



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P2

FEBRUARY/MARCH 2015

MEMORANDUM

MARKS: 75

This memorandum consists of 11 pages.

RESOURCE MATERIAL

1. An extract from topographical map 2528DA CULLINAN.
2. Orthophoto map 2528 DA 16 CULLINAN.
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 supplied with a 1 : 50 000 topographical map 2528DA of CULLINAN and an orthophoto map of a part of the mapped area.
4. You must hand the topographical map and the orthophoto map to the invigilator at the end of this examination session.
5. You may use the blank page at the back of this question paper for all rough work and calculations. Do NOT detach this page from the question paper.
6. Show ALL calculations, where applicable. Marks will be allocated for these.
7. You may use a non-programmable calculator.
8. The area demarcated in RED on the topographical map represents the area covered by the orthophoto map.
9. The following English terms and their Afrikaans translations are shown on the topographical map.

ENGLISH

Diggings
Conveyor belt
Golf course
River
Diamond mine
Sewage works
Waterworks
Sewage disposal works
Rifle range
Landing strip
Brickworks
Furrow
Refuse dump

AFRIKAANS

Uitgrawings
Vervoerband
Golfbaan
Rivier
Diamantmyn
Rioolwerke
Waterwerke
Riolverwyderingswerke
Skietbaan
Landingstrook
Steenwerke
Voor
Vullisstortingsterrein

GENERAL INFORMATION ON CULLINAN

Cullinan is situated in the Highveld region of South Africa. The town has an elevation of 1 476 m. The closest city is Pretoria, which is 40 km away, while Johannesburg is 100 km away. On 25 June 1905 the famed Cullinan Diamond, the largest in the world at 3 106 carats (621 g), was discovered by Frederick George Stanley Wells, a surface manager at the Premier Diamond Mining Company. The town of Cullinan owes its existence to diamond mining in the area. Cullinan's opencast mine is among the biggest in the world, three times the size of the more famous Kimberley Diamond Mine.

