basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

GEOGRAPHY P2

NOVEMBER 2018

MARKING GUIDELINES

MARKS: 75

These marking guidelines consist of 15 pages.

RESOURCE MATERIAL

1.   An extract from topographic map 2930CB PIETERMARITZBURG.

2.   Orthophoto map 2930 CB 8 PIETERMARITZBURG.

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 topographic map (2930CB PIETERMARITZBURG) and an orthophoto map (2930 CB 8 PIETERMARITZ-BURG) of a part of the mapped area.

4.   You must hand the topographic map and the orthophoto map to the invigilator at the end of this examination session.

5.   You may use the blank page at the end of this question paper for all rough work and calculations. Do NOT detach this page from the question paper.

6.   Show ALL calculations and use the formulae provided, where applicable. Marks will be allocated for these.

7.   Indicate the unit of measurement in the final answer of calculations, e.g. 10 km; 2,1 cm.

8.   You may use a non-programmable calculator.

9.   You may use a magnifying glass.

10.   The area demarcated in RED on the topographic map represents the area covered by the orthophoto map.

11.   The following English terms and their Afrikaans translations are shown on the topographic map:

ENGLISH	**AFRIKAANS**
Aerodrome	Vliegveld
Diggings	Uitgrawings
Canal	Kanaal
Firebreak	Brandgordel
Golf Course	Gholfbaan
Hiking Trail	Staproete
Hospital	Hospitaal
River	Rivier
Sewerage Works	Rioolwerke
Waterworks	Waterwerke

GENERAL INFORMATION ON PIETERMARITZBURG

Pietermaritzburg (umGungundlovu) is the capital city of KwaZulu-Natal. This second-largest city in the province was founded in 1838. It is a regionally important industrial hub, well-known for processing aluminium, timber and dairy products. It has an estimated population of around 500 000 (including neighbouring townships). Pietermaritzburg is situated along the N3 national road, the main route between the Pretoria-Witwatersrand-Vereeniging conurbation and the harbour city of Durban, some 90 kilometres from Pietermaritzburg. The Oribi airport is situated just outside Pietermaritzburg and has a regular scheduled service to the OR Tambo International Airport in Johannesburg.

[Source: http://en.wikipedia.org/wiki/pietermaritzburg]
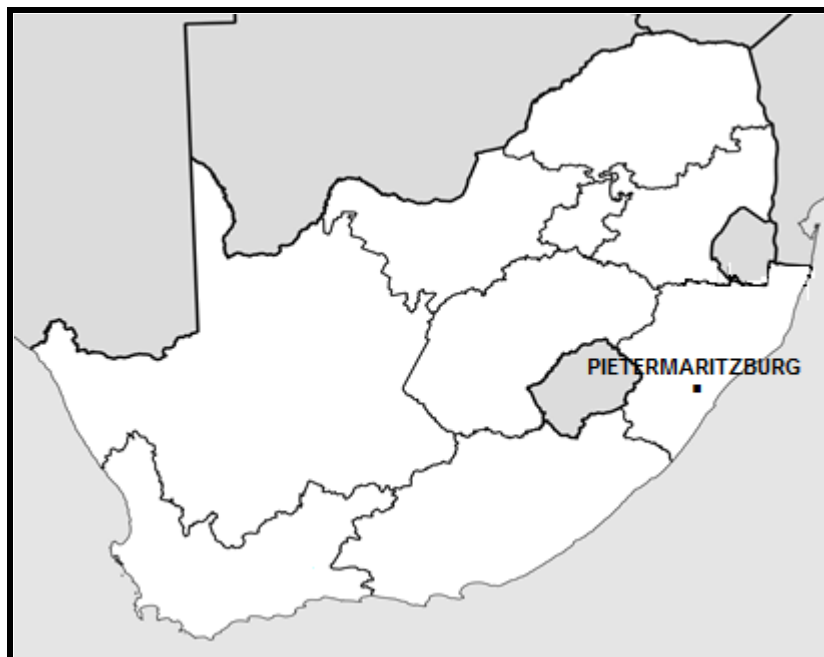
QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1 : 50 000 topographic map (2930CB PIETERMARITZBURG) 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   Pietermaritzburg is the capital city of …

    A   Mpumalanga.
    B   KwaZulu-Natal.
    C   Free State.
    D   Limpopo.

