2014 Telematics
Grade 12

Geography Mapwork

Price: R2,50
Dear Grade 12 Learner:

The Telematics project stems from the cooperation between the Western Cape Education Department and Stellenbosch University.

To be able to have success at the end of the year it will be very important to keep on learning and applying the prescribed key concepts/processes and process skills in the different knowledge areas throughout the year. Make sure that you are able to analyse and interpret geography related concepts in newspapers and magazines to the concepts and content you have discussed in the classroom. In addition spend at least a few hours per week studying / reading / making summaries about the four components in the theory section and attempt to integrate it with the mapwork section.

**Tips for Success**

- Work through last year’s examination papers as well as the exemplar papers that were prepared to assist you prepare for your examinations.
- Ask your teachers and fellow learners to work through the questions and answers with you.
- Don’t be surprised if you get resources you have never seen before. The examiners do this on purpose: they want to know if you can use your knowledge, not just learn it off by heart.
- Systematically work through your Geography textbook.

**Examination Guidelines for Theory (Paper 1) 2014**

1. This is a one and a half hour paper and will be written in the second session on the day of the Geography examination.

2. This question paper consists of four questions that are compulsory and is comprised of the following:

   - Question 1: Multiple choice – (15)
   - Question 2: Geographical techniques and calculations – (20)
   - Question 3: Application of theory / map and photo interpretation – (25)
   - Question 4: Geographical Information Systems – (15)
GEOGRAPHIC SKILLS AND TECHNIQUES
1. Mapwork skills
   - Locating position: degrees, minutes and seconds
   - Map scale word, ratio and line scale:
   - Direction: True and Magnetic bearing
   - Relative position: Map coordinates / fixing position
   - Distance: Measuring distance and converting to ground distance along a straight line in practice
   - Calculating area
   - Map and photo interpretation includes reading and analysis of physical and constructed features
   - Applying map-reading skills to maps and photos

2. Topographic maps
   - South African 1:50 000 referencing map system
   - 1:50 000 conventional signs and symbols
   - Contours and landforms
   - Cross-sections on 1:50 000 maps
   - Vertical exaggeration
   - Intervisibility
   - Gradient
   - Grid referencing

3. Aerial photographs and orthophoto maps
   - Oblique and vertical aerial photographs
   - Interpreting vertical aerial photographs
   - Advantages and disadvantages of different types of photographs
   - Orthophoto maps: identifying features
   - Comparing orthophoto maps with a topographic maps and other aerial photos
   - All techniques mentioned under mapwork techniques applicable to orthophoto maps
   - Use of tone, texture and shadow in the interpretation of photos
   - Orienting aerial photographs and orthophoto maps with other maps
4. **Geographical Information Systems**

- Concepts of GIS
- Reasons for the development of GIS
- Concept of remote sensing and resolution
- How remote sense is working
- GIS concepts: Spatial objects, lines, points, nodes, and scales
- Spatial resolution
- Spatial and attribute data: and vector and raster data
- Data standardisation and data sharing and data security
- Data manipulation: data integration, buffering, querying and s
- Application of GIS to all relevant topics in the grade
MAPWORK

READ AND INTERPRETATION OF MAPS AND ORTOPHOTOS

The purpose of these guidelines is to empower you with regard to the answer of interpretative questions in map work. Remember that a large amount of information could be found on the topographical and ortophoto map. To answer these questions successfully, you must know what to consider getting to the answer. Most of these questions come from previous matric examination question papers. Other possible questions have also been included. Remember that it is by no means a memorandum that accompanies the questions, but an attempt to show you what to consider getting to the answer. You must realize that ALL content, modules and skills can be assessed in Map work. Therefore use this guide to study and prepare yourself for your Map work question paper.

CLIMATE AND WEATHER

1. **Does the area receive seasonal rainfall or rainfall throughout the year?**
   Seasonal: Non perennial rivers/ dams/ cultivated lands near rivers/ irrigation

2. **Which slope is the warmest?**
   The northward facing slope.

