basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P2

FEBRUARY/MARCH 2016

MEMORANDUM

MARKS: 75

This memorandum consists of 13 pages.

RESOURCE MATERIAL

1. An extract from topographical map 3126DD QUEENSTOWN.

2. Orthophoto map 3126 DD 13 QUEENSTOWN.

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 topographical map (3126DD QUEENSTOWN) and an orthophoto map (3126 DD 13 QUEENSTOWN) 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 and formulae, where applicable. Marks will be allocated for these.

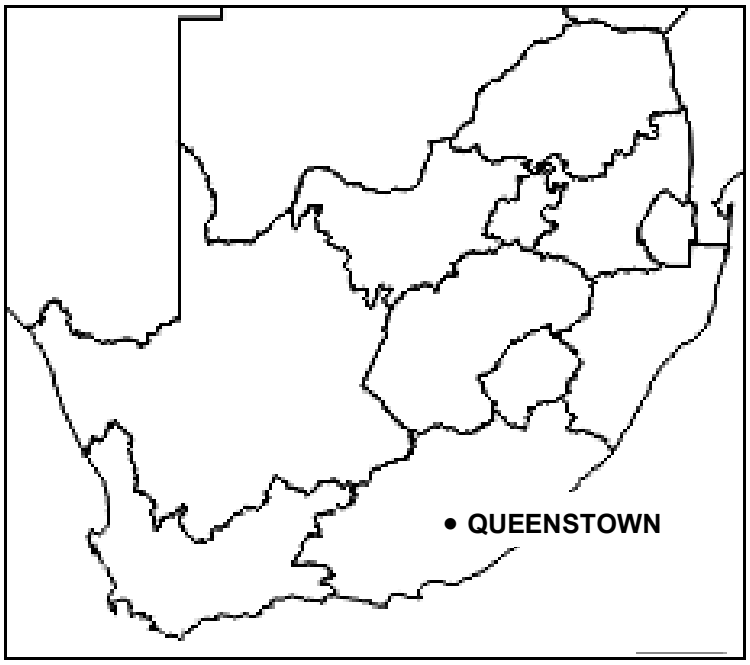
7. Indicate the unit of measurement in the final answer of calculations.

8. You may use a non-programmable calculator.

9. The following English terms and their Afrikaans translations are shown on the topographical map:

ENGLISH	**AFRIKAANS**
Aerodrome	Vliegveld
Caravan Park	Karavaanpark
College	Kollege
Diggings	Uitgrawings
Golf Course	Gholfbaan
Gorge	Ravyn (Kloof)
Holiday Resort	Vakansieoord
Purification Plant	Watersuiweringsaanleg
River	Rivier
Sewage Works	Rioolwerke
Yacht Club	Seiljagklub

GENERAL INFORMATION ON QUEENSTOWN



Coordinates: 31°54'S 26°53'E

Queenstown is a town in the Eastern Cape in South Africa. It lies on the Komani River, which forms part of the Great Kei system of rivers. Queenstown has a refreshing climate and plentiful water supply from the surrounding rugged mountains. The water is collected in the Bonkolo Dam (the name has been changed from Bongolo Dam recently), set in the hills. This dam is used extensively for recreation and water sports. Close to Queenstown is a nature reserve (Lawrence de Lange Nature Reserve) with numerous antelope, white rhinoceros and spectacular flowering plants, together with panoramic views from the mountain summit. Queenstown has rich sandstone layers deposited by meandering rivers on the flood plain. Queenstown's layout reflects its original objective as a defensive stronghold for the frontier area and has a most unusual design. There is a central hexagonal area where canon or rifle fire could be directed down six thoroughfares radiating from the centre.

[Adapted from http://en.wikipedia.org/wiki/Queenstown, Eastern Cape]

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1 **:** 50 000 topographical map 3126DD QUEENSTOWN, 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 Queenstown is situated in the …

A Western Cape.
B Eastern Cape.
C Northern Cape. ✓ **B**
D Free State.

1.2 The numbers **3126** in the map index refers to …

A 31' latitude and 26' longitude.
B 26' latitude and 31' longitude.
C 26° latitude and 31° longitude. ✓ **D**
D 31° latitude and 26° longitude.

1.3 The direction of trigonometrical station 60 in block **F1** from spot height 1076 in block **J1** on the topographical map is …

A north-west.
B east-northeast.
C north. ✓ **D**
D north-northeast.

1.4 What feature indicates that groundwater is found in **I6**?

A Dam
B Reservoir
C Windmill ✓ **C**
D Non-perennial river

1.5 The angle at which the tributaries meet the main stream in **C1** on the topographical map, indicates that the general flow direction of this stream is ...