> **B** ✓

1.2   The harbour closest to Pietermaritzburg is …

    A   Richards Bay.
    B   Port Elizabeth.
    C   Durban.
    D   Cape Town.

> **C** ✓

1.3   If you travel along the N3 in a north-westerly direction you will reach the town/city of …

    A   New Hanover.
    B   Donnybrook.
    C   Merrivale.
    D   Harrismith.

> **D** ✓

1.4   The true bearing of spot height 1031 (**K**) in block **B6** from trigonometrical station 263 (**J**) in block **D7** on the topographic map is …

    A   341°.
    B   161°.
    C   140°.
    D   19°.

> **A** ✓

1.5   The economic activity at **U** in block **A12** is a ... activity.

    A   primary
    B   secondary
    C   tertiary
    D   quaternary

> **B** ✓

1.6   The land-use zone at **1** on the orthophoto map is the …

    A   CBD.
    B   transition zone.
    C   green belt.
    D   rural-urban fringe.

> **C** ✓

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

     A   veterinary clinic.
     B   townhouse complex.
     C   shopping centre.
     D   office park.

> **C**
> ✓

1.8   The slope at line **3** on the orthophoto map is …

     A   concave.
     B   convex.
     C   stepped.
     D   uniform.

> **D**
> ✓

1.9   The main human-made factor that influenced the site of the farmstead at **L** in block **B9** on the topographic map is …

     A   the other road.
     B   a market.
     C   a reservoir.
     D   flat land.

> **A/C**
> ✓

1.10   The stream/drainage pattern that dominates area **M** in block **B10** and block **B11** on the topographic map is a … pattern.

     A   centripetal.
     B   radial.
     C   rectangular.
     D   trellis.

> **D**
> ✓

1.11   The dominant street pattern in block **G2** on the topographic map is …

     A   radial.
     B   unplanned irregular.
     C   grid iron.
     D   planned irregular.

> **B/D**
> ✓

1.12   The feature controlling the amount of water flowing through the canal in block **H8** on the topographic map:

     A   Bridge
     B   Buildings
     C   Weir
     D   Slope

> **C**
> ✓

1.13   Swartkop in block **F1** on the topographic map is a …

      A   butte.
      B   mesa.
      C   pointed butte.
      D   conical hill.

✓   **A**

1.14   The general direction of flow of the river in the valley represented by the curved line **4** on the orthophoto map:

      A   North
      B   West
      C   East
      D   South

✓   **B**

1.15   The distance between **T** in block **A12** and New Hanover on the topographic map is … kilometres.

      A   0,2
      B   22
      C   20,2
      D   2

✓   **C**

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

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

2.1   A tourist visiting Town Hill in Pietermaritzburg requires specific information regarding its location.

    2.1.1   State the topographic map index/code of Pietermaritzburg.

        2930CB ✓   (1 x 1)   (1)

    2.1.2   Determine the grid reference/co-ordinates of Town Hill at point **N** in block **F7** on the topographic map.

        29°35'06"S ✓ *30°21'17"E* ✓ */29°35,10'S* ✓ *30°21,30'E* ✓
        (Latitude: 05" - 07")   *(Latitude: 0,08' - 0,14')*
        (Longitude: 16" - 18") *(Longitude: 0,28' - 0,33')*   (2 x 1)   (2)

    2.1.3   The tourist wants to hike the Voortrekker Wagon Hiking Trail in block **F6** using a compass. Calculate the magnetic declination for 2018. Show ALL calculations. Marks will be awarded for calculations. Clearly indicate the unit of measurement in your final answer.