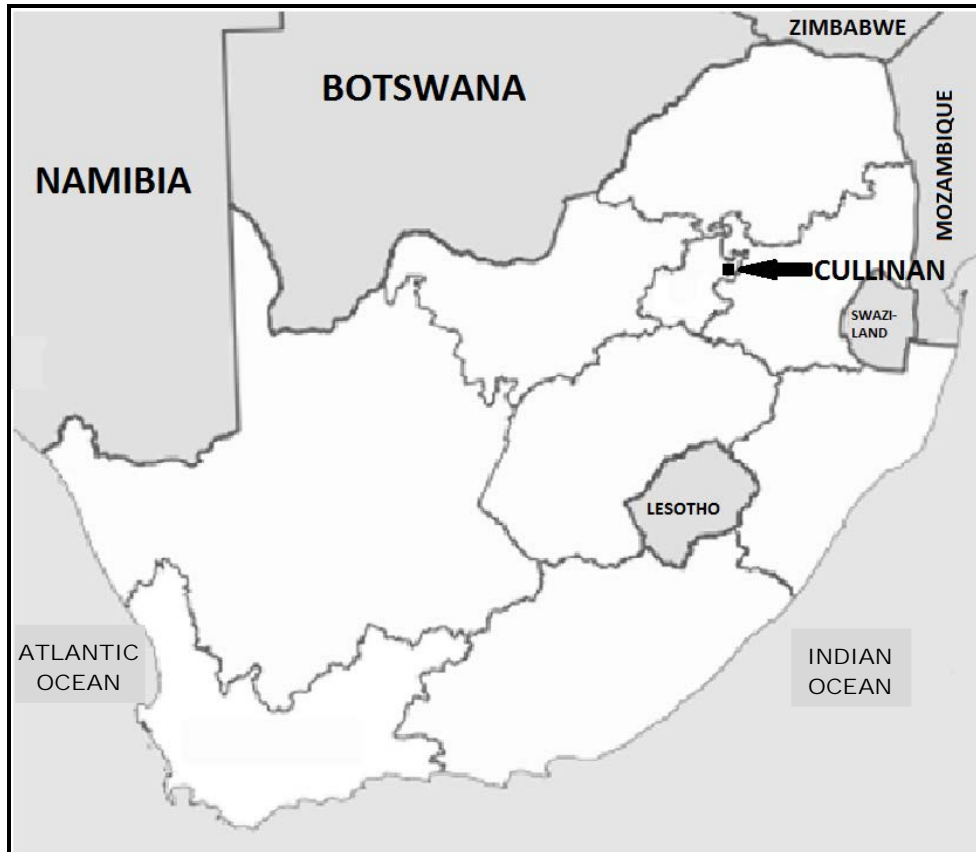


FIGURE 1

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1 : 50 000 topographical map 2528DA CULLINAN, 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–D) in the block next to each question.

1.1 The number **28** in the map index/reference of the topographical map of Cullinan refers to ...

- A line of latitude.
- B line of longitude.
- C minutes (') in the line of latitude.
- D seconds (") in the line of longitude.

B

1.2 The orthophoto map index/reference of the orthophoto map north-west of 2528DA 16 CULLINAN is ...

- A 2528DA 11.
- B 2528DD 22.
- C 2528AD 12.
- D 2528CB 15.

D

1.3 The photograph was taken at/during the ...

- A 12:00.
- B afternoon.
- C morning.
- D night.

B

1.4 Cullinan is situated in ...

- A North West.
- B Mpumalanga.
- C Limpopo.
- D Gauteng.

D

1.5 Feature **3** on the orthophoto map is a/an ...

- A mine dump.
- B dam.
- C excavation.
- D cutting.

A

1.6 The slope represented by the line running from **8** to **11** on the orthophoto map is a ... slope.

- A concave
- B convex
- C steep
- D terraced

B

- 1.7 The natural feature at **5** on the orthophoto map is a ...
- A spur.
 - B valley.
 - C saddle.
 - D gap.
- C**
- 1.8 The settlement of Rayton in blocks **H2** and **H3** is a ...
- A break-of-bulk location.
 - B gap town.
 - C bridge town.
 - D central place.
- D**
- 1.9 ... is/are the main raw material being mined in the Cullinan area.
- A Diamonds
 - B Copper
 - C Gold
 - D Platinum
- A**
- 1.10 The general flow direction of the river in block **H6** is ...
- A south-west.
 - B north-west.
 - C south-east.
 - D north-east.
- B**
- 1.11 The brickworks in blocks **G7/G8** are a ... economic activity.
- A primary
 - B secondary
 - C tertiary
 - D quaternary
- B**
- 1.12 The type of farming that is practised at Franjojan in block **H3** is ... farming.
- A large-scale
 - B small-scale
 - C fruit
 - D livestock
- B**
- 1.13 The value of contour line **D** in block **C7** is ...
- A 1 500 m.
 - B 1 520 m.
 - C 1 380 m.
 - D 1 360 m.
- C**

1.14 What type of mining technique is practised at the mine in block **D1**?

- A Opencast mining
- B Drilling
- C Shaft mining
- D Dredging

A

1.15 The pattern of the settlement found at **Z** in block **E8** is ...

- A linear.
- B dispersed.
- C nucleated.
- D circular.

C

(15 x 1)

[15]

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

2.1 Calculate the magnetic bearing of spot height 1464 at point **Q** in block **E6** from spot height 1429 at point **R** in block **E4** for the year 2015. Show ALL calculations. Marks will be awarded for calculations.

Magnetic bearing = true bearing + magnetic declination

True bearing: $95^\circ (93^\circ - 97^\circ) \checkmark$
Difference in years: $2015-2002 = 13 \text{ years } \checkmark$
Mean annual change: $8'W \checkmark$
Total change: $13 \times 8'W = 104'W/1^\circ44'W \checkmark$
Magnetic declination 2015: $16^\circ52'W + \checkmark 1^\circ44'W = 18^\circ36'W \checkmark$
Magnetic bearing 2015: $95^\circ + 18^\circ36' = 113^\circ36' \checkmark$

Range [111°28' to 115°28']

(7 x 1) (7)

