



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

GEOGRAPHY P2

COMMON TEST

JUNE 2016

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MARKS: 75

TIME: 1½ hours

NAME: _____

DIVISION: _____

This question paper consists of 12 pages and
1 page for rough work.

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 NAME, SURNAME, GRADE and DIVISION 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:

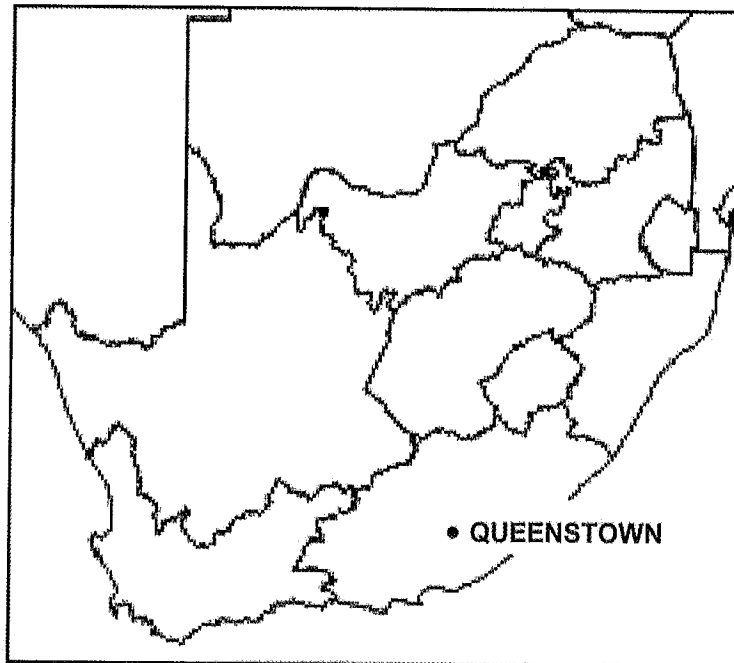
ENGLISH

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

AFRIKAANS

Vliegveld
Karavaanpark
Kollege
Uitgrawings
Golfbaan
Ravyn (Kloof)
Vakansieoord
Watersuiweringsaanleg
Rivier
Rioolwerke
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](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 The closest harbour to Queenstown is ...

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

1.2 The topographic map scale of 1:50 000 means that one centimeter on the map represents ... kilometres on the ground.

- A 0.01
- B 0.1
- C 0.5
- D 0.05

1.3 The altitude (height) of the Bonkolo dam wall in Block **C7** on the topographical map is ... metres.

- A 1290
- B 1135
- C 1169
- D 1287

1.4 The contour interval on the orthophoto map of Queenstown is ... metres.

- A 5
- B 10
- C 15
- D 20

1.5 The type of river represented by **Q** in block **C1** on the topographical map is ...

- A perennial.
- B episodic.
- C non-perennial.
- D exotic.

1.6 The street pattern in the area THE HEXAGON labeled 1 on the orthophoto map was designed...

- A as a defense purpose.
- B to ease traffic flow.
- C to avoid the hilly terrain
- D to beautify the area.

1.7 The next town using the N6 whilst travelling in a south westerly from Queenstown will be...

- A Takastad.
- B Cathcart.
- C Jamestown.
- D Kingwilliams Town.

1.8 The type of slope found at T in block B3 on the topographical map is a ... slope.

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

1.9 Evidence for the presence of groundwater in block G3 on the topographical map is shown by a ...

- A furrow.
- B windpump.
- C dam.
- D reservoir.

1.10 The natural feature labelled K in block I 5 is a/an ...

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

1.11 Feature 3 on the orthophoto map is a ...

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

1.12 Queenstown has hilly areas to the north and south and can therefore be regarded as a... town.

- A mining
- B gap
- C central place
- D junction

1.13 ... farming is being practised in block in block **G3**.

- A Commercial
- B Stock
- C Subsistence
- D Fruit

1.14 The type of infrastructure represented by the label **U** on the topographical map is a ...

- A road.
- B railway.
- C power line.
- D canal.

1.15 The row of trees in block **F7** on the topographical map is used as a ...

- A firebreak.
- B farm boundary.
- C plantation.
- D windbreak.

(15 x 1) (15)

QUESTION 2: MAP CALCULATIONS AND INTERPRETATION

2.1 Write the scale of the orthophoto map as a word scale.

(2 x1) (2)

2.2 Calculate the area covered by the recreational feature labelled **S** on the topographical map in m². Show ALL calculations. Marks will be awarded for calculations.

