



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P2

NOVEMBER 2015

MEMORANDUM

MARKS: 75

This memorandum consists of 16 pages.

Marking Guidelines

The following marking guidelines have been developed to standardise marking in all provinces.

Marking

- ALL questions MUST be marked, irrespective of whether it is correct or incorrect
- A clear, neat tick must be used: ✓
 - If ONE mark is allocated, ONE tick must be used: ✓
 - If TWO marks are allocated, TWO ticks must be used: ✓✓
 - The tick must be placed at the FACT that a mark is being allocated for
 - Ticks must be kept SMALL, as various layers of moderation may take place
- Incorrect answers must be marked with a clear, neat cross: ✕
 - Use MORE than one cross across a discussion style questions to indicate that all facts have been considered
 - Do NOT draw a line through an incorrect answer
 - Do NOT underline the incorrect facts
- Where the maximum marks have been allocated in the first few sentences of an answer, place an **M** over the remainder of the text to indicate the maximum marks have been achieved

For the following action words, ONE word answers are acceptable: **give, list, name, state, identify**

For the following action words, a FULL sentence must be written: **describe, explain, evaluate, analyse, suggest, differentiate, distinguish, define, discuss, why, how**

The following action words need to be read within its context to determine whether a ONE word answer or FULL sentence is required: **provide, what, tabulate**

Totalling and transferring of marks

- Each question must be totalled
 - Each question paper has four questions, therefore four sub-totals per question paper required
 - Question totals to be written in right hand margin at the end of the sub-section and underlined
 - Total must be written legibly
 - Leave room to write in moderated marks on different levels
- Question totals must be transferred to cover of answer book

Moderation

Marking on each level of moderation is done in the same way as the initial marking. All guidelines for marking must be adhered to.

If a mark for a question is changed after moderation, the moderator must strike through the marker's mark and write down the new mark. ~~14~~ 16

The total for the question paper must be re-calculated, and similarly be struck off and the new total to be written down.

~~32~~ 36

RESOURCE MATERIAL

1. An extract from topographic 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

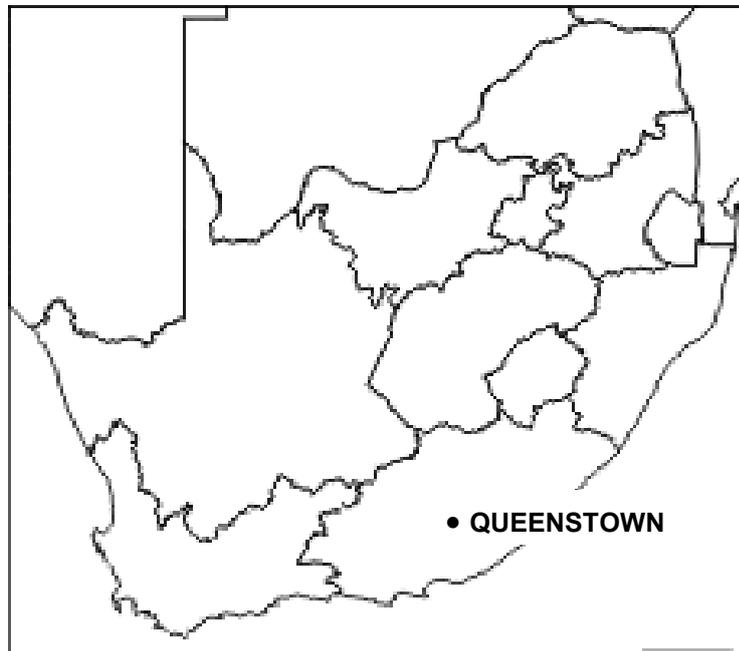
1. Write your EXAMINATION NUMBER in the spaces on the cover page.
2. Answer ALL the questions in the spaces provided in this question paper.
3. You are provided with a 1 : 50 000 topographic map 3126DD QUEENSTOWN and an orthophoto map 3126 DD 13, which covers a section of the topographic map.
4. You must hand the topographic map and the orthophoto map to the invigilator at the end of this examination session.
5. You must 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 if not provided, where applicable. Marks will be allocated for these.
7. You may use a non-programmable calculator.
8. The following English terms and their Afrikaans translations are shown on the topographical map:

ENGLISH

Aerodrome
Caravan Park
College
Diggings
Golf Course
Gorge
Holiday Resort
Purification Plant
River
Sewage Works
Yacht Club

AFRIKAANS

Vliegveld
Karavaanpark
Kollege
Uitgrawings
Gholfbaan
Kloof
Vakansie-oord
Watersuiweringaanleg
Rivier
Rioolwerke
Seiljagklub

GENERAL INFORMATION ON QUEENSTOWN

Coordinates: 31°54'S 26°53'E

Queenstown is a town in the Eastern Cape Province of 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 (named changed from Bongolo recently) Dam, 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.

Source: <http://en.wikipedia.org/wiki/Queenstown, Eastern Cape> (Adapted)

QUESTION 1: MULTIPLE CHOICE QUESTIONS

The questions below are based on the 1:50 000 topographic 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 correct answer and write only the letter (A–D) in the block next to the question.

1.1 The main city providing Queenstown with harbour facilities is ...

- A Port Elizabeth.
- B Durban.
- C East London.
- D Cape Town.

✓ **C**

1.2 Stream **L** is a non-perennial stream that flows down a steep gradient. The stream flow of the stream at **L** is dominated by ... flow.

- A turbulent
- B laminar
- C straight
- D meandering

✓ **A**

1.3 The hexagon shape at area **1** on the orthophoto map was originally designed for...

- A reducing traffic congestion.
- B avoiding hilly areas.
- C defense purposes.
- D creating aesthetic appeal.

✓ **C**

1.4 Recreational feature **2** on the orthophoto map is a ...

- A nature reserve.
- B cemetery.
- C park.
- D golf course.

✓ **D**

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

- A factory.
- B shopping centre.
- C civic centre.
- D school.

✓ **D**

1.6 The feature at grid reference 31°57'42"S26°56'17"E/31°57.7'S26°56.3'E is a ...

- A hiking trail.
- B dam.
- C non-perennial river.
- D contour line.

✓ **B**

- 1.7 The contour interval on the orthophoto map is ... metres.
- A 5
B 10
C 15
D 20
- ✓ **B**
- 1.8 No further expansion of Queenstown is possible in a ... direction.
- A southwesterly
B southeasterly
C northwesterly
D northeasterly
- ✓ **D**
- 1.9 Queenstown has hilly areas on the north and south and can therefore be regarded as a/an ... town.
- A gap
B mining
C junction
D educational
- ✓ **A**
- 1.10 Trees are found on the slope facing Berry Reservoir (**15** on the orthophoto map), because it is a ... facing slope.
- A northwest
B southeast
C northeast
D southwest
- ✓ **B**
- 1.11 The wind direction at **V** (block **A10**) on the topographic map is from ...
- A northeast to southwest.
B northwest to southeast.
C southeast to northwest.
D northwest to southwest.
- ✓ **B**
- 1.12 The land-use found at **M** in block **E8** on the topographic map is ...
- A residential.
B industrial.
C commercial.
D recreational.
- ✓ **B**

1.13 The line **K**, a high lying area, in block **I5** on the topographic map represents a ...

- A watershed.
- B basin.
- C interfluve.
- D valley.

