basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

GEOGRAPHY P2

FEBRUARY/MARCH 2018

MARKING GUIDELINES

MARKS: 75

These marking guidelines consist of 12 pages.

RESOURCE MATERIAL

1.   An extract from topographical map 2627CD PARYS.

2.   Orthophoto map 2627 CD 19 PARYS.

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 topographical map (2627CD PARYS) and an orthophoto map (2627 CD 19 PARYS) 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 use supplied formulae, where applicable. Marks will be allocated for these.

7.   Indicate the correct unit of measurement in the final answer of calculations. NO marks will be allocated for answers with incorrect units.

8.   You may use a non-programmable calculator and a magnifying glass.

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

10.   The following English terms and their Afrikaans translations are shown on the topographical map:

ENGLISH	**AFRIKAANS**
Aerodrome	Vliegveld
Caravan Park	Karavaanpark
Diggings	Uitgrawings
Golf Course	Gholfbaan
Gap	Poort
Holiday Resort	Vakansieoord
Island	Eiland
Purification Plant	Watersuiweringsaanleg
River	Rivier
Sewage Works	Rioolwerke
Woodlands	Beboste Gebied

GENERAL INFORMATION ON PARYS

Parys is a town in the Free State in South Africa. It is located on the banks of the Vaal River approximately 115 km south of Johannesburg. The completion of the railway line to Parys in 1905 suddenly made Parys more accessible to the public and this, in turn, led to the growth of the town as a holiday resort and industrial centre. Many artists have settled in the town and the variety of new, interesting shops and attractions make it the ideal breakaway from Gauteng and other big centres. Parys lies within the Vredefort Dome World Heritage Site. The Vredefort Crater is the largest verified impact crater on Earth. The Vredefort Dome was added to the list of UNESCO World Heritage Sites for its geological interest.

Coordinates: 26°54'S 27°27'E

[Adapted from http://en.wikipedia.org/wiki/Parys, South Africa, Freestate]

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1 : 50 000 topographical map (2627CD PARYS), 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 provincial border found on the topographical map separates the Free State and …

    A   Northern Cape.
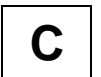   B   Gauteng.
    C   KwaZulu-Natal.
    D   Mpumalanga.

        ⊠
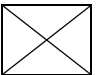
1.2   The topographical map index south-east of Parys is …

    A   2727AB.
    B   2727AD.
    C   2627DC.
    D   2727BA.

        D
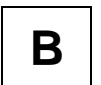
1.3   The difference in height between trigonometrical station 99 and spot height 1532 in block **B9** is … metres.

    A   1 433
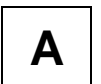   B   1 685,3
    C   153,3
    D   1 532

        C

1.4   The true bearing of the windpump in block **F4** from spot height 1474 in block **E6** is …

    A   120°
    B   240°
    C   60°
    D   200°

        B

1.5   The general direction in which the non-perennial stream flows in block **J8** is …

    A   south.
    B   east.
    C   north.
    D   west.

        A

1.6   The grid reference/coordinates of the excavations in block **J5** is …

    A   26°56'42"E 27°24'30"S/26°56,7'E 27°24,5'S.
    B   26°56'30"S 27°24'42"E/26°56,5'S 27°24,7'E.
    C   26°56'42"S 27°24'30"E/26°56,7'S 27°24,5'E.
    D   26°56'30"E 27°24'42"S/26°56,5'E 27°24,7'S.

        C
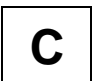
1.7   The area at **P** in block **H7** has a higher temperature than area **Q** in block **J3** due to the …

   A   artificial surfaces.
   B   aspect of slope.
   C   thermal belt.
   D   river's influence.

   A

1.8   The major primary activity in the mapped area is …

   A   mining.
   B   forestry.
   C   fishing.
   D   farming.

   D

1.9   The landform indicated by line **8** on the orthophoto map is a …

   A   gorge.
   B   spur.
   C   valley.
   D   poort.