(5 x1) (5)

2.3

2.3.1 Calculate the average gradient between spot height 1491 in Block **B5** and spot height 1290 in Block **C7**. Show all calculations.

$$\text{Gradient} = \frac{\text{Vertical interval}}{\text{Horizontal equivalent}}$$

(5 x1) (5)

2.3.2 Is the gradient calculated in QUESTION 2.3.1 steep or gentle. Give a reason for your answer.

(2 x1) (2)

2.4 Calculate the magnetic bearing of spot height 1391 in Block B1 from trigonometrical station 194 in Block D2 for the current year. Show all calculations. Marks will be awarded for calculations.

Magnetic bearing = true bearing + magnetic declination.

(6 x 1) (6)

QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Identify the drainage pattern formed by the streams flowing in the Lawerence De Lange Nature Reserve in the block **C3** on the topographical map.

(1 x 1) (1)

3.2 Describe the underlying rock structure associated with the drainage pattern identified in QUESTION 3.1.

(1 x 2) (2)

3.3 Provide ONE piece of map evidence which indicates that flash floods are a common occurrence over the mapped area.

(1 x 1) (1)

3.4 Explain why the north-eastern section of the town (Queenstown) is prone to flooding especially during periods of heavy rainfall.

(1 x 2) (2)

3.5 State TWO methods that civil engineers can use to reduce the effects of flooding in the area identified in QUESTION 3.4.

(2 x 2) (4)

3.6 The Klaas Smitsrivier in block **I 4** on the topographical map is flowing in a south-easterly direction. Give ONE piece of evidence from the map to support this statement.

(1 x 2) (2)

3.7 With reference to site, explain how Queenstown is affected by the changes in weather conditions especially during winter nights.

(2 x 2) (4)

3.8 State TWO problems that the inhabitants of Rooikrantz in block G1 might experience as a result of their isolated location.

(2 x 1) (2)

3.9 State TWO different ways in which the people living in the mapped area can use the Bonkolo Dam.

(2 x 1) (2)

3.10 The economic activity labelled 14 on the orthophoto has caused environmental damage.

3.10.1 Identify the economic activity.

(1 x 1) (1)

3.10.2 Explain how the environment is likely to be affected by this activity identified in QUESTION 3.10.1 in a negative way.

(2 x 2) (4)

[25]

QUESTION 4: GEOGRAPHIC INFORMATION SYTEMS (GIS)

4.1 Identify the following types of spatial features in each of the following blocks.

4.1.1 Line feature in Block **J3**. _____

4.1.2 Polygon feature in Block **D1**. _____

(2 x 1) (2)

4.2 Refer to Bowkerskop in the south-eastern section of the orthophoto map. Satellite imagery was used to conclude that "slope aspect" is responsible for the difference in vegetation density on either side of Bowkerskop.

Which one of the satellite was used in the above case? (Meteosat or Landsat).

(1 x 1) (1)

4.3 Locate Blue Rise residential area in Blocks **D5** and **D6**. Provide one example of attribute data of this area.

(1 x 1) (1)

4.4 Due to the increase in farming in Block **A8**, the possibility of increased erosion is likely. The local municipality wants to examine all sources of evidence before assessing the impact of erosion on the Bonkolo Dam. Various consultancies were invited to gather information using remote sensing. Consultancy **Group A** used a camera with a 2.5 megapixel and Consultancy **Group B** used a camera with a 8.2 megapixel to gather information.

4.4.1 Differentiate between the resolution of photographs of Group **A** and Group **B**.

(2 x 1) (2)

4.4.2 Suggest one reason why the use of remote sensing as a primary source of information would be of benefit to the local municipality.

(1 x 1) (1)

4.4.3 Explain ONE disadvantage of using secondary sources of the Bonkolo Dam.

(1 x 2) (2)

4.4.4 Having collected different sources of information/data, the local municipality wants to standardize the data.

(a) Define the term data standardization.

(1 x 1) (1)

(b) State ONE advantage of data standardization.

