basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION

GEOGRAPHY P2

2015

MEMORANDUM

MARKS: 75

This memorandum consists of 13 pages.

RESOURCE MATERIAL

1. An extract from topographical map 3319CB WORCESTER

2. Orthophoto map 3319 CB 15 WORCESTER

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 3319CB of WORCESTER 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 and formulae, 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	**AFRIKAANS**
Aerodrome	Vliegveld
Brickworks	Steenmakery
Caravan Park	Karavaanpark
Church Square	Kerkplein
College	Kollege
Diggings	Uitgrawings
Golf Course	Gholfbaan
Gorge	Kloof
Holiday Resort	Vakansieoord
Karoo Botanical Gardens	Karoo Botaniese Tuin
Prison	Tronk
Race Track	Renbaan
Rifle Range	Skietbaan
Sewage Works	Rioolwerke
Show Grounds	Skougronde
Weir	Stuwal
Yacht Club	Seiljagklub

GENERAL INFORMATION ON WORCESTER

Worcester is located 120 km north-east of Cape Town along the N1 Highway. The town experiences more extreme temperatures than neighbouring Cape Town, as oceanic influences are blocked by the Du Toitskloof and Slanghoek Mountain Ranges. The Worcester wine route forms part of the Breede River Valley. Worcester's wine lands are traditionally planted on the fertile flood plains of the Breede River, a hot and dry area with a low annual rainfall.

In conjunction with the Breedekloof district, the wine route in Worcester is the largest grape producing region in the Western Cape. It accounts for nearly 20% of the country's national vineyards and produces close to 27% of South Africa's total volume of wine and spirits. Over 50% of the country's export table grapes are also produced here.

[Adapted from http://en.wikipedia.org/wiki/Worcester, Western_Cape]

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1 : 50 000 topographical map 3319CB WORCESTER, 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 Worcester is situated in the ...

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

1.2 The direction of trigonometrical station 112 at **L** in block **D5** from the monument at Church Square at **M** in block **G9** is …

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

1.3 Which TWO types of scales are being used on the topographical map?

A Fraction and word scale
B Word and ratio scale
C Ratio and line scale
D Line and fraction scale ✓ **C**

1.4 The scale of the orthophoto map is ... than the scale of the topographical map.

A 5 times larger
B 5 times smaller
C 10 times larger
D 10 times smaller ✓ **A**

1.5 The map index (reference) of the map to the south-west of Worcester is …

A 3319CD.
B 3319CC.
C 3319DC.
D 3319CA. ✓ **B**

1.6 The coordinates of trigonometrical station 59 at **N** in block **I5** is ...

A 19°22'38"S 33°40'41"E/19°22,6'S 33°40,7'E.
B 33°39'47"S 19°22'38"E/33°39,8'S 19°22,6'E.
C 19°21'38"E 33°40'47"S/19°21,6'E 33°40,7'S.
D 33°40'41"S 19°22'38"E/33°40,7'S 19°22,6'E. ✓ **D**

1.7 The length of the disused rifle range in block **H7** is ... metres.

A 0,9
B 900
C 90
D 9 ✓ **B**

1.8 The feature hindering physical development of the urban area in block **I9** is/are …

A the sewage works.
B a steep gradient.
C a marsh and vlei.
D the dam. ✓ **C**

1.9 The landform at **1** on the orthophoto map is a …

A valley.
B spur.
C koppie.
D saddle. ✓ **A**

1.10 The human-made feature at **2** on the orthophoto map is a …

A monument.
B golf course.
C cemetery.
D stadium. ✓ **D**

1.11 The settlement pattern at **3** on the orthophoto map is …

A clustered.
B isolated.
C linear.
D circular. ✓ **B**

1.12 The land-use zone in block **H7** on the topographical map is ...

A commercial.
B industrial.
C residential.
D a rural-urban fringe. ✓ **D**

1.13 The stream channel pattern at **O** in block **K11** is ...

A meandering.
B laminar.
C rock-controlled.
D braided. ✓ **D**

1.14 The brickworks in block **E3** on the topographical map is an example of a … activity.

A quaternary
B tertiary
C secondary
D primary ✓ **C**

1.15 The purpose of the weir in block **K10** on the topographical map is to …

A reduce the flow of the water.
B create a walkway across the river.
C create a recreational facility.
D rechannel the water. ✓ **A**

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

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

2.1 Refer to spot height 534 and trigonometrical station 123 in block **D11** on the topographical map and answer the questions that follow.