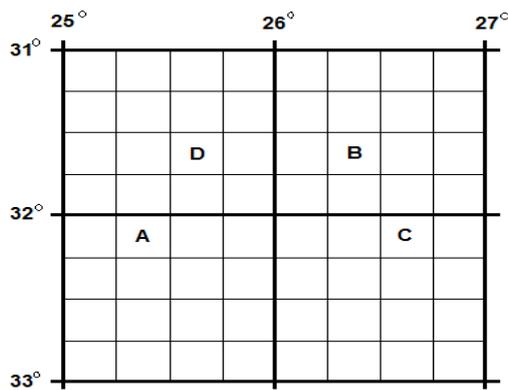
✓ **C**

1.14 The actual distance from spot height 1076 in block **J1**, on the topographic map to Whittlesea is ... kilometers.

- A 21.3
- B 22.3
- C 20
- D 21.6

✓ **D**

1.15 Which letter, in the grid below, represents the map/area southwest of 3126DD QUEENSTOWN?



✓ **C**

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

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

- 2.1 Calculate the area of land covered by feature 4 on the orthophoto map, in m². Show ALL calculations. Marks WILL be awarded for calculations.

Formula: Area = Length x Breadth

$$= (1.7 \text{ cm} \checkmark \times 100) (1.4 \text{ cm} \checkmark \times 100) [\text{Range } (1.5 - 1.9) (1.2 - 1.6)]$$

$$= 170 \text{ m} \times 140 \text{ m} \checkmark$$

$$= 23\,800 \text{ m}^2 \checkmark$$

Range [18 000 m² - 30 400 m²]

(4 x 1) (4)

[ACCEPT METHOD FOR MM]

- 2.2 Refer to the magnetic declination found on the topographic map and answer the questions that follow.

- 2.2.1 Calculate the magnetic declination of Queenstown for 2015. Show ALL calculations. Marks WILL be awarded for calculations.

Difference in years: 2015 – 2002

$$= 13 \checkmark \text{ years}$$

Mean Annual Change: 11'W

Total change: 13 x 11' W

$$= 143' \text{ W} / 2^\circ 23' \checkmark \text{ W}$$

Magnetic declination for 2015: 24° 16' + 2° 23' W

$$= 26^\circ 39' \text{ West} \checkmark (\text{of True North})$$

(4 x 1) (4)

- 2.2.2 Explain why it is important to correct the magnetic declination when using a topographic map and magnetic compass on a hike.

By not correcting the magnetic declination you will walk in the wrong direction and get lost ✓

To orientate the map ✓

The magnetic declination constantly changes ✓

To find an accurate direction ✓

To determine True North ✓

[ANY ONE]

(1 x 1) (1)

2.3 Locate points **5** and **6** on the orthophoto map.

2.3.1 Calculate the average gradient between point **5** and point **6** on the orthophoto map. Show ALL calculations. Marks WILL be awarded for calculations. (4 x 1)

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

$$\begin{aligned} VI &= 1400 \text{ m} - 1220 \text{ m} \\ &= 180 \text{ m} \checkmark \end{aligned}$$

$$\begin{aligned} VI &= 1400 \text{ m} - 1220 \text{ m} \\ &= 180 \text{ m} \checkmark \end{aligned}$$

$$\begin{aligned} HE &= 3.8 \text{ cm} \times 100 \\ &\quad [Range[3,6 - 4]] \\ &= 380 \text{ m} \checkmark \end{aligned}$$

OR

$$\begin{aligned} HE &= \frac{3.8 \text{ cm} \times 10\,000}{100} \\ &= 380 \text{ m} \checkmark \end{aligned}$$

$$\begin{aligned} G &= \frac{180}{380} \checkmark \\ &\quad [Mark allocated for substitution] \\ &= \frac{1}{2.1} \\ &= 1:2.1 / 1 \text{ in } 2.1 \checkmark \end{aligned}$$

$$\begin{aligned} G &= \frac{180}{380} \checkmark \\ &= \frac{1}{2.1} \\ &= 1 \text{ } 2.1 / 1 \text{ in } 2.1 \checkmark \end{aligned}$$

Range [1 : 2.0 – 1 : 2.2] (4 x 1) (4)

2.3.2 Explain why your answer to QUESTION 2.3.1 indicates a steep gradient.

The slope rises very quickly over a short distance ✓

For every 2.1 units that you move horizontally you will rise 1 unit vertically ✓

The relationship between the difference of the vertical interval and the horizontal equivalent is small ✓

The ratio is less than 1:10 ✓

[ANY ONE] (1 x 1) (1)

[MARK CONCEPT OF UNDERSTANDING STEEPNESS]

2.3.3 A road is being planned to link the Lawrence De Lange Nature reserve with the Bonkolo Dam for tourism purposes. This is indicated by line **N** on the topographic map. The gradient of the Long Hill Ridge, calculated in QUESTION 2.3.1, is creating challenges for the civil engineers. State TWO methods that the civil engineers can use/implement to overcome this challenge.