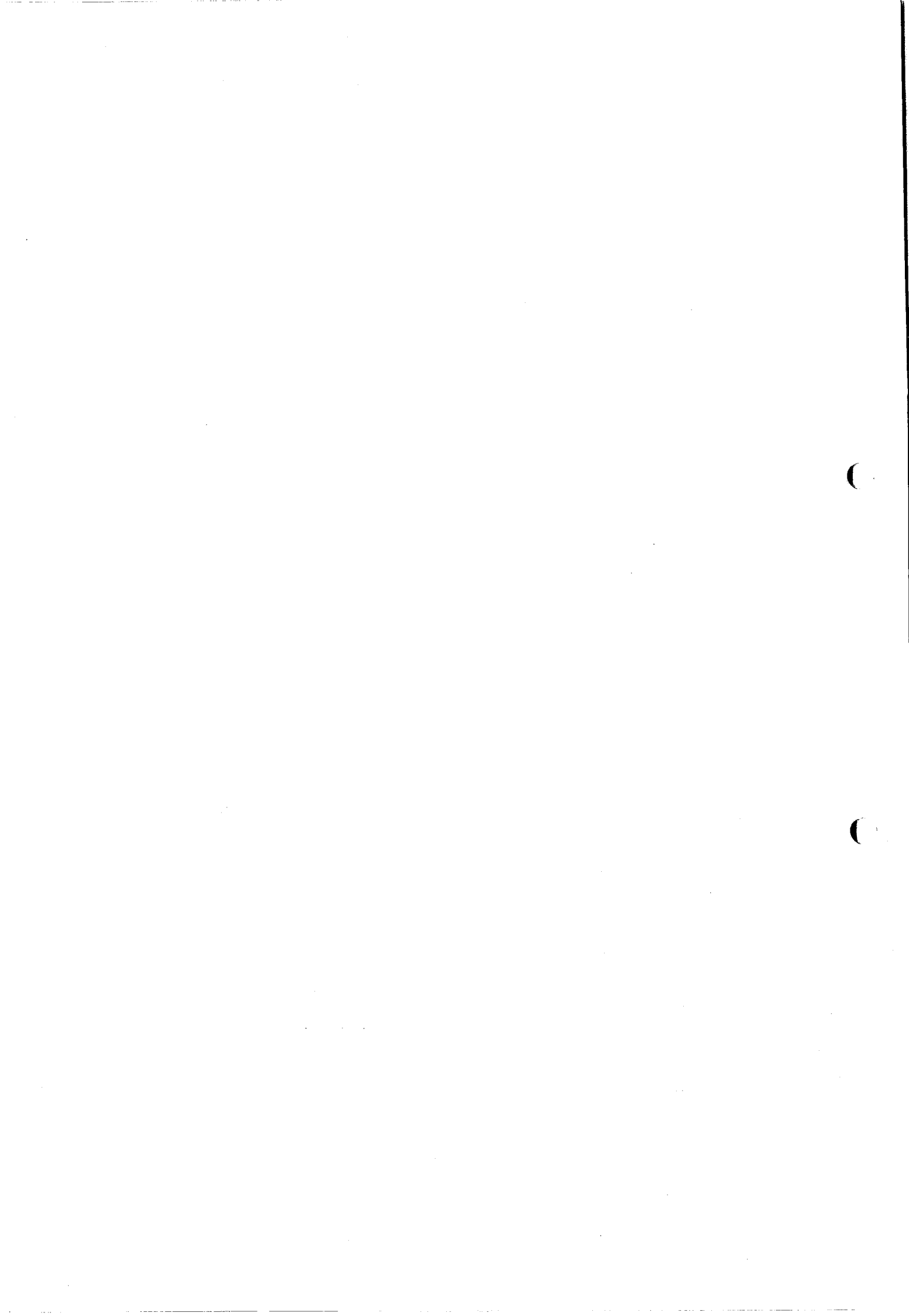
(1 x 1) (1)

4.5 Suggest TWO ways in which the Queenstown Tourism Board can use GIS to assist with the location of Curio (souvenir/remembrance) items.

(2 x 2) (4)
[15]

TOTAL MARKS: [75]

ROUGH WORK





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

GEOGRAPHY P2

MEMORANDUM

COMMON TEST

JUNE 2016

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MARKS: 75

TIME: 1½ hours

N.B. This Memorandum consists of 11 pages.