2.1.1 Calculate the difference in height between spot height 534 and trigonometrical station 123.

758,9 m – 534 m = 224,9 m ✓ (1 x 1) (1)

2.1.2 Is the average gradient between spot height 534 and trigonometrical station 123 gentle or steep? Give evidence from the map to support your answer.

Answer: *Steep* ✓

Reason: *The contour lines between the two points are close together* ✓ (1 + 1) (2)

2.1.3 Determine whether there is intervisibility between spot height 534 and trigonometrical station 123. Give a reason for your answer.

Answer: *Spot height 534 is visible from trigonometrical station 123/ There is intervisibility/Yes* ✓

Reason: *No obstruction (high-lying area) between the two points* ✓ (1 + 1) (2)

2.1.4 Two cross-sections are drawn between spot height 534 and trigonometrical station 123 on the topographic map. One cross-section has a vertical exaggeration of 2 times and the other one a vertical exaggeration of 25 times. Which ONE of the two cross-sections would give you a clearer idea of the profile of the landscape? Give a reason for your answer.

Answer: *Cross-section is exaggerated 25 times* ✓

Reason: *The greater the vertical exaggeration, the clearer the differences in high lying and low lying areas/relief* ✓
If the vertical exaggeration is 2 times the differences in high lying and low lying areas/relief may not be clear ✓
Difference in relief ✓
[Concept] (1 + 1) (2)

2.2 Refer to benchmark 201.8 in block **G3** and benchmark 262.2 in block **F9** on the topographic map and answer the questions that follow.

2.2.1 Determine the true bearing of benchmark 201.8 from benchmark 262.2.

261º ✓ *[range - 259º to 263º]* (1 x 1) (1)

2.2.2 Calculate the magnetic declination of the topographical map for 2015. Use the steps below to answer the question. Show ALL calculations.

Difference in years: *2015 – 2010 = 5 years* ✓

Mean annual change: *3'W* ✓

Total change: *3'W x 5 years = 15'W* ✓

Magnetic declination 2015: *24º27'W +* ✓ *15'W = 24º42'W* ✓(5 x 1) (5)

2.2.3 Calculate the magnetic bearing of benchmark 201.8 from benchmark 262.2 on the topographical map. Show ALL calculations.

Formula: Present magnetic bearing = true bearing +
present magnetic declination

261º + 24º42' ✓ *[Mark given for correct substitution] = 285º42'* ✓
[range - 283º42' to 287º42'] (2 x 1) (2)

2.3 Calculate the area (in m²) of the demarcated orchards and vineyards, labelled **4** on the orthophoto map. Show ALL calculations.

Formula: Area = Length (L) x Breadth (B)

= (2.5 cm ✓ x 100) x (1.8 cm ✓ x 100)
*[Range: **L** (2.3 cm – 2.7 cm) : **B** (1.6 cm – 2 cm)]*
= 250 m ✓ x 180 m ✓
= 45 000 m² ✓
[Range for final answer: 36 800 m² to 54 000 m²]
[Accept other calculation methods] (5 x 1) (5)

[20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Study the table below showing temperatures for the area **M** in block **G9** and area **P** in block **G4** on the topographical map and answer the questions that follow.