Building a tunnel ✓

Cutting/Blasting through the ridge ✓

Building a road along the contours

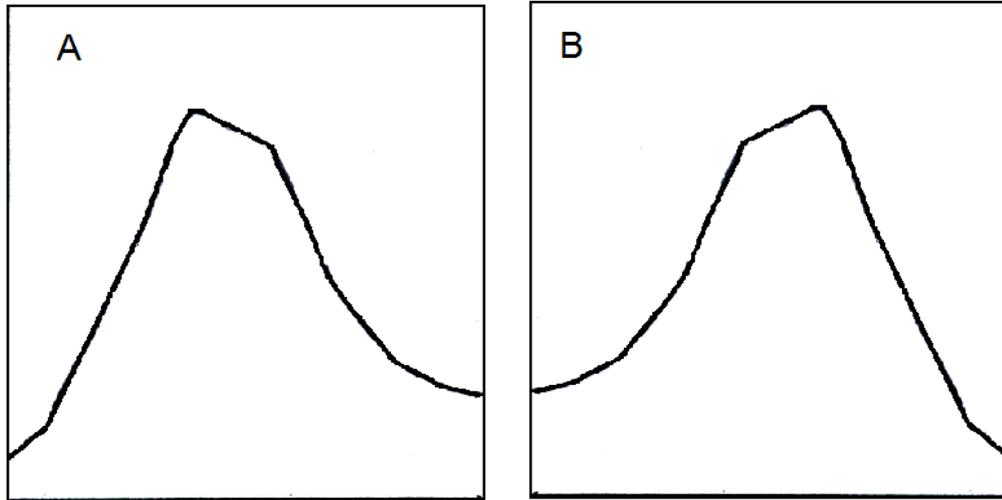
Construct a pass/zig-zag road ✓

Cableway ✓

[ANY TWO] (2 x 1) (2)

2.4 Study cross-sections **A** and **B**.

2.4.1 Which cross-section, **A** or **B**, represents a cross-section from point **7** to point **8** on the orthophoto map?



Answer: **A** ✓

(1 x 1) (1)

2.4.2 Explain your answer to QUESTION 2.4.1.

Contour lines on side 7/ southern side are closer to one another ✓
Contour lines on side 8/northern side are further apart ✓
Very steep slope on the southern slope/side 7 ✓
Concave/Gentle slope on the northern slope/side 8 ✓
In sketch A the steepest slope is on the left hand side which is the side (closer to 7) ✓
In sketch A the gentlest slope is to the right hand side which is the side (closer to 8) ✓
Point 7 is on a lower contour line than Point 8 ✓
[ANY TWO]

(2 x 1) (2)

2.4.3 Identify the landform illustrated by the cross-section.

Koppie/conical hill/hill ✓

(1 x 1) (1)

[20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Study the table below showing the average monthly precipitation for Queenstown and answer the questions that follow:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Tot
Precipitation mm	69	79	74	38	20	13	8	15	28	41	58	71	514

3.1.1 Calculate the average annual precipitation for Queenstown.

514 ✓✓ mm (2 x 1) (2)

3.1.2 Queenstown generally experiences a low annual rainfall. State TWO steps that people in the area have taken to manage this shortage of water.

