



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2010

**GEOGRAPHY – PAPER 2
MEMORANDUM**

MARKS: 100

TIME: 1½ hours

This memorandum consists of 10 pages.

RESOURCE MATERIAL

An extract from topographical map 2527CA RUSTENBURG WEST.

Orthophoto map 2527CA 20 RUSTENBURG.

NOTE: After the exam, the resource material must be collected by the schools for their own use.

A non-programmable calculator may be used.

INSTRUCTIONS AND INFORMATION

1. Write your NAME in the space provided on the cover page of the QUESTION PAPER.
2. Answer ALL the questions in the spaces provided in this question paper.
3. You are supplied with a 1:50 000 topographical map 2527CA RUSTENBURG WEST and an orthophoto map of a part of the mapped area.
4. The topographical map and the orthophoto map must be handed to the invigilator at the end of this examination session.
5. You may use the blank page at the back of this paper for all rough work and calculations.
6. The following English terms and/or their Afrikaans translations are shown on the 1:50 000 topographical map:

<u>ENGLISH</u>	<u>AFRIKAANS</u>
Aerodrome	Vliegveld
Golf Course	Gholfbaan
Landing Strip	Landingstrook
Nature reserve	Natuurreservaat
Slimes Dam	Slikdam

QUESTION 1**MULTIPLE-CHOICE QUESTIONS**

Refer to the 1:50 000 topographical map 2527CA RUSTENBURG WEST and the orthophoto map of a part of the mapped area to answer the following questions. Various options are provided as answers for the following statements. Choose the answer and write only the letter (A – D) next to the question number (1.1 – 1.10) in the block next to each statement.

1.1 The scale of the orthophoto map is...

- A 5 times smaller than the scale of the topographical map.
- B equal to the scale of the topographical map.
- C 10 times smaller than the scale of the topographical map.
- D 5 times larger than the scale of the topographical map.

D

1.2 The orthophoto map is obtained from a ...

- A horizontal photograph.
- B low-oblique aerial photograph.
- C high-oblique aerial photograph.
- D vertical aerial photograph.

D

1.3 The topographic map is drawn on a calculated grid of latitudinal and longitudinal lines. This projection is referred to as the ... projection.

- A Mercator
- B Lambert
- C Transverse
- D Gauss Conform

D

1.4 Spot heights, bench-marks, trigonometrical stations and contour lines represent ... on the topographical map.

- A lines joining places of equal height
- B altitude (height) above sea level
- C the height of features such as mesas
- D the gradient of the area

B

1.5 The map reference/code of the topographical map directly west of 2527CA is ...

- A 2527DA
- B 2526DB
- C 2525CC
- D 2525CD

B

1.6 The feature marked **1** on the orthophoto map is a/an ...

- A sports field.
- B dam.
- C reservoir.
- D excavation.

A

1.7 Identify the street pattern found around **6** on the orthophoto map.

- A Gridiron
- B Planned irregular
- C Radial
- D Unplanned irregular

A

1.8 The slope element marked **A** in block G5 on the topographical map is the ... slope.

- A scarp/cliff
- B crest/waxing
- C pediment
- D talus/debris/scree

A
B

1.9 The main primary economic activities taking place at **B** (block E10) on the topographical map is ...

- A fishing and crop farming.
- B forestry and mining.
- C mining and crop farming.
- D mining and livestock farming.

C

1.10 The major raw material mined around the Rustenburg area is ...

- A platinum.
- B coal.
- C diamonds.
- D iron ore.

A

10x2=[20]

QUESTION 2

GEOGRAPHICAL TECHNIQUES AND CALCULATIONS

- 2.1 Calculate the area (in km²) of the region marked **O** on the topographical map. Area **O** is found between 25°39'S and 25°42'S and 27°13'E and 27°15'E. Show ALL your calculations.

$$\text{Area} = L \times B \quad \checkmark$$

$$\begin{aligned} L &= 6,6 \text{ cm} \\ &= 6,6 \times 0,5 \\ &= 3,3 \text{ km} \quad \checkmark \end{aligned}$$

$$\begin{aligned} B &= 11,1 \text{ cm} \\ &= 11,1 \text{ cm} \times 0,5 \\ &= 5,55 \text{ km} \quad \checkmark \end{aligned}$$

$$\begin{aligned} \text{Area} &= 3,3 \text{ km} \times 5,55 \text{ km} \quad \checkmark \\ &= 18,315 \text{ km}^2 \\ &= 18,3 \text{ km}^2 \quad \checkmark \end{aligned}$$

$$\text{Area} = L \times B \quad \checkmark$$

$$\begin{aligned} L &= \frac{6,6 \times 50\,000}{100\,000} \\ &= 3,3 \text{ km} \quad \checkmark \end{aligned}$$

$$\text{OR} \quad \begin{aligned} B &= \frac{11,1 \text{ cm} \times 50\,000}{100\,000} \\ &= 5,55 \text{ km} \quad \checkmark \end{aligned}$$

$$\begin{aligned} \text{Area} &= 3,3 \text{ km} \times 5,55 \text{ km} \\ &= 18,315 \text{ km}^2 \\ &= 18,3 \text{ km}^2 \quad \checkmark \end{aligned}$$