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 The closest harbour to Queenstown is ...
A Cape Town.
B Durban.
C East London.
D Port Elizabeth. C✓
- 1.2 The topographic map scale of 1:50 000 means that one centimeter on the map represents ... kilometres on the ground.
A 0.01
B 0.1
C 0.5
D 0.05 C✓
- 1.3 The altitude (height) of the Bonkolo dam wall in Block C7 on the topographical map is ... metres.
A 1290
B 1135
C 1169
D 1287 B✓
- 1.4 The contour interval on the orthophoto map of Queenstown is ... metres.
A 5
B 10
C 15
D 20 B✓
- 1.5 The type of river represented by Q in block C1 on the topographical map is ...
A perennial.
B episodic.
C non-perennial.
D exotic. C✓

1.6 The street pattern in the area THE HEXAGON labeled 1 on the orthophoto map was designed ...

- A as a defense purpose.
- B to ease traffic flow.
- C to avoid the hilly terrain
- D to beautify the area.

B✓

1.7 The next town using the N6 whilst travelling in a south westerly from Queenstown will be ...

- A Takastad.
- B Cathcart.
- C Jamesstown.
- D Kingwilliams Town.

C✓

1.8 The type of slope found at T in block B3 on the topographical map is a ... slope.

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

A✓

1.9 Evidence for the presence of groundwater in block G3 on the topographical map is shown by a ...

- A furrow.
- B windpump.
- C dam.
- D reservoir.

B✓

1.10 The natural feature labelled K in block I 5 is a/an ...

- A watershed.
- B valley.
- C interfluv.
- D mesa.

C✓

1.11 Feature 3 on the orthophoto map is a ...

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

C✓

1.12 Queenstown has hilly areas to the north and south and can therefore be regarded as a ... town.

- A mining
- B gap
- C central place
- D junction

B✓

1.13 ... farming is being practised in block in block G3.

- A Commercial
- B Stock
- C Subsistence
- D Fruit

A✓

1.14 The type of infrastructure represented by the label U on the topographical map is a ...

- A road.
- B railway.
- C power line.
- D canal.

C✓

1.15 The row of trees in block F7 on the topographical map is used as a ...

- A firebreak.
- B farm boundary.
- C plantation.
- D windbreak.

D✓

(15 x 1) (15)

QUESTION 2: MAP CALCULATIONS AND INTERPRETATION

2.1 Write the scale of the orthophoto map as a word scale.
One centimeter on the map represents 0,1 km/100m or (10 000cm) on the ground. (2 x1) (2)

2.2 Calculate the area covered by the recreational feature labelled S on the topographical map in m 2. Show ALL calculations. Marks will be awarded for calculations.

$$\begin{aligned} \text{Area} &= \text{Length} \times \text{Breadth} \checkmark \\ L &= 0,7 \text{ cm } (0.6 - 0.8) \times 500 = 350\text{m} \checkmark \\ B &= 0,4 \text{ cm } (0.3 - 0.5) \times 500 = 200\text{m} \checkmark \\ &= 350\text{m} \times 200\text{m} \checkmark \\ &= 70\,000\text{m}^2 \checkmark \end{aligned}$$

Range (45 000m² – 100 000 m²) (5 x1) (5)

2.3.1 Calculate the average gradient between spot height 1491 in Block B5 and spot height 1290 in Block C7. Show all calculations.

$$\begin{aligned} \text{Gradient} &= \frac{\text{Vertical interval}}{\text{Horizontal equivalent}} \\ VI &= 1491 - 1290\text{m} = 201\text{m} \checkmark \\ HE &= 8 \times (0,5 \times 1000) \checkmark = 4000 \checkmark \\ &= \frac{201}{4000} \\ &= \frac{201}{201} : \frac{4000}{201} \\ &= 1:19,90 \checkmark \end{aligned}$$

Range (1:19.40 – 1:20: 39) (5 x1) (5)

2.3.2 Is the gradient calculated in QUESTION 2.3.1 steep or gentle? Give a reason for your answer.

Steep, ✓
For every 19, 90 meters on walks horizontally, the land rises by 1 meter. ✓
 (2 x1) (2)

2.4 Calculate the magnetic bearing of spot height 1391 in Block B1 from trigonometrical station 194 in Block D2 for the current year. Show all calculations. Marks will be awarded for calculations.