A westerly.
B northerly.
C easterly. ✓ **A**
D southerly.

1.6 The height of the index contour line in block **B10** on the topographical map is ... metres.

A 1 095
B 1 100
C 1 160 ✓ **D**
D 1 200

1.7 Area **1** on the orthophoto map has a/an … street pattern.

A unplanned irregular
B gridiron
C radial concentric ✓ **C**
D planned irregular

1.8 The drainage pattern in blocks **C9/10** and **D9/10** on the topographical map is a … pattern.

A parallel
B centripetal
C radial ✓ **C**
D trellis

1.9 What is the stream order at point **X** in block **D9**?

A 3
B 2
C 1 ✓ **B**
D 4

1.10 The landform at **R** in block **I4** on the topographical map is a …

A pass.
B saddle.
C gorge. ✓ **C**
D spur.

1.11 The shadows of the trees at **16** on the orthophoto map are found in the south-east, indicating that the photograph was taken at …

A 08:00
B 16:00
C 10:00 ✓ **D**
D 14:00

1.12 The major primary activity in the mapped area is …

A forestry.
B farming.
C mining. ✓ **B**
D fishing.

1.13 Bowkerskop, found between points **7** and **8** on the orthophoto map, is a …

A mesa.
B cuesta.
C conical hill. ✓ **C**
D butte.

1.14 The main factor limiting farming in block **A3**, that is evident on the topographical map, is ...

A pollution.
B deforestation.
C erosion. ✓ **C**
D overgrazing.

1.15 Identify feature **14** on the orthophoto map.

A Embankment
B Mine dump
C Excavation ✓ **C**
D Cutting

(15 x 1) **[15]**

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

2.1 Calculate the magnetic bearing of spot height 1200 (block **H5**) from trigonometrical station 203 in block **G6** on the topographical map.

Formula:
Magnetic bearing = true bearing + present magnetic declination

True bearing: *223° ✓*

Difference in years: *2016 – 2002 = 14 years ✓*

Mean annual change: *11'W*

Total change: *14 x 11' W = 154' W (2°34'W) ✓*

Magnetic declination for 2016: *24°16' W +2° 34' W ✓*
= 26°50'West of True North

Magnetic bearing for 2016: *223°+ 26°50' = 249°50' ✓*

Range: (248°01' - 250°01') (6 x 1) (6)

2.2 Refer to recreational area **S** on the topographical map and **11** on the orthophoto map.

2.2.1 Calculate the area of recreational area **S** on the topographical map in m^2. Show ALL calculations. Marks will be awarded for calculations.

Formula: **area = length (L) x breadth (B)**

= (0,7 cm x 500) ✓(0,5 cm x 500) ✓
= 350 m x 250 m ✓
= 87 500 m^2 ✓

Range [60 000 m^2 - 120 000 m^2]
[Accept other calculation methods] (4 x 1) (4)

2.2.2 The area of recreational area **S** on the topographical map is the same as the area of recreational area **11** on the orthophoto map as it is the same place. Explain why it appears to be larger on the orthophoto map.

The scale of the orthophoto map is 1 : 10 000 and the scale of the topographical map is 1 : 50 000 ✓
This indicates that the scale of the orthophoto map is 5 times larger than the scale of the topographical map, making the recreational area appear larger on the orthophoto map ✓ (2 x 1) (2)

2.3 Refer to trigonometrical station 293 in block **D6** and trigonometrical station 187 in block **D7** and answer the questions that follow.

2.3.1 Calculate the average gradient between trigonometrical station 293 in block **D6** and trigonometrical station 187 in block **D7**. Show ALL calculations. Marks will be awarded for calculations.

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

VI = 1 468,9 m – 1 211,1 m
= 257,8 m ✓
HE = 3,2 cm x 500
= 1 600 m
G = $\frac{257,8}{1\,600}$ ✓
= $\frac{1}{6,2}$
= 1 : 6,2 ✓

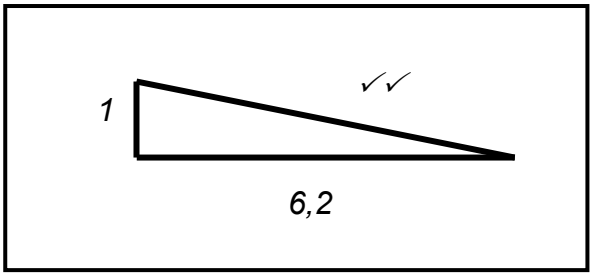
OR

VI = 1 468,9 m – 1 211,1 m
= 257,8 m ✓
HE = $\frac{2,5 \text{ cm} \times 50\,000}{100}$
= 1 600 m ✓
G = $\frac{257,8}{1\,600}$ ✓
= $\frac{1}{6,2}$
= 1 : 6,2 ✓