Range [1792 km² – 1884 km²]

(5)

- 2.2 Calculate the average gradient between spot height •1153 (4) and spot height •1162 (5) on the orthophoto map. Show ALL your calculations.

$$\text{Gradient} = \frac{VI}{HE} \quad \text{or} \quad \frac{H}{D} \quad \checkmark$$

$$\begin{aligned} VI &= 1\,162 \text{ m} - 1\,153 \text{ m} \quad \checkmark \\ &= 9 \text{ m} \quad \checkmark \end{aligned}$$

$$\begin{aligned} HE &= 6,2 \times 100 \\ &= 620 \text{ m} \quad \checkmark \end{aligned}$$

$$\begin{aligned} G &= \frac{9}{620} \quad \checkmark \\ &= \frac{1}{69} \\ &= 1:69 \quad \checkmark \end{aligned}$$

$$G = \frac{VI}{HE} \quad \checkmark$$

$$\begin{aligned} VI &= 1\,162 \text{ m} - 1\,153 \text{ m} \quad \checkmark \\ &= 9 \text{ m} \quad \checkmark \end{aligned}$$

$$\begin{aligned} HE &= \frac{6,2 \times 10\,000}{100} \\ &= 620 \text{ m} \quad \checkmark \end{aligned}$$

$$\text{OR} \quad \begin{aligned} G &= \frac{9}{620} \quad \checkmark \\ &= \frac{1}{69} \\ &= 1:69 \quad \checkmark \end{aligned}$$

Range [1:67 – 1:70]

(6)

- 2.3 By how much does the N4 increase/decrease in height from **G**(F2) to **H**(E4) on the topographical map?

Increases ✓ *by 63,1m* ✓ (2)

- 2.4 Locate spot height •1248 (B4) and trigonometrical station Δ 29 (B7). Determine the magnetic bearing of trigonometrical station Δ 29 from spot height •1248.

True bearing = 90° ✓ ($88^\circ - 92^\circ$)

Difference in years = 2010 - 1997
= 13 yrs ✓

Mean annual change = 2' W ✓

Total annual change = 13 x 2'W
= 26' W ✓

Magnetic declination 2010 = $15^\circ 57' W + 26' W$
= $15^\circ 83' W$
= $16^\circ 23' W$ ✓

Magnetic bearing = Magnetic declination + True bearing
= $16^\circ 23' + 90^\circ$ ✓
= $106^\circ 23'$ ✓

Range [$104^\circ 23' - 108^\circ 23'$]

(7)
[20]

QUESTION 3**APPLICATION OF THEORY/MAP AND PHOTO INTERPRETATION**

3.1 Identify the feature marked **E** on the topographical map.

Mesa √√ / *Narrow ridge* √√
[Any ONE]

1x2=(2)

3.2 The river is rejuvenating itself in Block J10. Give ONE piece of evidence from the topographical map to substantiate this statement.

There is a waterfall in this area √√

1x2=(2)

3.3 Give ONE piece of evidence from the topographic map to show that nature conservation is a priority in the mapped area.

Rustenburg Nature Reserve √√
Magaliesberg Protected Natural Environment √√
[Any ONE]

1x2=(2)

3.4 Locate the Rustenburg Hiking Trail in blocks J7/8.

3.4.1 You are a novice hiker, who is very unfit. You are given a choice between doing hiking trail **C** or **D** starting at **F** in J8. Which hiking trail would you choose? Give ONE reason for your answer.

D √√
D has a gentler slope than C √√
D is a shorter route than C √√
[Any ONE reason]

2x2=(4)

3.4.2 Identify the landform at **F** from where you will start your hike.

Valley √√

1x2=(2)

3.5 Locate the area marked **3** on the orthophoto map.

3.5.1 This area is a low cost-housing scheme. Give ONE piece of evidence from the orthophoto map to support this statement.

Houses appear small √√
Plots appear small √√
Little established vegetation √√
Low cost housing √√
High density housing √√
Few trees √√
[Any ONE]

1x2=(2)

3.5.2 The local government in charge of the area marked **3** is posed with many challenges regarding service delivery. Give TWO possible challenges that they could face.

- *Ensuring that the houses are sustainable* ✓✓
 - *More green belt development* ✓✓
 - *Non-payment for services* ✓✓
 - *Maintaining a good infrastructure* ✓✓
 - *Providing recreation and maintaining facilities* ✓✓
 - *Reduce crime/corruption* ✓✓
- [Any TWO suitable answers]

2x2=(4)

3.6 Refer to the group of farms in E5 and the farm Omdraai in J4.

3.6.1 Compare the group of farms in E5 and the farm Omdraai in J4 in terms of the settlement pattern that they assumed.

Group of farms *clustered/nucleated* ✓✓

Omdraai *isolated/dispersed* ✓✓

2x2=(4)

3.6.2 Give TWO pieces of evidence found on the topographical map to suggest that commercial farming is taking place in E5.