$$\begin{aligned} \text{Magnetic bearing} &= \text{true bearing} + \text{magnetic declination.} \\ \text{True bearing} &= 180^\circ + 141^\circ = 321^\circ \checkmark \quad \text{RANGE (320^\circ - 322^\circ)} \\ \text{Magnetic declination for 2002} &= 24^\circ 16' \\ \text{Mean annual change} &= 11' W \\ \text{Magnetic declination for 2016} &= 2016 - 2002 = 14 \text{ years} \checkmark \\ \text{Total change} &= 14 \text{ years} \times 11' W = 154' (2^\circ 34' W) \checkmark \\ \text{MD for current year} &= 24^\circ 16' W + (2^\circ 34' W) = 26^\circ 50' W \text{ of True North} \checkmark \\ \text{Magnetic bearing for 2016} &= 26^\circ 50' + 321^\circ \checkmark \\ &= 347^\circ 50' \checkmark \quad \text{Range (346^\circ 50' - 348^\circ 50')} \end{aligned}$$

(6 x 1) (6)
 [20]

QUESTION 3: APPLICATION AND PHOTO INTERPRETATION

3.1 Identify the drainage pattern formed by the streams flowing in the Lawrence De Lange Nature Reserve in the block C3 on the topographical map.

Dendritic ✓ (1 x 1) (1)

3.2 Describe the underlying rock structure associated with the drainage pattern identified in QUESTION 3.1

Igneous or horizontal sedimentary rock that has an uniform resistance to erosion ✓✓ (1 x 2) (2)

3.3 Provide ONE piece of map evidence which indicates that flash floods are a common occurrence over the mapped area.

Erosion Sand ✓ (1 x 1) (1)

3.4 Explain why the north-eastern section of the town (Queenstown) is prone to flooding especially during periods of heavy rainfall.

*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 ✓✓
[ANY ONE EXPLANATION]*

(1 x 2) (2)

3.5 State TWO measures that civil engineers can use to reduce the dangers associated with flooding in the area identified in QUESTION 3.4.

*Cement barriers along the slope ✓✓
retaining walls ✓✓
Build large storage dams to control flow ✓✓
Efficient drainage systems ✓✓
Slopes covered by nets to hold soil and rocks ✓✓
Build protective roof over road / tunnel roof ✓✓
Plant pillars into the soil to stabilise soil ✓✓
Remove loose rocks regularly ✓✓
Create controlled rockfalls to remove loose rocks
Regular inspections ✓✓
Road signs and warnings ✓✓
Restriction of human activities
Plant natural vegetation ✓✓
Reduce deforestation ✓✓
Widen the river channel to contain a greater volume of water ✓✓
Cut and fill of slopes ✓✓
Drainage and run-off channeling structure ✓✓
Reinforce rock structures with bolts ✓✓
Temporary closing of roads ✓✓*

[Any TWO. Accept other logical measures]

(2 x 2) (4)

3.6 The Klaas Smitsrivier in block I 4 on the topographical map is flowing in a south-easterly direction. Give ONE piece of evidence from the map to support this statement.

*Spot height readings are decreasing in a south-easterly direction ✓✓
Contour readings are decreasing in a south-easterly direction ✓✓
The Vs of the contours are pointing to the north-westerly direction ✓✓ (1 x 2) (2)
[Any ONE]*

3.7 With reference to site, explain how Queenstown is affected by the changes in weather conditions especially during winter nights.

*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 and causes frost ✓✓
The altitude of the valley is high above sea level resulting in regular low temperatures ✓✓
The valley is inland and has a continental climate ✓✓
[ANY TWO]*

(2 x 2) (4)

3.8 State TWO problems that the inhabitants of Rooikrantz in block G1 might experience as a result of their isolated location.

*Lack of information ✓
Difficult to transport goods ✓
Development in the area might be very slow ✓
Cut off from services e.g. schools and hospitals ✓
Boredom ✓
Prone to crime ✓
[Accept other reasonable answers]*

[ANY TWO]

(2 x 1) (2)

3.9 State TWO different ways in which the people living in the mapped area can use the Bonkolo Dam.

*Water supply for domestic use ✓
industrial use ✓
mining/excavation activities ✓
Generation of electricity ✓
For irrigation/farming ✓
Recreation or examples e.g. fishing/sailing/rowing ✓
Tourism Job opportunities ✓
Flood control ✓*

[Any TWO]

(2 x 1) (2)

3.10 The economic activity labelled **14** on the orthophoto has caused environmental damage.

3.10.1 Identify the economic activity.

Excavation ✓

(1 x 1) (1)

3.10.2 Explain how the environment is likely to be affected by this activity identified in QUESTION 3.10.1 in a negative way.