        Difference in years: 2018 – 2016 = 2 ✓ *years*

        Mean annual change: 9' ✓ *W*

        Total change: 2 x 9' = 18' ✓ *W*

        Magnetic declination for 2018: 24°45' W + ✓ *18' = 25°03' W* ✓   (5 x 1)   (5)
        [GIVE MARKS FOR CORRECT INFORMATION NEEDED TO DETERMINE FINAL ANSWER, EVEN IF NOT ACCORDING TO THE STIPULATED GUIDELINE]

2.2   Refer to the Voortrekker Wagon Hiking trail in block **F6** on the topographic map.

    2.2.1   State the orthophoto map index/code that a tourist will use when hiking the Voortrekker Wagon Hiking Trail.

        2930 CB 7 ✓   (1 x 1)   (1)

2.2 Calculate the average gradient between contour line **O** (height 820 m) and the trigonometrical station at **P** on the topographic map. Show ALL calculations. Marks will be awarded for calculations.

Formula: $\textbf{Average gradient} = \dfrac{\textbf{vertical interval (VI)}}{\textbf{horizontal equivalent (HE)}}$

VI	= 1057,9 m – 820 m = 237,9 m ✓	*VI*	= 1057.9 m – 820 m = 237,9 m ✓
HE	= 3,9 ✓ cm x 500	*HE*	$= \dfrac{3,9 ✓ \text{ cm x } 50\,000}{100}$

Range for measurement [3,8 cm – 4 cm]

= 1 950 ✓ m   **OR**   = 1 950 ✓ m

Range for HE [1 900 m – 2000 m]

$= \dfrac{237,9}{1\,950}$ ✓   **(One mark for correct substitution)** $= \dfrac{237,9}{1\,950}$ ✓

$G = \dfrac{237,9}{1\,950}$ $G = \dfrac{237,9}{1\,950}$

$= \dfrac{1}{8,2}$ / 1 : 8,2 / 1 in 8,2 ✓ $= \dfrac{1}{8,2}$ / 1 : 8,2 / 1 in 8,2 ✓

Range for final answer [1 : 7.9 – 1 : 8.41]   (5 x 1)   (5)

2.2.3 Describe the curved route followed by the Voortrekker Wagon Hiking Trail from its start at **O** to the trigonometrical station at World's View.

The trail follows the winding path of the spur ✓
The trail follows the more gentle route/The trail avoids the very steep slopes ✓
It is an easier route to hike along ✓
It avoids the difficult route of hiking through valleys and over spurs ✓
The trail follows the low lying area ✓
The trail goes uphill and it is easier to follow a winding route ✓
The slope is uneven resulting in a winding route ✓
It goes generally NW/N ✓
It passes through a woodland area ✓
It passes by perennial water/dam ✓
It passes by the river ✓
It passes the reservoir ✓
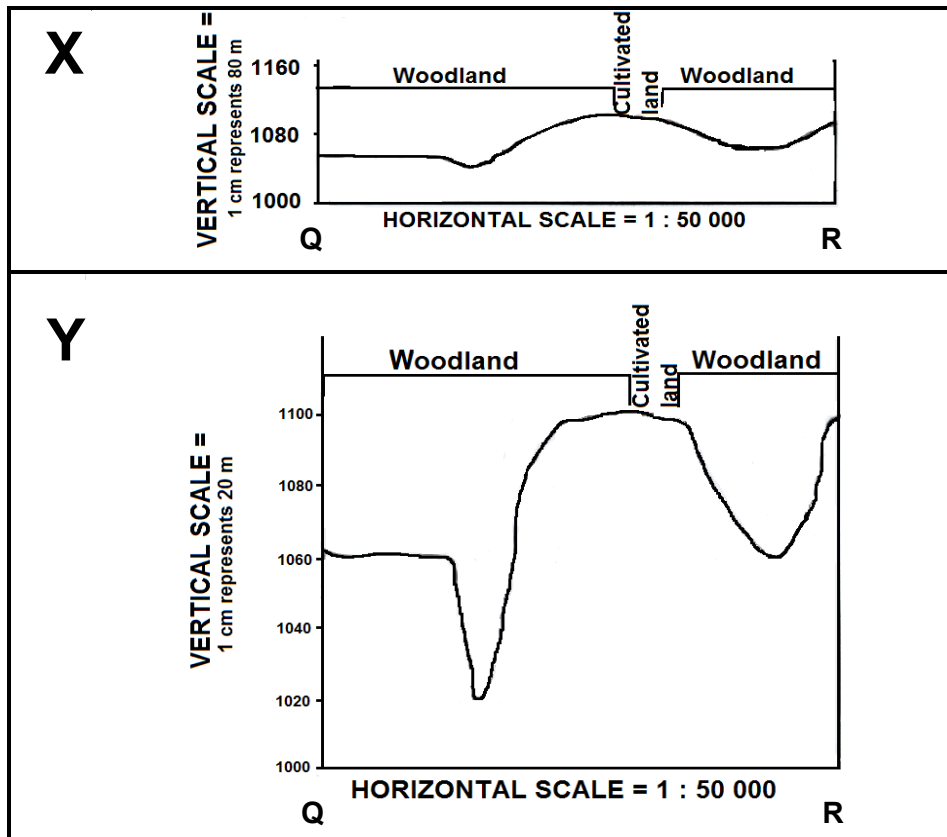*There are monuments that it passes by ✓*
There is a lookout tower towards the end of the trail ✓
[Any TWO]   (2 x 1)   (2)