- *Intensive farming* ✓✓
 - *Farm boundaries* ✓✓
 - *Farms have names* ✓✓
 - *Reservoirs to store water and for irrigation* ✓✓
 - *Near transport routes e.g. roads* ✓✓
- [Any TWO]

2x2=(4)

3.6.3 There are no rivers flowing through E5. Give ONE measure that farmers have introduced to obtain water in this area.

Reservoirs ✓✓
Dams ✓✓
 [Any ONE]

1x2=(2)

3.7 Refer to the orthophoto. Compare the area marked **11** to the area marked **8** in terms of the different street patterns that were assumed here.

8 *irregular* ✓✓

11 *gridiron* ✓✓

2x2=(4)

3.8 Environmentalists often criticize mining companies because of the damage that is caused by shaft mining. Suggest ONE way in which mines in the RUSTENBURG area can rehabilitate the environment.

- *Fill the land* ✓✓
 - *Plant more vegetation* ✓✓
- [Any ONE suitable answer]

1x2=(2)

3.9 Identify the following features on the orthophoto map:

7 *Slimes Dam* ✓✓

9 *Industries* ✓✓

12 *Golf Course* ✓✓

3x2=(6)

[40]

QUESTION 4

GEOGRAPHIC INFORMATION SYSTEMS (GIS)

4.1 Define the following concepts:

4.1.1 *Buffering (Buffer zoning)*

Process of demarcating an area, around a polygon/feature
[Concept] ✓✓

1x2=(2)

4.1.2 *Database*

A collection of data organized for use in computers
[Concept] ✓✓

1x2=(2)

4.2 Mention TWO ways in which the farmers in E5 could put GIS to use.

- *Determine soil type* ✓✓
 - *Determine soil fertility* ✓✓
 - *Determine drainage* ✓✓
 - *Determine availability of underground water* ✓✓
 - *Determine slope of land (gradient)* ✓✓
 - *Early detection of crop diseases/pests* ✓✓
- [Any TWO. Accept other logical answers]

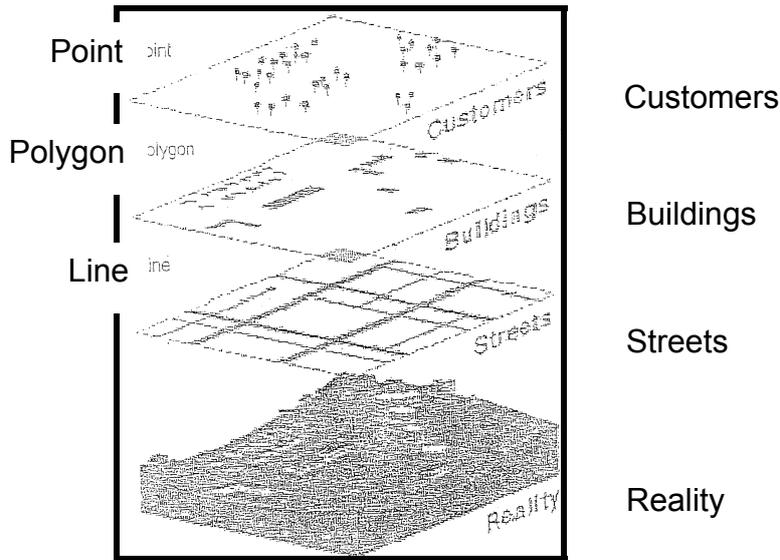
2x2=(4)

4.3 Spatial analysis is used in various ways in our daily life. Give ONE way in which spatial analysis is used in our daily lives.

- *Deciding which route is the shorter when you travel to school* ✓✓
 - *Deciding which areas are affected by crime* ✓✓
 - *Deciding which route will be best to reduce traffic congestion* ✓✓
- [Any ONE suitable answers]

1x2=(2)

4.4 Study the diagram below showing thematic layering GIS before answering the questions that follow.



4.4.1 Give the meaning of the term *thematic layering*.

Maps showing different types of information are projected onto one another/placed on top of one another ✓✓
 [Concept]

1x2=(2)

4.4.2 Explain any TWO uses of data layering in a GIS.

- *Different sets of data can be compared* ✓✓
 - *Relationships between different sets of data can be established* ✓✓
 - *Analysing different sets of information* ✓✓
 - *Comparisons can assist with future developments* ✓✓
- [Any TWO. Accept other logical answers]

2x2=(4)

4.4.3 Name any TWO layers of information that one can identify in block G3 on the topographical map.

- *Vegetation* ✓✓
 - *Drainage* ✓✓
 - *Cultivation* ✓✓
 - *Relief* ✓✓
 - *Infrastructure* ✓✓
 - *Land-use* ✓✓
- [Any TWO]

2x2=(4)
 [20]

TOTAL: 100