	M	**P**
Average summer temperature	21 ºC	19 ºC

3.1.1 What is the difference in temperature between **M** and **P**?

*2ºC/**M** has a higher temperature than **P** ✓* (1 x 1) (1)

3.1.2 Give a reason for the difference in temperature between **M** and **P**.

*Area **M** is an urban heat island ✓✓*
*Area **M** is an urban area and area **P** is a rural area ✓✓*
*Area **M** is made up of artificial surfaces (concrete, steel, tar) and area **P** of natural surfaces (vegetation) ✓✓*
*Natural processes e.g. evapotranspiration occurs at **P**, but are limited at **M** ✓✓*
*More pollution at **M** to trap heat than at **P** ✓✓*
*More artificial heating at **M** than at **P** ✓✓*
M is closer to the industrial area ✓✓
P is near the river ✓✓
[Any ONE - Accept other answers related to urban heat islands] (1 x 2) (2)

3.2 Many vineyards are found in the south-western section of the topographical map.

3.2.1 Name the main industry related to these vineyards.

Wine industry/winery ✓
Dried grapes/Raisins/Sultanas ✓
Grape juice ✓
Packaging of grapes for export ✓
Grape jam ✓
Bottling of fruit ✓
Distilling of spirits ✓
[Accept any suitable answer related to grapes] (1 x 1) (1)

3.2.2 Explain how the climate of this region positively influences the industry mentioned in QUESTION 3.2.1.

Worcester is hot and dry, with low annual rainfall and this promotes the growth of grapes ✓✓
Mountain ranges blocks oceanic influences reducing moisture and strong winds ✓✓
Winter rainfall is experienced which promotes growth of a variety of grapes ✓✓
[Any ONE] (1 x 2) (2)

3.2.3 Give TWO reasons why the section south-west on the topographical map is farmed intensively.

Flat land/floodplain ✓
Availability of water/rivers/dam/availability of irrigation ✓
Fertile soil ✓
Accessibility/roads
[Any TWO] (2 x 1) (2)

3.2.4 Give TWO positive economic impacts of this intensive type of farming on the local economy.

Create employment ✓✓
Upskilling of labourers ✓✓
Earn foreign exchange due to export ✓✓
Increase tourism creating more business opportunities ✓✓
Improve the quality of life of the local people thereby increasing the local market ✓✓
Improves infrastructure in the area which encourage more investments/foreign capital ✓✓
Increase in the amount of winemaking boosts sales and the economy ✓✓
[Any TWO - accept other relevant answers] (2 x 2) (4)

3.3 Refer to Audenberg Ridge Peaks (blocks **B10**, **11** and **12**) on the topographical map and answer the questions that follow.

3.3.1 Name the physical feature formed by Audenberg Ridge Peaks, separating the two drainage basins.

Watershed/water divide/divide ✓ (1 x 1) (1)

3.3.2 Identify the drainage pattern north of Audenberg Ridge Peaks found specifically in block **B12**.

Trellis drainage pattern ✓ (1 x 1) (1)

3.3.3 Name the underlying rock structure associated with the drainage pattern mentioned in QUESTION 3.3.2.

Folded sedimentary rocks/folded rock ✓
Alternate layers of hard and soft rock exposed on the surface✓
(Any ONE) (1 x 1) (1)

3.4 Examine the street pattern found at area **5** on the orthophoto map.

3.4.1 Identify the street pattern at **5**.

Grid-iron/grid/rectangular/block street pattern ✓ (1 x 1) (1)

3.4.2 Give ONE advantage of the street pattern at **5**.

Easy to plan/layout ✓
Easy to extend ✓
Easy to regulate/subdivide ✓
Don't get lost easily ✓
Travel shorter distances ✓
[Any ONE - accept other relevant answers] (1 x 1) (1)

3.4.3 Give ONE disadvantage of the street pattern at **5**.

Causes traffic congestion ✓
Time consuming ✓
Plenty of accidents ✓
High fuel consumptions ✓
Monotonous/Boring ✓
Generates more pollution ✓
[Any ONE - accept other relevant answers] (1 x 1) (1)

3.4.4 Give ONE possible reason for the choice of the street pattern at **5**.

Flat land ✓✓
Older part of the town ✓✓
Traditional pattern used in the past ✓✓
Easy to extend/plan ✓✓
[Any ONE] (1 x 2) (2)

3.5 The orthophoto was taken in 1988 and the topographical map was printed in 2007. Zweletemba (**G12** on the topographical map and **7** on the orthophoto map) shows urban expansion.