- Unhealthy environment/ environmental injustice** ✓
- Cause land/air and water pollution/ground water pollution** ✓
- Destruction of natural vegetation** ✓
- Destroys ecosystem/biodiversity/habitat** ✓
- Soil erosion** ✓
- Destroy aesthetic appeal/scars the land Despoliation** ✓

[Any TWO]

(2 x 2) (4)
[25]

QUESTION 4: GEOGRAPHIC INFORMATION SYSTEMS (GIS)

4.1 Identify the following types of spatial features in each of the following blocks.

4.1.1 Line feature in Block **J3**. **Powerline/original farms/fence/river** ✓

4.1.2 Polygon feature in Block **D1**. **dam** ✓

(2 x 1) (2)

4.2 Refer to Bowkerskop in the south-eastern section of the orthophoto map. Satellite imagery was used to conclude that "slope aspect" is responsible for the difference in vegetation density on either side of Bowkerskop.

Which one of the satellite was used in the above case?(Meteosat or Landsat).

Meteosat ✓

(1 x 1) (1)

4.3 Locate Blue Rise residential area in Blocks **D5** and **D6**. Provide one example of attribute data of this area.

High income residential area. ✓

Large plots ✓

Located on the outskirts of the city ✓

(1 x 1) (1)

4.4 Due to the increase in farming in Block **A8**, the possibility of increased erosion is likely. The local municipality wants to examine all sources of evidence before assessing the impact of erosion on the Bonkolo Dam. Various consultancies were invited to gather information using remote sensing. Consultancy **Group A** used a camera with a 2.5 megapixel and Consultancy **Group B** used a camera with a 8.2 megapixel to gather information.

4.4.1 Differentiate between the resolution of photographs of Group **A** and Group **B**.

Consultancy Group A used a camera with 2.5 megapixel, this will have a poor resolution. The pixels are large and hence contains less details. ✓
The image is will not be clear. ✓

Consultancy Group B used a camera with a megapixel of 8.2. This will have a high resolution, pixels will be smaller and greater in number. ✓
The smaller the pixel, the better the resolution. This will store greater detail and more clarity. The image will therefore be clearer and sharper. ✓
(2 x 1) (2)

Note to the educator/marker

- Question 4.5. must be ignored because of a technical error namely, the omission of the word "shop".
- The question should have read as follows:
"Suggest TWO ways in which the Queenstown Tourism Board can use GIS to assist with the location of Curio shop (souvenir/remembrance) items."
- Adjust marks and recalculate maximum marks out of 71

TOTAL MARKS: [71]

4.4.2 Suggest one reason why the use of remote sensing as a primary source of information would be of benefit to the local municipality.

*Information can be collected of the Bonkolo Dam from a distance via satellites. ✓
Satellite images can continuously take photos of the area at different times. ✓
Comparing of photos will indicate the extent of erosion. ✓
Photos can be used to analyse the impact of erosion. ✓*

(1 x 1) (1)

4.4.3 Explain ONE disadvantage of using secondary sources of the Bonkolo Dam.

*Information of the Bonkolo Dam may not be accurate and reliable. ✓✓
The data may be outdated. ✓✓
The information may be biased. ✓✓*

(1 x 2) (2)

4.4.4 Having collected different sources of information/data, the local municipality wants to standardize the data.

- (a) Define the term data standardization.
It is a process where data that is captured in a predetermined agreed format. ✓
- (b) State ONE advantage of data standardization.
*Can be used to compare data gathered. ✓
Data can be grouped together in a meaningful way. ✓
Helps to detect and prevent errors. ✓*

(1x1) (1)

(1 x 1) (1)

4.5 Suggest TWO ways in which the Queenstown Tourism Board can use GIS to assist with the location of Curio (souvenir/remembrance) items.

*To determine the number of people that visit the Bonkolo Dam ✓✓
Frequency of tourists, to determine profits and sales ✓✓
Determine major transport routes, to see if tourists have access to the proposed shop ✓✓
To determine what shops already exist, to ensure that there is no duplication of sales/ stock ✓✓
To examine the cost of building the shop, examine the topography/relief of the land. ✓✓
To determine if there is enough space available. ✓✓
To determine the economic status of the inhabitants, so that this shop can stimulate ecotourism. ✓✓*

(2 x 2) (4)
[15]