Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2016

GEOGRAPHY P2 MEMORANDUM

MARKS: **75**

This memorandum consists of 10 pages.

SECTION A

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions are based on the 1:50 000 topographic map **2829AC HARRISMITH**, as well as the orthophoto map 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 to D) in the block next to each question.

1.1 The contour interval on the orthophoto map is … meters.

A 20
B 10
C 5
D 50

C

1.2 The rows of trees found close on Secunda farm, in block **E2**, are used as …

A demarcation.
B protection.
C plantations.
D windbreaks.

D

1.3 The coordinates of trigonometrical station number 44, in block **B13** is …

A 28°16’10”S 29°12’50”E / 28°16,1’S 29°12,8’E.
B 28°15’10”E 29°14’20”S / 28°15,1’E 29°14,3’S.
C 29°13’22”S 28°16’10”E / 29°13,3’S 28°16,1’E.
D 29°13’22”E 28°15’10”S / 29°13,3’E 28°15,1’S.

A

1.4 The province in which Harrismith is found is ...

A Mpumalanga.
B Kwa-Zulu Natal.
C Gauteng.
D Free State.

D

1.5 The feature marked **1** on the orthophoto map is a …

A spur.
B golf course.
C saddle.
D cemetery.

B

1.6 The building marked **10** on the orthophoto map is a …

A school.
B factory.
C hospital.
D smallholding.

C

1.7 The general direction of the Sterkfontein Dam Nature Reserve area, in block **J2** from Harrismith, in block **B8** is …

A north west.
B south east.
C north east.
D south west.

D

1.8 The landform between trigonometrical beacon 44 and spot height 2338 in **B13**, on the topographic map is a …

A saddle.
B plain.
C plateau.
D pass.

D

1.9 The town of Harrismith is found in a/an … rainfall region.

A summer
B winter
C year through
D autumn

A

1.10 The road/s that link/s Harrismith to Witsieshoek in the south west on the topographic map is/are the …

A N5.
B N5, R74 and 712.
C R74.
D N3 and R74.

B

1.11 The map projection used on the orthophoto map is …

A Universal Transverse.
B Lambert.
C Gauss Conform.
D Mercator.

C

1.12 Evidence of the extraction of underground water in block **D1** is indicated by a …

A dam.
B wind pump.
C reservoir.
D furrow.

B

1.13 The slope between **C** to **D** on the topographical map is ...

A concaved.
B convexed.
C stepped.
D uniformed.

A

1.14 The main vegetation type found in block **C12**.

A Woodland
B Orchards and vineyards
C Cultivated lands
D Game and nature reserves

A

1.15 The reference number of the orthophoto map directly north-east of Harrismith is ...

A 2829 AC 3.
B 2829 AA 24.
C 2829 AB.
D 2829 AC 7.

B

(15 × 1) (15)
[15]

SECTION B

QUESTION 2: MAPWORK TECHNIQUES AND CALCULATIONS

Consult the topographic map and answer the following questions. You may use the orthophoto map.

2.1 Locate the largest dam in block **G5** on the topographic map and calculate the length of the dam wall in meters.

Show ALL calculations. Marks will be awarded for calculations.

Length = 0,3 ✓cm × 0,5 × 1000 (0,2 to 0,4 cm) = 0,3 ✓cm × 500

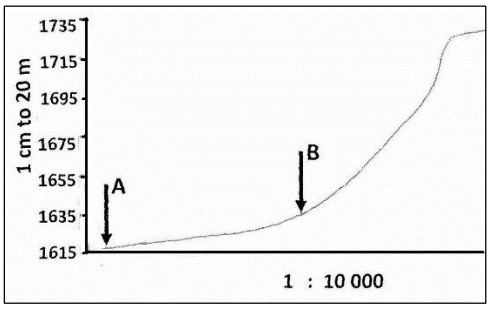
OR

= 150 m ✓ = 150 m ✓

[Range 100 – 200 m]

(2 × 1) (2)

2.2 The cross section below is drawn between **5** and **6** on the orthophoto map.



2.2.1 Identify the feature marked **A** and **B** on the cross section.

A = *Railway line ✓*

B = *N3 National freeway ✓*

(2 × 1) (2)

2.2.2 Calculate the vertical exaggeration of this cross section from **5** to **6**.

Use the formula: $VE = \frac{Vertical\ scale\ (VS)}{Horisontal\ scale\ (HS)}$

1 cm = 20 m (therefore 20 × 100 = 2 000 m)
VS = 1 : 2000 ✓
HS = 1 : 10 000 ✓

$VE = \frac{Vertical\ scale\ (VS)}{Horisontal\ scale\ (HS)}$
$=(\frac{1}{2000} \times \frac{10000}{1})$ ✓
= 5 times ✓*[No units – no marks for final answer]*

(4 × 1) (4)

2.2.3 Provide ONE reason why the vertical scale in a cross section is exaggerated (made bigger).

- *It allows for relief features to be seen more clearly.* ✓
- *If the vertical scale is not exaggerated the relief feature will be flat.* ✓

Any ONE (1 × 1) (1)

2.3 2.3.1 Use the information on the topographic map and calculate the magnetic declination for 2016.