3.5.1 Define the term *urban expansion*.

The physical growth/expansion of the urban area ✓
[Concept] (1 x 1) (1)

3.5.2 Give the direction in which urban expansion has occurred.

Northeast ✓ (1 x 1) (1)

3.5.3 What is the name given to the newly developed area after urban expansion took place?

Mandela Square ✓ (1 x 1) (1)

3.5.4 Explain how this urban expansion has negatively affected the surrounding natural environment.

Removal of vegetation due to development of houses and infrastructure ✓✓
Biodiversity is decreased ✓✓
Polluting of the Hexrivier river due to construction and domestic waste ✓✓
Lowering of water table due to additional water consumption ✓✓
Increase in temperature effects the environment ✓✓
Increased soil erosion ✓✓
Reduced the natural environment ✓✓
[Any ONE - Accept any other relevant answers] (1 x 2) (2)

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QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.1 Define the term *geographical information systems*.

It is a computerised system designed to capture, manipulate, manage, analyse and display spatial and non-spatial data to solve planning and management problems ✓
[Concept] (1 x 1) (1)

4.2 Data can be shown as raster or vector data.

4.2.1 Define the terms *raster data* and *vector data*.

Raster data: *Data of geographical features shown with grid cell/pixels* ✓
[Concept]

Vector data: *Data of geographical features shown in point, line, polygon format* ✓
[Concept] (2 x 1) (2)

4.2.2 Which ONE of the two maps, the topographical map or the orthophoto map, is an example of raster data? Give a reason for your answer.

Answer: *Orthophoto map* ✓

Reason: *Orthophoto is made up of grid cells/pixels* ✓
Orthophoto is a photograph/real time image ✓
[Any ONE] (1 + 1) (2)

4.3 Refer to block **G5** and answer the following questions:

4.3.1 Define the term *data layering.*

It is the placing of different layers of data on top of one another ✓
[Concept] (1 x 1) (1)

4.3.2 Name THREE data layers that encouraged the farmer to place his farm in that specific area (block **G5**).

Drainage/water supply/(non-perennial) river/(perennial)river)/dam✓
Topography/flat land/space for farming/relief/slope/contour lines ✓
Fertile soil/soil type/arable land/land suitable for farming ✓
Infrastructure/national roads/secondary roads/other roads/accessibility ✓
[Any THREE] (3 x 1) (3)

4.4 Refer to the Karoo Botanical Gardens in blocks **E9/10**.

4.4.1 Name and explain the GIS process that was used to stop urban development in the Karoo Botanical Gardens.

GIS process: *Buffering* ✓

Explanation: *Demarcating the Karoo Botanical Gardens by using a protected area symbol* ✓
Separating nature reserve from the urban area ✓
To solve the problem of incompatible land use ✓
[Concept] (1 + 1) (2)

4.4.2 Explain why buffering around the Karoo Botanical Gardens is important.

Restrict urban expansion ✓✓
It will allow the Karoo Botanical Gardens *maintain its natural environment* ✓✓
It will preserve the natural fauna and flora of the Karoo Botanical Gardens ✓✓
Biodiversity of the Karoo Botanical Gardens will be protected ✓✓
The aesthetic appeal of the Karoo Botanical Gardens will be maintained and will continue to be a tourist attraction ✓✓
The protection of the Karoo Botanical Gardens will generate income for the area e.g. through tourism ✓✓
Employment will be created as more people will be visiting the area ✓✓
The Karoo Botanical Gardens natural fauna and flora, biodiversity and aesthetic appeal makes it an ideal area for recreation ✓✓
[Any TWO – Accept other relevant answers] (2 x 2) (4)
[15]

GRAND TOTAL: 75