   B

1.10   The national highway (N1) becomes … Street where it passes through the town of Parys.

   A   Sciffier
   B   Allenby
   C   Breë
   D   Eike

   C

1.11   The man-made feature at **10** on the orthophoto map is a/an …

   A   mine dump.
   B   excavation.
   C   dam.
   D   quarry.

   B/D

1.12   The main reason for the linear-shaped settlement at **S** in block **I5** is the …

   A   road.
   B   fence.
   C   boundary.
   D   river.

   D

1.13   Parys can be regarded as a/an … settlement.

   A   mining
   B   gap
   C   educational
   D   bridge

   D

1.14   The drainage pattern in block **J3** is a … pattern.

    A   trellis
    B   dendritic
    C   rectangular
    D   radial

    B

1.15   Where the stream in block **J8** flows into the dam at **X**, it is a …-order stream.

    A   first
    B   second
    C   third
    D   fourth

    B

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

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

2.1   Calculate, in km², the area highlighted in RED on the topographical map, which indicates the area covered by the orthophoto map. Show ALL calculations. Marks will be awarded for calculations.

Formula: **Area = length × breadth**

= (9.9 ✓ cm x 0.5 km) (7.4 ✓ cm x 0.5 km) [9.8 – 10] [7.3 – 7.5]
= 4.95 ✓ km x 3.7✓ km [4.9 km – 5.0 km] [3.65 km – 3.75 km]
= 18.32 km² ✓
Range: [17.89 km² – 18.75 km²]   (5 x 1)   (5)

2.2   Refer to lines **11**–**12** on the orthophoto map, which loosely follow a hiking trail.

2.2.1   Calculate the average gradient between **11**–**12**. Show ALL calculations. Marks will be awarded for calculations.

Formula: $$\textbf{Gradient} = \frac{\textbf{vertical interval (VI)}}{\textbf{horizontal equivalent (HE)}}$$

VI	*= 1 400 m – 1 380 m*	*V*	*= 1 400 m – 1 380 m*
	= 20 m ✓		*= 20 m ✓*

HE = 10.3 cm ✓ x 100   **OR**   *HE* $= \dfrac{10.3\ cm\ \ x\ 10\ 000}{100}$

       = 1 030 m ✓   *= 1 030 m ✓*
       [Measurement range: 10.2 cm – 10.4 cm]
       [Distance range: 1 020 m – 1 040 m]

G   = $\dfrac{20}{1\ 030}$ ✓ (For correct substitution)   *G =* $\dfrac{20}{1\ 030}$ ✓

      = $\dfrac{1}{51.5}$ *=* $\dfrac{1}{51.5}$
      = 1 : 51.5/1 in 51.5✓   *= 1 : 51.5/1 in 51.5 ✓*

Range [1 : 51 – 1 : 52]   (5 x 1)   (5)

2.2.2   Give evidence from the orthophoto map to show that the average gradient calculated in QUESTION 2.2.1 is NOT a true reflection of the real landscape.

*The contour lines between **11** and **12** are not equally spaced/equal distance apart ✓*
The changes in the spacing between the contour lines show changes in the gradient ✓
*From **11** it starts of extremely gentle and thereafter it gets steeper as we move to **12**/Contour lines at **11** are far apart and close together at **12** ✓*
*Between **11** and **12** the slope is concave ✓*
 [Any TWO]   (2 x 1)   (2)

2.2.3   The hiking trail is recommended for novice (first-time) hikers. Give ONE reason evident in your answer to QUESTION 2.2.1 to support this statement.

The average gradient is gentle/not steep/1 : 51.5 ✓
For every 51.5 m moving forward you only rise by 1 m ✓
[Any ONE]   (1 x 1)   (1)

2.3   Refer to the information about the magnetic declination of Parys found on the topographical map.

2.3.1   Calculate the magnetic declination of Parys for 2018. Show ALL calculations. Marks will be awarded for calculations.