Show ALL calculations. Marks will be awarded for calculations.

Difference in years: *2016 - 2001*
= 15 years ✓
Total change: *15 × (8' W)* ✓
= 120' / 2°00'W ✓
Magnetic declination for 2016: *20°28' W (+ ✓) 120' W (2°00' W)*
= 22°28' W ✓
[No units – no marks for final answer]

(5 × 1) (5)

2.3.2 If the true bearing from trigonometric beacon station 299 (block **C9**) to trigonometric beacon station 44 (block **B13**) is 63°, determine the magnetic bearing for 2016.

Formula:
Magnetic bearing=True bearing (TB) + Magnetic declination (MD)

MB = 63° + *22°28'*
= 85°*28'* ✓

(1 × 1) (1)

2.4 Peter and Zane are doing an adventure race and have to run from spot height 1794, labelled **9**, in a straight line to spot height 1729, marked **8** on the orthophoto map.

Calculate the average gradient of their run.
Show ALL calculations. Marks will be awarded for calculations.

Formula: $\boldsymbol{Gradient} = \frac{Vertical\ interval\ (VI)}{Horizontal\ equivalent\ (HE)}$ ✓

VI = 1794 m – 1729 m
= 65 m ✓

HE $= \frac{10\ cm\ x\ 10\ 000}{100}$
= 1 000 m ✓

Gradient $= \left[\frac{65\ m}{1\ 000\ m}\right]$ ✓
= 1 : 15,4 or $\frac{1}{15,4}$ ✓

[9,9 cm – 10,1 cm]
[990 m – 1 010 m]

VI = 1794 m – 1729 m
= 65 m ✓

HE = 10 cm × 100
= 1 000 m ✓

= $\left[\frac{65\ m}{1\ 000\ m}\right]$ ✓
= 1 : 15,4 or $\frac{1}{15,4}$ ✓

[Range: 15,2 – 15,5]

(5 × 1) (5)

[20]

SECTION C

QUESTION 3: MAP INTERPRETATION AND ANALYSIS

3.1 The town of Harrismith has a rich cultural heritage. Give TWO pieces of evidence, from the map, to support this statement.

- *Numerous monuments* ✓
- *42 Black Watch ….* ✓
- *Queen's Hill* ✓
- *King's Hill plantation* ✓
- *Victoria Lake* ✓

[Any TWO]

(2 × 1) (2)

3.2 Refer to the section of the Nuwejaarspruit (stream) in block **H/I 1 and 2** and answer the questions that follow:

3.2.1 In which direction does the Nuwejaarspruit (stream) flow?

Give ONE reason to support your answer.

Answer *North / NNW / NNE* ✓ (1 × 1) (1)

Reason

- *The contour heights decrease Northwards* ✓✓
- *Spot heights decrease northwards* ✓✓
- *Position of dam wall* ✓✓
- *Dam water south of dam wall* ✓✓

[Any ONE]

(1 × 2) (2)

3.2.2 What type of river is the Nuwejaarspruit?

- *Perennial* ✓

(1 × 1) (1)

3.3 Give ONE reason visible on the topographic map, why the land on the eastern side of the Sterkfontein Dam has not been developed.

- *Protected area* ✓✓

(1 × 2) (2)

3.4 The excavation activities (blocks **H2**, **H3**) in the mapped area has caused environmental despoliation (damage). Suggest TWO ways in which the affected area can be restored (made good).

- *Reforest or re-establish indigenous vegetation* ✓✓
- *Landfill and create a park* ✓✓
- *Develop into dam* ✓✓

[Any TWO]

(2 × 2) (4)

3.5 Soil erosion is occurring over a large area in blocks **D4** and **E3**. Suggest TWO strategies that may help overcome this problem.

- *Afforestation programme* ✓✓
- *Building anti-erosion walls* ✓✓
- *Awareness programme to educate farmers about environmentally sustainable farming practices* ✓✓

[Any TWO]

(2 × 2) (4)

3.6 Refer to both the orthophoto and topographic map and identify the features labelled **12** and **13**.

12 = *Prison* ✓

13 = *Hotel* ✓

(2 × 1) (2)

3.7 Study the landforms marked **G** (block **F4**) and **H** (block **H13**).

3.7.1 Name the landforms marked **G** and **H** respectively.

G = *Butte* ✓

H = *Koppie / Conical hill* ✓

(2 × 1) (2)

3.7.2 Are these landforms associated with massive igneous rock, inclined rock strata or horizontal rock strata?

- *Horizontal rock strata* ✓

(1 x1) (1)

3.7.3 Which ONE of the landforms **G** or **H**, has been exposed to erosion the longest? Explain your answer.

*Answer: **H** = Koppie / conical hill / hill / **H** ✓*

Explanation: No longer a hard cap/sill ✓✓

1 + (1 × 2) (3)

3.7.4 What type of rocks are these landforms in QUESTION 3.7.3 most probably consisting of.

- *Sedimentary ✓*

(1 × 1) (1)

[25]

SECTION D

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.1 What is the term used to describe the conversion of a paper map to be used in a computer?