2.2 Refer to spot height 1508 at point **1** and spot height 1516 at point **2** on the orthophoto map, and answer the following questions. Show ALL calculations. Marks will be awarded for calculations.

$$\text{Gradient} = \frac{\text{VI}}{\text{HE}}$$

2.2.1 Calculate the average gradient between points 1 and 2.

$$VI = 1\,516\,m - 1\,508\,m \checkmark$$

$$= 8\,m \checkmark$$

$$VI = 1\,516\,m - 1\,508\,m \checkmark$$

$$= 8\,m \checkmark$$

$$HE = 6,5\,cm \checkmark \times 100$$

$$= 650\,m \checkmark$$

OR $HE = \frac{65\,mm \checkmark \times 10\,000}{1\,000}$

$$= 650\,m \checkmark$$

$$\text{Gradient} = \frac{8}{650}$$

$$= \frac{1}{81,3}$$

$$\text{Gradient} = \frac{8}{650}$$

$$= \frac{1}{81,3}$$

$$= 1 : 81,3/1 \text{ in } 81,3 \checkmark$$

$$= 1 : 81,3/1 \text{ in } 81,3 \checkmark$$

Range [1 : 84,3 to 1 : 78,3]

(5 x 1) (5)

2.2.2 What does your answer to QUESTION 2.2.1 tell you about the steepness of the slope?

Slope is gentle ✓

(1 x 1) (1)

2.2.3 Give TWO reasons for your answer to QUESTION 2.2.2.

For every one unit you move vertically, you will only move 81,3 units horizontally ✓

Contour lines on the orthophoto map are far apart, indicating a gentle gradient ✓

(2 x 1) (2)

2.3 Determine the intervisibility of point 1 from point 2 on the orthophoto map. Give ONE reason for your answer.

Intervisibility: *Point 1 is visible from point 2* ✓

Reason: : *No obstructions* ✓✓

No high lying area between point 1 and point 2 ✓✓

[Any ONE]

(1 + 2) (3)

2.4 Give the grid reference/coordinates of spot height 1429 at point R in block E4 on the topographic map.

25°41.1'S ✓ 28°33.6'E ✓ / 25°41'06"S ✓ ; 28°33'35"E ✓

(2 x 1) (2)

[20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Refer to the area from **K** in block **F1** to **J** in block **E2** and answer the following questions.

3.1.1 Identify the landform between **K** and **J**.

Valley ✓

(1 x 1) (1)

3.1.2 State the type of wind that will occur at the landform identified in QUESTION 3.1.1, at 23:00.

Katabatic/Downslope/Mountain wind ✓

(1 x 1) (1)

3.1.3 Give a possible reason why no farming activities are found at **E** in block **F1**.

*Frost will damage the crops in winter ✓✓
The river can cause flooding ✓✓
[Any ONE]*

(1 x 2) (2)

3.2 Refer to the rivers in blocks **H1** and **H2** and blocks **H3** and **H4** on the topographic map. These rivers are flowing in opposite directions.

3.2.1 State the direction of the flow of the river found in blocks **H1** and **H2**.

West ✓

(1 x 1) (1)

3.2.2 State the direction of the flow of the river found in blocks **H3** and **H4**.

East ✓

(1 x 1) (1)

3.2.3 Explain the difference in the direction of the flow of the rivers identified in QUESTIONS 3.2.1 and 3.2.2.

Ridge/high-lying area forms watershed separating the river systems ✓✓

(1 x 2) (2)

- 3.3 The golf course at point **4** on the orthophoto map can be considered to be a greenbelt area. Besides recreational use, explain TWO other positive effects it will have on the residential area at point **9**.

Create a buffer zone between residential area 9 and mining area ✓✓

Create aesthetic appeal/beautify the area ✓✓

Create a greater oxygen supply ✓✓

Reduce pollution ✓✓

Lower temperatures ✓✓

[Any TWO. Accept other reasonable answers.] (2 x 2) (4)

- 3.4 Infrastructure is important for mining. Refer to the Premier Diamond Mine on the orthophoto map to answer the following questions.

- 3.4.1 State TWO forms of infrastructure used by the Premier Diamond Mine.