3. **Where would you find temperature inversions?**
   In valleys

4. **In which direction will the smoke blow if a fire is made in the evening on the middle slopes?**
   NB CATABATIC flow is examined. The smoke will move DOWNWARDS towards the valley. (The opposite for anabatic flow)

5. **In which direction will a airplane take off and land before/after a cold front.**
   (Remember that airplanes always land and take off against the wind.)
   Before front: Takes off and lands in NW direction. After front: takes off and lands in SW direction

6. **Which residential areas will be influenced by pollution the most during winter / day / night?**
   Look at NW and SW winds as well as the direction of land and sea breezes
GEOMORPHOLOGY

1. **Identify the stream patterns in the area.**
   Types: Dendritic, radial, rectangular, trellis – **You must know what each one looks like**

2. **In which stage of the fluvial cycle is the river on the map?**
   - Upper course: Steep/ mountainous/ waterfalls/ short tributaries/ high watersheds/
   - Middle course: Gradual slope/ longer tributaries/ low watershed
   - Lower course: Very gradual/ meanders/ sand deposits/ marshes/ oxbow lakes/

3. **Physical aspects influencing construction of railways and roads.**
   Mountains/ steep slope/ marshes/ rivers

4. **Identify landforms regarding structural landscapes (Grade 11 content)**
   Horizontal layers: Mesa/ butte/ conical hills/tors
   Inclined layers (strata): Dip and scarp slopes
   Massive igneous rocks: Dome shaped landforms (batholiths, laccoliths, lopolith)

5. **In which direction do the layers dip?**
   Layers always dip in the direction of the GRADUAL slope.

6. **In which direction does the river flow?**
   - Towards the sea
   - Always from high to low.
   - Contours bend upstream
   - Dam wall on downstream side
   - Tributaries join at acute angles

7. **Name two temporary bases of erosion in the river**
   Waterfall / dams / lakes

8. **What indication is there that rejuvenation has occurred in the river?**
   Waterfall

ENVIRONMENT

1. **Nature conservation on map/photo**
   Nature reserves/ Hiking trails/ Fire break/ wild reserve/

2. **Indication of conservational farming**
   Anti erosion walls/ camps/ rows of trees to reduce wind/ contour ploughing/

3. **Sources of pollution in area?**
   Air pollution: Industries
   Noise pollution: Airport
   Water pollution: Factories/ camping sites/ power station near river
ECONOMIC GEOGRAPHY

(a) PRIMARY ACTIVITIES

1 Commercial vs Subsistence farming?
Commercial: Good infrastructure/ irrigation/ large farms/ farm names/ cellar/ dipping tank/experimental farm/ estate/ sugar mill/ service rail/ abattoir/ dairy
Subsistence: Few roads/ foot path/ no power lines / small patches of cultivated land

2 Describe factors influencing agriculture: Advantage & disadvantage
Advantage: Rivers/ dams/ flat land/ power lines/ railway lines/ telephone lines/
Disadvantage: Steep slopes/ water scarce/ marches

3 Identifying of mining activities
Excavations/ mine dump/ converyer belt/ terraces/ names of mines/ old mines/ subsiding ground

4 Identifying of fishing activities
Fishing harbours / Fisherman’s houses/ factories near coast/

5 Identifying of forestry
Trees/ woodlands/ sawmill/ lookout towers/ fire break/ state forest/

(b) SECONDARY ACTIVITIES

1 Describe the factors influencing the location of the industries.
Flat area/ raw materials/ transport (name types)/ power supply/ water/ workforce (residential area)/ market/ outskirts

2 Light or heavy industries?
Heavy: Far from CBD/ transport-rail/ Raw material-mining
Light: Near CBD/ transport-road/ raw material-agriculture

(c) TERTIARY ACTIVITIES

1 Tourist attractions, holiday resorts, camping sites
Near beaches/ near roads & railway/ wine tasting/ historical buildings / monuments

2 Types of services in area
Electricity supply/ telephone/ medical/ post office/ educational (schools/ college/ university)/ Police services/ etc. (Buildings on map)
3  **Recreational facilities in area?**
   Example Golf course/ athletics/ shooting range/ Race track / Also look at names and functions on orthophoto map

4  **Factors influencing location of airport/aerodrome**
   Flat land/ far from built-up area – safety/ noise/ roads/ urban rural fringe

5  **Do the road and railway line follow the same route? Why?**
   The same? NB Topography