Digitising ✓

(1 × 1) (1)

4.2 Differentiate between vector and raster data.

Vector: *Uses points, lines and areas inside a polygon to define data stored in a computer ✓*

Raster: *Each area is divided into rectangular grid cells and each rectangular cell contains an attribute value and its location coordinates ✓ [Concept]*

(2 × 1) (2)

4.3 Explain why the orthophoto map of Harrismith has a high spatial resolution.

- *The orthophoto map has a higher degree of detail and clarity of images. ✓✓*
- *High resolution maps have a better quality image ✓✓*
- *The orthophoto map has a larger scale ✓✓*
- *Large scale maps show more detail and better resolution ✓✓ [Any ONE]*

(1 × 1) (1)

4.4 Answer the following questions on data layering:

4.4.1 Explain the meaning of the term *data layering* in GIS.

- *Maps showing different types of information are projected onto one another / placed on top of one another* ✓

[Concept]

(1 × 1) (1)

4.4.2 Discuss how TWO data layers influenced the farmer in block **H9**, on the topographic map, in making his farm more profitable.

- *Infrastructure - road / buildings / farm houses* ✓✓
- *Relief - contours / hill / soil type / gradient* ✓✓
- *Drainage - availability of water / dam / river / windpump* ✓✓

[Any TWO]

(2 × 2) (4)

4.5 Identify a point feature and a line feature in block **I9**.on the topographic map.

A point feature:

- *windpump* ✓
- *resevoir* ✓
- *spot height* ✓

[Any ONE]

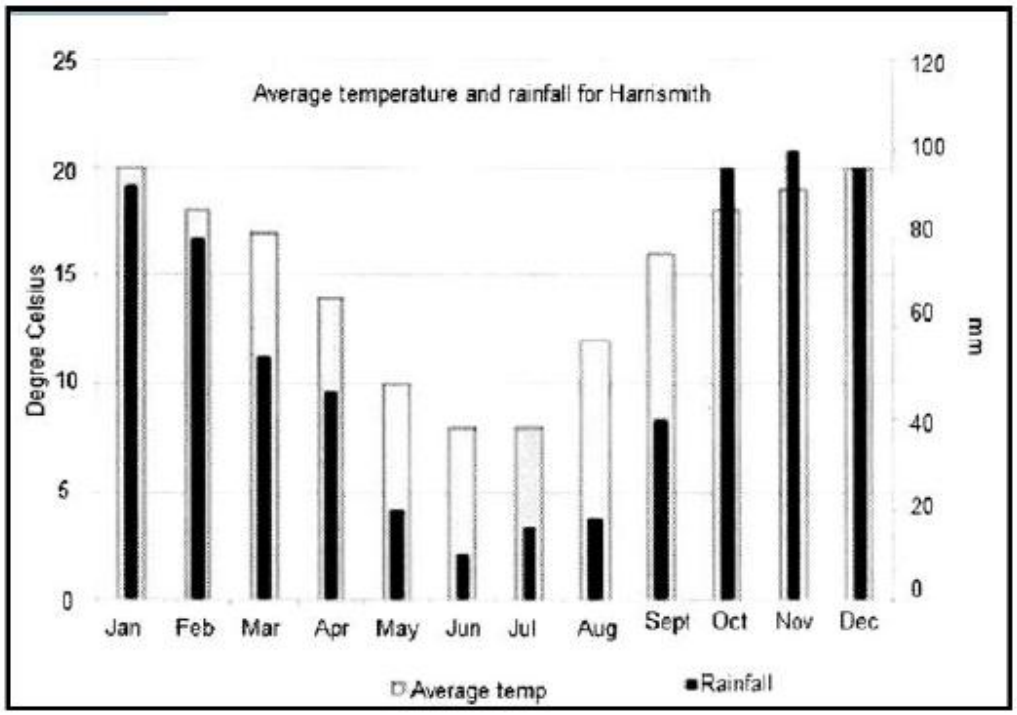
A line feature:

- *other road* ✓
- *secondary road* ✓
- *contour line* ✓
- *river* ✓
- *dam wall* ✓
- *fence* ✓
- *row of trees* ✓

[Any ONE]

(2 × 1) (2)

4.6 Study the bar graph below, which depicts temperature and rainfall data for Harrismith. A statistical analysis of the data on the graph will be useful for farmers. The bar graph is an example of attribute data.



4.6.1 Give TWO attributes provided by the bar graph.

- *Temperature* ✓
- *Rainfall* ✓

(2 × 1) (2)

4.6.2 Explain how you can use attributes provided by the bar graph.

- *To determine the average temperature/rainfall for the year* ✓
- *To determine the maximum temperature/rainfall* ✓
- *To determine the minimum temperature/rainfall* ✓
- *To determine months with high temperature/rainfall* ✓
- *To determine months with low temperature/rainfall* ✓
- *To determine the type of crops to be grown* ✓
- *To determine when to grow certain crops* ✓
- *To determine the harvesting period of the crops* ✓

[Any TWO]

(2 × 1) (2)

[15]

GRAND TOTAL: 75