial area.

3.6.1 Are the industries heavy or light industries?

Answer: light✓

(1 x 1) (1)

3.6.2 Discuss why the industries identified in QUESTION 3.6.1 are in a suitable location.

Proximity to residential areas for potential market/ customers ✓✓

Availability/ Close of/to labour from the surrounding residential areas ✓✓

Accessible to road (R43) to distribute goods ✓✓

The surroundings are not polluted by the industries ✓✓

The raw materials required for the industries are nearby ✓✓

It is situated on flat land because the contour lines are far apart ✓✓

(Any TWO)

(2 x 2) (4)

[25]

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

- 4.1 The following information of the Klei Dam at **Q** (block **G8**) on the topographic map is provided:

Location: 34°21'45"S 19°12'45"E

Depth: 10 m

- 4.1.1 Is the Klei Dam at **Q** in block **G8** a point, line or polygon feature?

Answer: *polygon*✓ (1 x 1) (1)

- 4.1.2 State whether the following are *spatial data* or *attribute data*.

- (a) The depth of the Klei Dam at **Q**

Attribute data✓ (1 x 1) (1)

- (b) The location of the Klei Dam at **Q**

Spatial data✓ (1 x 1) (1)

- 4.1.3 Explain the importance of determining the depth of the Klei Dam at **Q** for farming activities in the area.

The water holding capacity is more in the deeper dam/greater volume of water✓✓

More water available in a deep dam for the farmers to use during drought/greater storage capacity✓✓

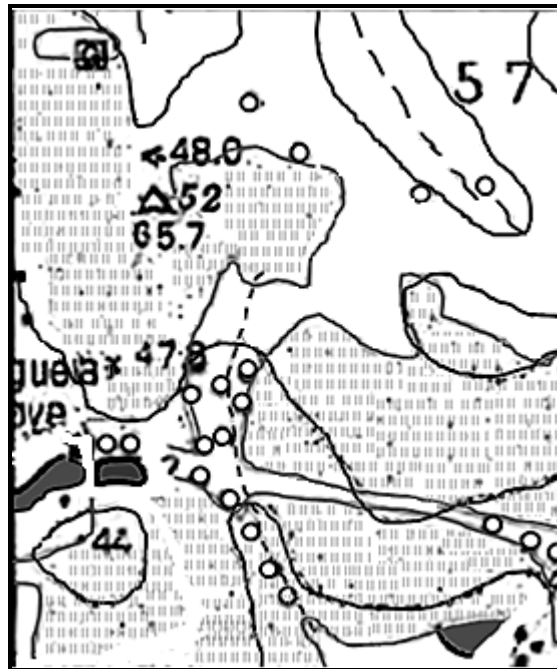
To determine how much water (quantity) is available for irrigation✓✓

Depth of dam important in case of flooding to take precautionary measures✓✓

Evaporation (rate) is less in deeper dams, therefore more water is available✓✓

(Any ONE) (1 x 2) (2)

- 4.2 Refer to the enlarged insert of block **F4** from the topographic map showing a combination of different data layers.



- 4.2.1 What is a *data layer*?

A layer represents a certain/ specific theme or spatial geographical feature ✓

[Concept –

DO NOT ACCEPT THE DEFINITION OF DATA LAYERING] (1 x 1)

(1)

- 4.2.2 Use the topographic map and identify the data layer that has been omitted (left out) from the insert.

Infrastructure (Transport) (DO NOT ACCEPT ROADS) ✓ (1 x 1)

(1)

- 4.2.3 What is the importance of the data layer identified in QUESTION 4.2.2 to the economic development of the farming community in block **F4**?

Importance for transportation ✓✓ (of inputs to farmers) ✓✓

(of produce from farmers) ✓✓

Allows access to services (Accept examples) ✓✓

Creates accessibility for labourers to and from the farm ✓✓

Infrastructure allows for tourists to have access to the farms ✓✓

(Any TWO)

(2 x 2)

(4)

- 4.3 Refer to blocks **D4** and **D5** on the topographic map. The quality of water in the identified blocks could be affected by human activities. How would a GIS specialist use data querying to evaluate the quality of water in this area?

Conducting research on activities in the area ✓✓

Determine how much fertiliser is being washed into the water resources ✓✓

Determine what the level of pollution (acidity, oil, and fumes) of water is (accept examples of causes) ✓✓

Determine how the amount of littering on the golf course influences the water quality ✓✓

Determine how household waste products from the Arabella Country Estate impact on water quality ✓✓

Determine what the impact of buffering on the water quality is ✓✓

(Any TWO)

(2 x 2)

(4)

[15]

TOTAL: 75