6  **For what is the dam used on the map? Give reasons**
   - Drinking water: Purifying works
   - Irrigation: Canals and furrows
   - Recreation: Yacht club, hotels at dam, camping site, slipway etc

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### SETTLEMENT GEOGRAPHY

(a) **RURAL SETTLEMENT**

1  **Rural or urban**
   Rural: Primary/ Urban: Secondary and Tertiary/ Mention examples on map and photo

2  **Nucleated or dispersed (PATTERN)**
   Nucleated: Buildings near to each other
   Dispersed: Buildings far

3  **Factors influencing site of rural settlements**
   Rivers/ flat land/ fertile soil near rivers/

4  **Factors influencing shape of settlements**
   - Linier: Road/River
   - Round: central point
   - Crossroad: Roads that cross or join

(b) **URBAN SETTLEMENT**

1  **Describe the factors that influenced the site of the urban settlement on the map**
   Flat land/ roads/ river/ railway/ mountains/ sea etc.

2  **Type of settlement based on function**
   Central place town: Does the settlement serve its surrounding rural area
   (Sphere of influence)
Specialized settlement: Is it a mining town / holiday town/ educational town?

3 Identify the land-use zone at ............. on the map/ orthophoto

- CBD – Accessibility/ functions
- INDUSTRIES: Light or heavy/ influencing factors/ (see economic)
- RETAIL: In CBD/ isolated shops in residential areas/ shopping centres – main roads
- RESIDENTIAL AREAS: High income-slope/low income – near factories
- RURAL URBAN FRINGE. : Racing track/ power station/ cemetery/ golf course etc

4 Shape and factors determining shape

Linier: Mountains/ rivers
Stellar: Roads

5 Identify street patterns and factors

Rectangular: Flat land/ oldest
Irregular: Undulating surface / steep slope/ later development
CALCULATIONS

DISTANCE

FORMULA: \[ \text{Distance} = \frac{\text{Distance on Map} \times \text{Scale}}{100\,000} \]

Calculate the distance of the national road from A to B.

STEP 1
Measure distance on the map in \text{cm}.

Distance = 4,8 cm

STEP 2
Place in Formula

\begin{align*}
\text{Distance} &= \frac{4,8 \times 50\,000}{100\,000} \\
&= \frac{4,8}{2} \\
&= 2,4 \text{ km}
\end{align*}

STEP 3
Answer in \text{km}.
**AREA**

**FORMULA:** Area = Length x Breadth

Calculate the area of block X

![Rectangle diagram]

**STEP 1**
Calculate length (see distance)

Length = \( \frac{5 \text{ cm} \times 50 \, 000}{100 \, 000} \)

= 2.5 km

**STEP 2**
Calculate breadth (See distance)

Breadth = \( \frac{3 \text{ cm} \times 50 \, 000}{100 \, 000} \)

= 1.5 km

**STEP 3**
Place in formula

Area = \( l \times b \)

= 2.5 km x 1.5 km

**STEP 4**
Answer in \( \text{km}^2 \)

= 3.75 \( \text{km}^2 \)
GRADIENT

FORMULE: \[ \text{Gradient} = \frac{\text{VI (Difference in height)}}{\text{HE (Distance)}} \]

Calculate the gradient from C to D

STEP 1
Calculate difference in height (VI)

\[ 460 - 340 = 120m \]

STEP 2
Calculate distance (HE)

\[ \text{Distance} = \frac{\text{Distance on Map x Scale}}{100000} \]

\[ = \frac{4.8 \times 50000}{100000} \]

\[ = 2.4 \text{ km} \]

\[ = 2400m \]

STEP 3
Convert to METER

STEP 4
Put in formula and simplify

\[ \text{Gradient} = \frac{120m}{2400m} \]

\[ = \frac{1}{20} \]

\[ = 1:20 \]
Magnetic declination is the difference between true and magnetic north.

Mean magnetic declination 23° 53’ west of true north (July 2002). Average annual change 6’ west.

Calculate the magnetic declination for 2009.