*Storage dams ✓
Wind pumps ✓
Water purification plant ✓
Canals ✓
Furrows ✓
Reservoirs ✓
Weirs ✓
Water points ✓
[ANY TWO]* (2 x 1) (2)

3.2 If Queenstown had to experience extremely high rainfall over a short period of time, Long Hill will increase the chances of flooding. Explain how Long Hill will increase the chances of flooding on the northeast section of Queenstown.

*The gradient of Long Hill is very steep which will reduce infiltration and increase surface run-off ✓✓
The lack of vegetation will increase run-off ✓✓
Impermeable rock increases run-off ✓✓
[ANY ONE EXPLANATION]* (1 x 2) (2)

3.3 With reference to Queenstown’s location in a valley, give reasons why it regularly experiences frost during the night in winter.

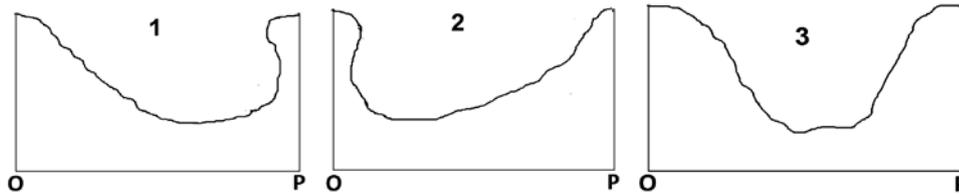
*Cold dense air moves downslope/ Katabatic wind moves downslope under the force of gravity ✓✓
Cold air collects on the valley floor ✓✓
The air mass in the valley cools to dew point temperature below 0°C ✓✓
The altitude of the valley is high above sea level resulting in regular low temperatures/The valley is inland and has a continental climate ✓✓
Dew point temperature is under 0°C for frost to occur ✓✓
[ANY TWO]* (2 x 2) (4)

3.4 Refer to the Klaas Smits River (flowing between blocks **G1** and **J6**) and answer the following questions.

3.4.1 Give the general direction in which the Klaas Smits River flows between blocks **G1** and **J6**.

Southeasterly/East South East ✓ (1 x 1) (1)

3.4.2 Which ONE of the cross-profiles (**1**, **2** or **3**) below will be a representation of line **O-P** in blocks **H1** and **H2**? Explain your answer.



Cross-profile choice: **1** ✓

Explanation: *At O the slip-off developed and at P the undercut slope developed* ✓✓

O is on the inside and P is on the outside of the meander ✓✓

Deposition on the inside (O), erosion on the outside (P) ✓✓

At O the slope is more convex/gentle and at P the slope is concave/steep ✓✓

[ANY ONE] (1 + 2) (3)

3.5 Compare land-use zones marked **1** and **9** on the orthophoto map by completing the table below, which reflects the general characteristics of these land use zones.

	Land-use zone 1	Land-use zone 9
3.5.1 Type of land-use	<i>Commercial//CBD</i> ✓ (1 x 1)	<i>Residential</i> ✓ (1 x 1)
3.5.2 The major street pattern	<i>Radial/Radial concentric/Spiderweb/Cobweb</i> ✓ (1 x 1)	<i>Grid/Grid iron/Block/Rectangular</i> ✓ (1 x 1)

(4)

3.6 Find the N6 highway, labelled **10**, on the orthophoto map.

3.6.1 Name the N6 where it passes through The Hexagon.

Cathcart ✓ (1 x 1) (1)

3.6.2 Suggest ONE economic advantage of the N6 for Queenstown.

People using the N6 will stop and buy goods at local businesses ✓✓

Maintenance of roads create employment opportunities ✓✓

Economic growth ✓✓

Encourages tourism ✓✓

Encourages trade of goods ✓✓

Industrialisation ✓✓

Services will benefit ✓✓

Can give examples of items that can be purchased ✓✓

[ANY ONE - ACCEPT OTHER REASONABLE ANSWERS] (1 x 2) (2)

3.7 Refer to blocks **A7** to **A10** and **B7** to **B10** on the topographic map.

3.7.1 Give TWO physical factors that favour farming in the northeastern part of the mapped area.

North facing slopes ✓

Sheltered slopes ✓

Level ground ✓

Water available from rivers ✓

Groundwater ✓

Fertile soil ✓

[ANY TWO] (2 x 1) (2)

3.7.2 Explain how infrastructure is promoting farming in the area covered by blocks **A7** to **A10** and **B7** to **B10**.