2.3   Refer to benchmark 1060.9 at **Q** in block **D4** and spotheight 1106 at **R** in block
       C6 found on the topographic map. The cross-sections below represent the area
       between **Q** and **R**.

   2.3.1   Match cross-sections **X** and **Y** with the vertical exaggerations below.

           25 times: *Y* ✓

           6,25 times: *X* ✓   (2 x 1)   (2)

   2.3.2   Explain how the vertical exaggeration of cross-sections would make
           interpretation of the landscape easier.

           The shape of the features on the landscape is more clear when the
           vertical exaggeration is increased ✓
           To represent the topography of the landscape ✓
           To emphasize vertical features which are too small to identify relative to
           the horizontal scale ✓
           By increasing the vertical exaggeration the topography and gradient can
           be seen more clearly ✓
           Specific features are more recognizable/clearer ✓
           Without vertical exaggeration the cross-section would be flat ✓
           A larger exaggeration creates a clearer impression of the landscape ✓
           Height differences between features can be clearly identified ✓
           Y is clearer than X ✓
           [Any TWO]   (2 x 1)   (2)
                                                                                      [20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1   The bottom of the valley at area **M** on the topographic map experiences frost
       during the early hours of the morning in winter.

       3.1.1   Name the local/tertiary wind that is responsible for the formation of frost.

               Katabatic/Downslope/Gravitational wind ✓
               Mountain wind ✓
               [Any ONE]   (1 x 1)   (1)

       3.1.2   Explain how the wind mentioned in QUESTION 3.1.1 causes frost.

               *The slopes cool down resulting in the air in contact with the slopes cooling
               down* ✓✓
               The cooler air becomes heavy and dense ✓✓
               Cooler air subsides down the valley slopes ✓✓
               Cooler air accumulates on the valley floor/trapped by inversion layer ✓✓
               The cold subsiding air cools the temperature to below freezing point ✓✓
               [Any TWO]   (2 x 2)   (4)

3.2   Refer to slope **5** (low-income residential area) and slope **6** (high-income
       residential area) on the orthophoto map.

       3.2.1   Explain how aspect of slope influenced the site of the high-income
               residential area at **6**.

               *Slope 6 is a north/northeast facing slope and experiences the direct rays
               of the sun (making it warmer)* ✓✓   (1 x 2)   (2)

       3.2.2   Give ONE reason, evident on the orthophoto map, which influenced the
               location of the low-income residential area at slope **5**.