**STEP 1**
- Calculate the difference in years
- 2009 – 2002 = 7 years

**STEP 2**
- Calculate total change
- 6’ x 7 years = 42’ west

**STEP 3**
- Add to, or deduct from magnetic declination
- 23° 53’ + 42’ = 23° 95’
- = 24° 35’ west

**STEP 4**
- Remember: you are working with minutes. There cannot be more than 60!

**TIP**
- Magnetic declination can be calculated easily if you DRAW the information supplied. You will then get a mental image of the calculation

Consider the following when you work with magnetic declination:
1. What is the average mag declination (in degrees & minutes)?
2. In which direction is the magnetic declination?
3. In what year was the magnetic declination given?
4. What is the mean annual change (in minutes)?
5. In what direction was this change?
6. For what year must the magnetic declination be calculated?

**STEP 3 NB:** FOR SOUTH-AFRICA
- If the change is towards the west, it is ADDED
- If the change is towards the EAST, it should be SUBTRACTED
PAPER 2: SUGGESTIONS FOR IMPROVEMENT

QUESTION 1: MULTIPLE CHOICE QUESTIONS
(a) Learners should not only know the different types of landforms and slopes, but they should also be able to identify them on the map and in the surrounding environment.
(b) Learners should know how to use the information supplied at the bottom of the map, for example projection used to draw the map, map symbols, magnetic declination, contour interval and map code, because this will make answering Question 1 easier.
(c) The use of conventional signs should be emphasises, and that learners should study the key of the map before attempting to answer questions. More tasks on the conventional signs can assist the learners.

QUESTION 2: CALCULATIONS AND APPLICATION
The following exercises/activities could be undertaken to overcome challenges relating to the calculation of gradient:
• Calculation problems can be resolved through continuous exercise. Calculation problems cannot be solved if learners are given limited exercises.
• From time to time learners should be given exercises on calculations. This could be given as homework and marked in class.
• Ensure that all areas of calculations are covered and that learners know how to follow the steps when doing calculations as calculation steps are awarded marks.
• The following formula should be used when calculating gradient. Take note that there are other variations to this formula that can be used to calculate gradient. This formula, however, covers all the steps needed to gain full marks when gradient is calculated.

QUESTION 3: APPLICATION AND INTERPRETATION
(a) Regular and correct use of geographical concepts will improve learners’ understanding thereof.
(b) Continuous integration of content knowledge with map work must be introduced as early as early as Grades 10 and 11.
(c) Regular worksheets will enable learners to improve map reading and interpretation skills.
(d) Learners should be exposed to previous examination papers where similar questions and questions of the correct difficulty levels are provided.
(e) Exercises to identify landforms and drainage patterns on topographic maps when those concepts are taught in theory must be practiced in class.
(f) Exercises to identify settlement outlines, street patterns and land use zones on topographic maps when those concepts are taught in theory.
(g) Learners should be taught that scale influences distances between similar points when measured on the topographic map and orthophoto map respectively. Teachers must emphasise that the scale of the topographic map is 1:50 000 while the scale of an orthophoto map is 1:10 000.
(h) Learners must be taught how to orientate the topographic map with the orthophoto map.

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)
(a) GIS concepts must be taught in context. While it is important for learners to know the concepts and be able to define them when required to, learners must be able to apply the concepts in practical life situations. Learners must therefore be aware of the fact that GIS will not just consist of theory and definitions but rather be practically applied to the map examined.
(b) Learners are advised to create scenarios to be challenged on how to apply knowledge on their understanding of concepts and to apply GIS knowledge across the various topics of the subject (integration).
Learners could be required to apply GIS in flood prevention (buffering);
• Could apply GIS in choosing a site for the development of a settlement (data layering);
• Could create a new map from different types and sized maps (data integration);
• Must know that GIS can contribute in solving social and environmental challenges; and
• Must be aware that GIS can be used to manage various issues e.g. disasters, crime, etc.
(c) Learners should integrate GIS knowledge across the various topics of the subject. Learners could be asked to apply GIS concepts in Climate and Weather, Geomorphology, Settlements and Economic Geography.
By so doing, learners will know that GIS can contribute in solving social and environmental challenges.

(d) Refer to previous NSC question papers to get an idea as to how GIS questions are set. Teaching approaches should be adapted accordingly.

(e) Learners can be exposed to cell phones that have GPS.