Transport network makes area accessible ✓✓

Easy to transport crops/accessibility of market ✓✓

Infrastructure to import raw materials e.g. fertilizers, seeds, equipment ✓✓

Power lines indicate that farming could utilize electricity ✓✓

Reservoirs/dams/storage dams/wind pumps to provide irrigation ✓✓

Farm buildings ✓✓

Houses and homesteads for farm workers ✓✓

[Candidates may use examples of specific infrastructure]

[ANY ONE] (1 x 2) (2)

[25]

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.1 Soil erosion is increasing in the area covered by blocks **A1** and **A3**. The local municipality has decided to do an environmental impact study to evaluate the influence humans have had on this increase in erosion.

4.1.1 Mention TWO ways in which data can be collected to do an environmental impact study.

Surveys/Questionnaires ✓

Photographs ✓

Remote sensing/satellite images ✓

Testing of natural environment e.g. testing soil and water quality ✓

Physical measurements using secondary data ✓

Using existing maps ✓

[ANY TWO]

(2 x 1) (2)

4.1.2 How can the collected data be used to protect the affected areas against further soil erosion?

Identify causes of erosion ✓

Collected data can show how the area has been disturbed ✓

Collected data can be used to plan strategies to combat soil erosion ✓

Candidates may use examples e.g. recent photographs are compared to older photographs ✓

Replanting of trees where vegetation has been destroyed ✓

Create a buffer zone ✓

Implementation of correct farming methods ✓

Make decision makers aware of the severity of the problem ✓

Build a model of possible solutions ✓

[ANY THREE – ACCEPT OTHER REASONABLE ANSWERS] (3 x 1) (3)

4.2 How can urban and regional planners use GIS for the development of a planned shopping centre at **W** in block **F4**.

Determine existing major transport routes ✓✓

Accessibility ✓✓

Determine crime rates ✓✓

Economic status of inhabitants ✓✓

Number of customers/market/threshold population ✓✓

What competition exists in the area ✓✓

Cost to build shopping centre ✓✓

Types of products to sell ✓✓

Determine if geology ✓✓ topography/relief ✓✓ drainage ✓✓ soils ✓✓ are suitable for development ✓✓

Zoning/Bylaws of municipality ✓✓

Availability of space for further development ✓✓

[ANY TWO – ACCEPT OTHER REASONABLE ANSWERS] (2 x 2) (4)