Range [1 : 6 – 1 : 6,4] (4 x 1) (4)

2.3.2 Draw a diagram that illustrates the average gradient, calculated in QUESTION 2.3.1.

Diagram



(2 x 1) (2)

2.3.3 Give reasons why the gradient calculated in QUESTION 2.3.1 is considered relatively steep.

For every one vertical unit ✓ you only move 6,2 units horizontally ✓
Rise by one unit ✓ over a short distance ✓
[Concept]
[Any ONE] (2 x 1) (2)

[20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Find Bowkerskop in the south-eastern section of the orthophoto map. The orthophoto map clearly shows a difference in vegetation density on either side of Bowkerskop.

3.1.1 State, and define, the microclimatological phenomenon responsible for the difference in vegetation density on either side of Bowkerskop.

Climatological phenomenon: *Slope aspect ✓*

Definition: *The location and direction of the valley/hill slopes in relation to the sun's rays ✓*
[Concept] (2 x 1) (2)

3.1.2 Explain how this microclimatological phenomenon in QUESTION 3.1.1 is responsible for the difference in vegetation density on either side of Bowkerskop.

North-facing slopes will experience more evaporation resulting in less moisture content in the soil and vegetation density is lower ✓✓

OR

South-facing slopes are in the shadow zone of the koppie and will experience less evaporation, resulting in a higher moisture content in the soil, and vegetation density is higher ✓✓ (1 x 2) (2)

3.2 Refer to block **H1** on the topographical map and answer the following questions:

3.2.1 Name the stream channel pattern of the river in block **H1**.

A meandering stream channel pattern ✓ (1 x 1) (1)

3.2.2 Give reasons why the stream channel pattern in QUESTION 3.2.1 developed here.

*In **H1** it is flowing over a gentle gradient* ✓✓ *which makes the river weave from side to side because of excess energy* ✓✓ (2 x 2) (4)

3.2.3 Explain why laminar flow is taking place in block **H1**.

The gradient is gentle ✓✓
There is a weir to control/slow the flow ✓✓
There is a low velocity ✓✓
[Any ONE] (1 x 2) (2)

3.3 Study slopes **12** and **13** on the orthophoto map.

3.3.1 Give the shape for each of slopes **12** and **13**.

Slope **12**: *Uniformly steep* ✓

Slope **13**: *Concave* ✓ (2 x 1) (2)

3.3.2 Name the landform formed by slopes **12** and **13**.

(Homoclinal) Ridge ✓ (1 x 1) (1)

3.4 Study the residential area Blue Rise in blocks **D5** and **D6**.

Explain how the size of the plots and the location of Blue Rise indicate that it is a high-income residential area.

It has large plots ✓✓
It is located on the outskirts of the city ✓✓
[Any ONE] (2 x 2) (4)

3.5 Queenstown is classified as a gap town.

3.5.1 Define the term *gap town*.

A town found at the gap/opening between hills/mountains ✓
[Concept] (1 x 1) (1)

3.5.2 State ONE economic advantage of the location of Queenstown.

It will be a stop-over point for people travelling through the gap and this would bring in business for Queenstown ✓✓ (Can give examples e.g. fill petrol and buy goods.)
More businesses and investments will be attracted to area ✓✓
It will create more employment for the people living in the area ✓✓
(Any TWO – Accept other relevant answers) (1 x 2) (2)

3.5.3 State ONE environmental disadvantage of the location of Queenstown.

Katabatic air flow results in low temperatures (frost pocket) at night ✓✓
Katabatic air flow will trap pollutants in the valley above Queenstown ✓✓
They will experience a lot of traffic resulting in a lot of air pollution ✓
There will be an increase in the amount of litter pollution ✓✓
There will be an increase in the amount of noise pollution ✓✓
It could result in environmental despoliation ✓✓
(Any ONE – Accept other relevant answers) (1 x 2) (2)

3.6 You are a town and city planner. It is required of you to evaluate the Queenstown area regarding its tourism potential.

Why would you promote Queenstown as a tourist destination?

It has a nature reserve ✓
It has dams for recreation ✓
It has many recreational centres ✓
The area has many hilly areas (aesthetic appeal, recreation, hiking trails) ✓
It has historical importance ✓
[Any TWO] (2 x 1) (2)
[25]

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.1 The orthophoto map shows a high resolution.