Roads ✓

Railway lines ✓

Conveyor belt ✓

Dam ✓

Reservoirs ✓

Power lines ✓

[Any TWO] (2) (2)

- 3.4.2 Explain why the infrastructure mentioned in QUESTION 3.4.1 is of importance to the Premier Diamond Mine.

Roads – transport of raw materials/machinery used ✓✓

Railway lines – transport of raw materials/machinery used ✓✓

Conveyor belt – moves material from one part of the mine to another ✓✓

Dam/Reservoir – supplies water for cooling systems in the mines ✓✓

Power lines – supply energy/electricity ✓✓

[Any TWO. Accept other reasonable answers.] (2 x 2) (4)

- 3.4.3 Evaluate the impact of the Premier Diamond Mine on the urban expansion of Cullinan.

It will limit urban expansion towards the west ✓✓

(1 x 2) (2)

- 3.5 Find the refuse dump in blocks **E2** and **E3**.

- 3.5.1 Identify the land-use zone in which the refuse dump is situated.

Rural-urban fringe ✓

(1 x 1) (1)

- 3.5.2 Why is the refuse dump located in the land-use zone which you identified in QUESTION 3.5.1?

It produces bad odours which is unpleasant for people ✓✓

It is far away from the residential areas ✓✓

Rats breed in the refuse ✓✓

Breeding ground for diseases ✓✓

[Any ONE. Accept other reasonable answers.]

(1 x 2) (2)

- 3.5.3 What has the local government done to improve the aesthetic appeal (appearance) of the area surrounding the refuse dump?

The local government planted trees ✓✓

(1 x 2) (2)
[25]

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

- 4.1 Refer to the area demarcated in RED on the topographic map and answer the following questions relating to remote sensing.

- 4.1.1 Define the concept *remote sensing*.

Collecting of information about the earth's land and sea surfaces with sensors from above the earth, with devices such as satellites ✓
[Concept]

(1 x 1) (1)

- 4.1.2 Would an environmentalist use active or passive remote sensing?

Active remote sensing ✓

(1 x 1) (1)

- 4.1.3 How would remote sensing assist environmentalists to evaluate the impact of the Premier Diamond Mine on the natural environment?

Could analyse the impact mining is having on the removal of vegetation by checking spatial areas ✓✓

Could compare the past and present effects to evaluate the impact mining has on the fauna and flora by analysing spatial areas ✓✓

Could analyse how water quality is influenced by analysing spectral resolution ✓✓

Could analyse how biodiversity is affected checking spatial areas ✓✓

(Any TWO. Accept other reasonable answers.)

(2 x 2) (4)

- 4.1.4 Explain ONE measure that the Premier Diamond Mine could use by implementing GIS to limit the negative impact it has on the natural environment.
- Use buffering to limit the area where mining can be done ✓✓*
- (1 x 2) (2)
- 4.2 Refer to river **F** in blocks **H5** and **G5** on the topographic map and answer the following questions.
- 4.2.1 Define the term *attribute data*.
- Further information about an area in addition to its location ✓
[Concept]*
- (1 x 1) (1)
- 4.2.2 State TWO attributes of the river (**F**) in blocks **H5** and **G5**.
- It has non-perennial tributaries ✓
It flows in a northerly direction ✓
It flows over a flat surface ✓
The river takes a winding course ✓
[Any TWO]*
- (2 x 1) (2)
- 4.2.3 State ONE use of the river in blocks **H5** and **G5**.
- Water for farming ✓
It is used as a furrow ✓
For domestic use ✓
[Any ONE]*
- (1 x 1) (1)
- 4.3 Data manipulation refers to data that is processed and converted into useful information. A primary source/data is manipulated to create a secondary source/data.
- 4.3.1 Is the orthophoto map an example of a primary or a secondary source?
- Secondary ✓*
- (1 x 1) (1)
- 4.3.2 Give a reason for your answer to QUESTION 4.3.1.
- Information such as contour lines, features and names are added to a vertical aerial photograph ✓✓*
- (1 x 2) (2)
- [15]**
- TOTAL: 75**