               Next to the road for transport ✓✓
               Access to place of work ✓✓
               South facing slope has cheaper land ✓✓
               *In comparison to slope 6 slope 5 is more gentle therefore it is cheaper/
               easier to build on* ✓✓
               Close to railway line ✓✓
               [Any ONE]   (1 x 2)   (2)

3.2.3   Suggest how natural vegetation could have influenced the land values of residential areas **5** or **6**.

The vegetation creates aesthetic appeal/beauty/scenery at **6** *which increases the land value* ✓✓
OR
Lack of vegetation at **5** *reduces the aesthetic appeal and decreases land values* ✓✓
Vegetation creates cleaner (absorbing carbon) air this area attracts more residents and increases land values ✓✓
Vegetation lowers temperature on this north facing slope which is hot during summer ✓✓
[Any ONE. THE REASONS MUST REFER TO THE RELEVANT ESIDENTIAL AREA SELECTED]   (1 x 2)   (2)

3.3   Refer to Mabane River and the Gordon Falls in block **H2** on the topographic map. Directly upstream of the Gordon Falls the river meanders and directly downstream of Gordon Falls, the river follows a straight path. Explain the reasons for the difference in the stream channel patterns of the Mabane River, as mentioned above.

Upstream of the Gordon Falls the wider space between the contour lines shows the river flows on level ground/slower velocity (speed) making it meander ✓✓
OR
Upstream of the Gordon Falls the landscape is flatter/slower velocity (speed) which allows the river to meander ✓✓
As the water flows over the waterfall it becomes more energetic, due to a steeper gradient/higher velocity (speed) resulting in a straight course downstream of the Gordon Falls ✓✓
OR
Rejuvenation downstream of the Gordon Falls result in vertical erosion therefore a narrower river valley results in a straightened pattern ✓✓   (2 x 2)   (4)
[ANSWER MUST BE QUALIFIED. FULL EXPLANATION]

3.4   Is the shopping mall at **7** on the orthophoto map a neighbourhood shopping centre or a regional shopping centre? Give a reason for your answer.

Answer: *Regional shopping centre* ✓

Reason: N*ext to national freeway (N3) for accessibility/Near main road (R56) intersection with the N3* ✓✓
It is on the outskirts of the city resulting in less congestion and more accessibility ✓✓
The size of the building is large ✓✓
Space available for expansion ✓✓
Close to middle and high income customers ✓✓
There are many roads linking the shopping mall for accessibility/ larger sphere of influence/range ✓✓
Potentially many clients/large threshold population ✓✓
Large parking space ✓✓
[Any ONE]   (1 + 2)   (3)

3.5 Are the industries at Willowton at **8** on the orthophoto map market-orientated or raw material-orientated? Give a reason for your answer.

Answer: *Market orientated* ✓

Reason: *It is situated close to market/customers/consumers/suburbs* ✓✓
No evidence of raw material in the vicinity of Willowton ✓✓
The good transport networks around Willowton creates accessibility to the markets ✓✓
The proximity close to the service line ✓✓
[Any ONE] (1 + 2) (3)

3.6 The quarry at **S** in block **D4** on the topographic map is situated next to the residential area of Leonard. Suggest ONE social justice and ONE social injustice that the people of Leonard could experience due to the quarry.

Social justice: *The quarry could create employment for people of Leonard, improving their quality of life* ✓✓
It could create the multiplier effect which will create more employment ✓✓
Create more services (examples) in the area ✓✓
People can afford basic needs due to employment ✓✓
Better infrastructure as new roads will be built ✓✓
[Any ONE]

Social injustice: *Various forms of pollution is generated from quarrying* ✓✓
The health of the people (respiratory illnesses) affected by the dust (air pollution) from the quarry ✓✓
The people's hearing could be affected due to the noise pollution caused by dynamite explosions in the quarry ✓✓
Water table is polluted (water pollution) reducing quality of water for people ✓✓
Land values will decrease due to a decrease in the aesthetic appeal ✓✓
Safety risk for children playing around quarry ✓✓
Vibrations from explosives may damage houses ✓✓
Expensive to repair infrastructure ✓✓ (4)
[Any ONE] (2 x 2 **[25]**

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.1 Refer to block **D8** on the topographic map.