4.3 The sketch map below is a plan view of a part of the built up area of Queenstown and its surroundings.

4.3.1 What is *attribute data*?

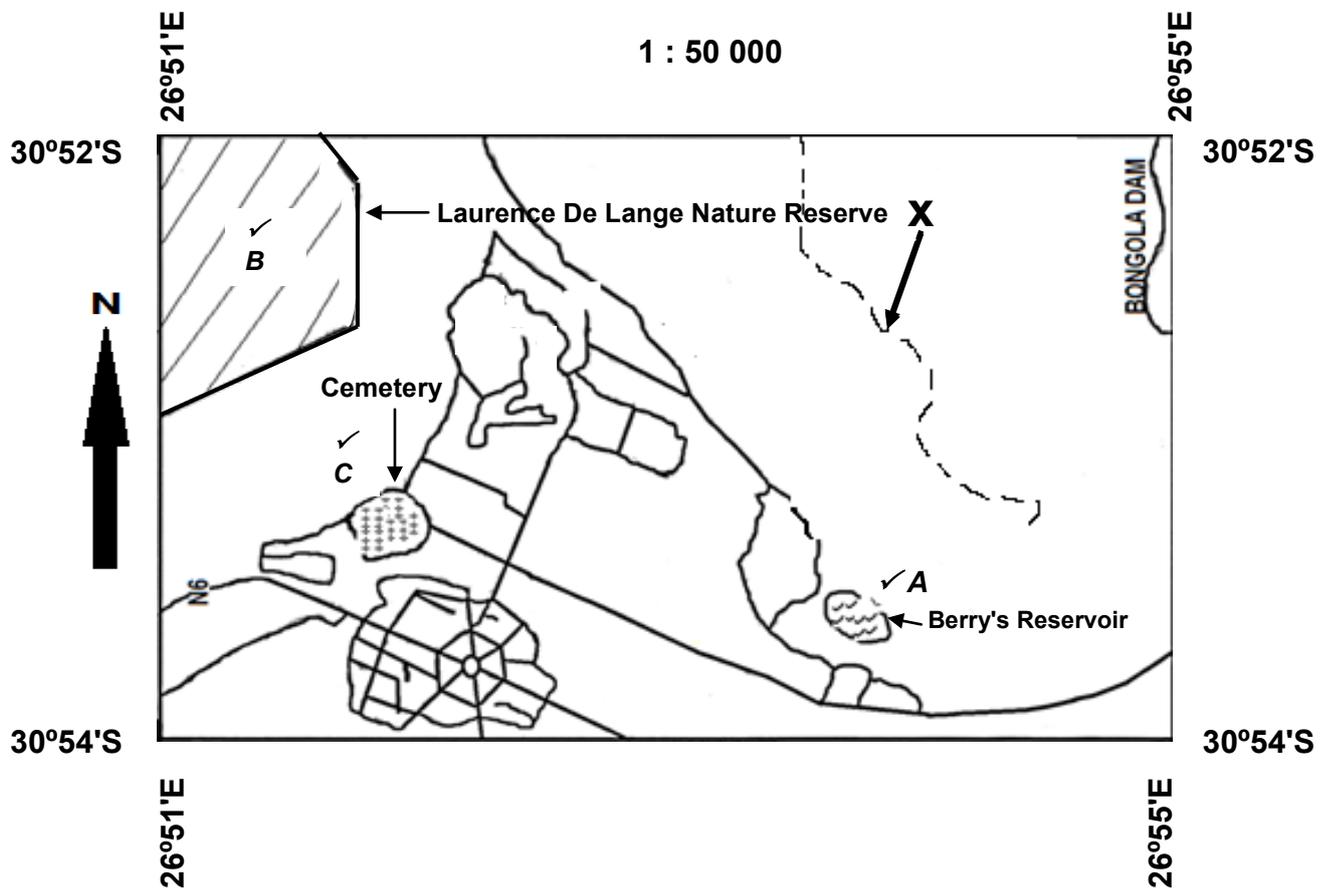
*Data that describes/gives characteristics of spatial data (features)/
Quantifies and qualifies the feature ✓
[CONCEPT]*

(1 x 1) (1)

4.3.2 Use the symbols shown in the key below to locate the position of the following attribute data for Queenstown on the sketch map.

- (a) Berry's Reservoir
- (b) Lawrence De Lange Nature Reserve
- (c) The Cemetery

(3 x 1) (3)



KEY

	Bergsig		Berry's Reservoir		Long Hill
	LAWRENCE DE LANGE NATURE RESERVE		Cemetery		

4.3.3 Give the spatial position of the hiking trail at point **X** on the sketch map.

North of Berry's Reservoir ✓✓

West of Bongolo Dam ✓✓

East of Nature Reserve ✓✓

Northeast of Hexagon ✓✓

Northeast of cemetery ✓✓

[OR in relation to any other feature on the sketch]

[ANY ONE]

OR

*31°52 (.6')S ✓ 26°53(.9')E ✓ or 31°52' (36")S ✓ 26°53' (54")E ✓ **OR***

30°52 (.6')S ✓ 26°53(.9')E ✓ or 30°52' (36")S ✓ 26°53' (54")E ✓

(2 x 1) (2)

[15]

GRAND TOTAL: 75