4.1.1 Explain the term *resolution*.

It refers to the detail and accuracy of an image/photo ✓
[Concept] (1 x 1) (1)

4.1.2 Give evidence that the orthophoto map has a high resolution.

All features are clear ✓ (1 x 1) (1)

4.1.3 Why can one say that the orthophoto map is an example of raster data?

It is a photograph and therefore consists of pixels/digital blocks ✓
(1 x 1) (1)

4.2 Due to the increase in farming in block **A8**, the possibility of increased erosion is very likely. The local municipality can use remote sensing to assess the impact of erosion on the Bonkolo Dam.

4.2.1 Explain the term *remote sensing*.

It is the collection of information of the Earth's surface from a distance e.g. via satellites ✓
[Concept] (1 x 1) (1)

4.2.2 Explain how the local municipality will use remote sensing to monitor the negative impact of the increased erosion on the Bonkolo Dam.

Satellites will continuously take photos of the area at different times ✓✓
By comparing these photos we will see the expansion of erosion ✓✓
Photos can be used to analyse the impact of erosion ✓✓
[Any TWO – Accept other reasonable answers] (2 x 2) (4)

4.3 You have a choice between TWO sites on which to build a shopping mall: **T** in block **B3** and **U** in block **E7**.

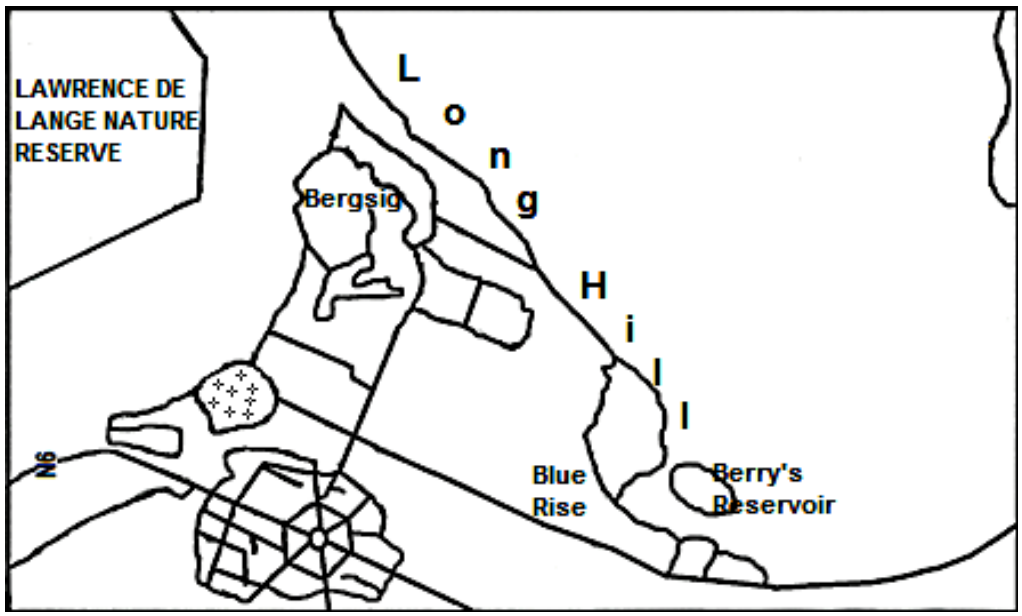
4.3.1 Give TWO data layers, evident on the topographical map, that you would use to assist you in making your choice.

Infrastructure/The National Road/N6 ✓
Topography/Flat land ✓
Land-use/Nearer to the market/Nearer to Queenstown/Nearer to the residential areas/Open space ✓
[Any TWO] (2 x 1) (2)

4.3.2 Name your final choice.

U ✓ (1 x 1) (1)

4.4 The plan view sketch of a part of Queenstown below is an example of data integration.



4.4.1 Explain the term *data integration*.

It is the combining of different sources of information to give the user a unified view ✓
[Concept] (1 x 1) (1)

4.4.2 Name TWO sources that could have been used to obtain information to produce this sketch map.

Topographical map ✓
Orthophoto map ✓
Satellite photographs ✓
Aerial photographs ✓
[Any TWO] (2 x 1) (2)

4.4.3 State ONE problem for a cartographer when he/she was producing this sketch map.

Using maps with different scales ✓
Getting the scale accurate ✓
Getting the shapes of the features correct ✓
Using maps with different map projections ✓
[Any ONE] (1 x 1) (1)
[15]

TOTAL: 75