4.1.1 Name the type of vector data used in block **D8** to indicate the secondary road.

Line (1 x 1) (1)

4.1.2 Explain the relevance of using vector data on the topographic map.

Standardising data is easier because you can use a reference/key to refer to features on a map ✓✓
The use of vector data on a topographic map makes map interpretation more user friendly ✓✓
To obtain data/information in one glance (quicker) ✓✓
Topographic maps are electronic versions of reality and symbols, like lines, point and polygons are used to represent real spatial features ✓✓
The use of vector data on a topographical map makes it easy to do data layering ✓✓
Vector data provides true shapes and distances of spatial features ✓✓
[Any ONE] (1 x 2) (2)

4.2 Refer to the topographic map and orthophoto map.

4.2.1 Is scale an example of attribute or spatial data?

Attribute data ✓ (1 x 1) (1)

4.2.2 Explain the relevance of scale when facing a geographical query/problem, e.g. a possible veld fire in block **D8** on the topographic map.

Scale allows you to determine the actual extent of the veld fire ✓✓
Scale allows you to determine the actual area effected by the veld fire ✓✓
Scale will allow rescue workers to determine the actual distance they have to travel in order to assist ✓✓
Determine the number of water tanks to be used ✓✓
Larger scale allows to see more detail ✓✓
To determine the positioning of the fire breaks/buffering ✓✓
Determine the number of fire fighters to be deployed ✓✓
Can determine the distance to the nearest water source/dam ✓✓
Can determine the gradient which the rescue workers will face so they can prepare themselves ✓✓
Can determine the distance between the fire and building structures ✓✓
Planning of possible evacuation routes ✓✓
[Any ONE] (1 x 2) (2)

4.2.3 How can the scale of the topographic map and orthophoto map be manipulated in order to make data integration of these two maps easier?

Adjust the scale of the topographic map to make it the same (enlarge the scale) as the orthophoto map ✓✓
Adjust the scale of the orthophoto map to make it the same (reduce the scale) as the topographic map ✓✓
Adjust the scale of the orthophoto map and the topographic map to a common scale ✓✓ (2)
[Any ONE] (1 x 2)

4.3 Refer to the topographic map and orthophoto map. The statistics below refer to selected suburbs in Pietermaritzburg and the percentage (%) increase in crime levels from 2015 to 2016.

PERCENTAGE (%) INCREASE IN CRIME LEVELS			
TYPE OF CRIME	**SUBURBS**		
	Townhill **(F7)**	Mountain Rise **(F1)**	Plessislaer **(I6)**
Housebreaking	18,6%	11,3%	23,4%
Car hijacking	100%	177,8%	36,4%

[Adapted from SAPS crime statistics 2015–16 by Theuns Kruger, Graphic 24]

4.3.1 Name ONE way in which the data above could have been collected.

Information from police station ✓
Surveys/Questionnaires/interviews/fieldwork ✓
National crime stats ✓
Statistics SA/Census ✓
Internet ✓ (1)
[Any ONE] (1 x 1)

4.3.2 Is the information in the table above primary data or secondary data?

Secondary data ✓ (1 x 1) (1)

4.3.3 Which type of crime has shown the highest percentage increase in these suburbs?

Car hijacking ✓ (1 x 1) (1)

4.3.4 Explain why it is important for the well-being of the community of Pietermaritzburg to analyse these statistics.

It can assist with identifying the frequency of crime ✓✓
It can help police with regard to the deployment of officers ✓✓
Identify crime hotspots ✓✓
Implement strategies/possible solutions such as a neighbourhood watch/crime protection forums ✓✓
Deployment of police ✓✓
Develop precautionary measures/security to improve safety (accept examples) ✓✓
It can help insurance companies to correctly validate their crime related insurance policies ✓✓
To help prospective property buyers to identify crime hotspots ✓✓
Important to analyse statistics to put contingency plans in place ✓✓
Identification of patterns and trends to catch perpetrators ✓✓
Crime preventions can focus on the more prevalent (common) type of crimes ✓✓
To determine which time of day crime is the highest and lowest ✓✓
[Any TWO]   (2 x 2)   (4)
                                                                         [15]

                                                          TOTAL: 75