Difference in years: *2018 – 2011 = 7 years* ✓

Mean annual change: *2' W* ✓

Total change: *7 x 2' W = 14' W* ✓

Magnetic declination for 2018:   *18 °52' W +* ✓ *14' W*
                                  = 19 °06' West of True North ✓   (5 x 1)   (5)

2.3.2   Compare the magnetic declination for 2018 to the magnetic declination for 2011 and indicate which one is bigger.

2018 is bigger ✓
19^0 06'W is bigger than 18^0 52'W ✓
[Any ONE]   (1 x 1)   (1)

2.3.3   Give ONE reason for your answer to QUESTION 2.3.2.

The mean annual change is westwards ✓
The angle between the true and the magnetic north has increased since 2011 ✓
As the years increase, we add to the magnetic declination ✓
The mean annual change since 2011 must be added which makes it bigger ✓
[Any ONE]   (1 x 1)   (1)
                                                                                                 [20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1   Refer to block **B2**.

3.1.1   State the climatological factor that affected the location of the woodlands (plantation) in block **B2**

Aspect of slope/South facing slope ✓   (1 x 1)   (1)

3.1.2   Explain how the climatological factor stated in QUESTION 3.1.1 benefits the growth of the trees in the woodlands.

Less evaporation from the soil ✓✓
Soil moisture content is higher ✓✓
Less direct sunlight (shadow zone) ✓✓
Slope is cooler ✓✓
[Any TWO]   (2 x 2)   (4)

3.1.3   Evaluate how topography influenced the location of the woodlands in block **B2**.

Woodlands/plantations can be located on steep slopes ✓✓
The felling of trees can occur on steep slopes ✓✓
[Any ONE]   (1 x 2)   (2)

3.2   Refer to the meander and slopes **13** and **14** on the orthophoto map.

3.2.1   Name the slopes of meanders **13** and **14** respectively.

Slope 13: *Slip-off/convex/depositional slope* ✓

Slope 14 *Undercut/concave/erosional slope* ✓   (2 x 1)   (2)

3.2.2   Explain how slope **13** could have increased the size of Grooteiland.

*At slope **13**/the slip-off slope deposition occurred which has increased the size of Grooteiland* ✓✓
The constant building up of sediments on slope 13 ✓✓
[Any ONE]   (1 x 2)   (2)

3.2.3   Discuss why the geomorphological activity at slope **14** may cause the inhabitants of the settlements along the river to take precautionary measures to protect their properties in the future.

*At slope **14**/the undercut slope we have erosion/undercutting and the river bank is in danger of collapsing into the river* ✓ ✓   (1 x 2)   (2)

3.3   Refer to the street patterns at **P** and at **T** in blocks **H7** and **I9**.

   3.3.1   Name the predominant street patterns at **P** and **T**.

   P *Grid iron/Rectangular* ✓

   T: *(Planned) Irregular* ✓   (2)

   3.3.2   Would area **P** or area **T** experience more traffic congestion? Give a reason for your answer.

   Answer: ***T*** ✓

   Reason: *The accessibility in and out of **T** is limited* ✓✓
   *Only a few roads link area **T** to the surrounding areas* ✓✓
   Many roads intersecting over very short distances ✓✓
   *There are a more intersections in area **T*** ✓✓
   ***P** is more accessible* ✓✓
   *More roads linking area **P** to the surrounding areas* ✓✓
   Roads intersecting over greater distances with one another ✓✓
   *There are fewer intersections in area **P*** ✓✓
   [Any ONE]   (1 + 2)   (3)

3.4   Refer to blocks **E1**, **F1** and **F2** on the topographical map. Explain the role of the trees found along the banks of the Vaal River.

   The trees stabilise the river banks ✓✓
   Trees trap soil and prevent soil erosion ✓✓
   The trees assist in the development of a levee which reduces flooding ✓✓
   The trees act as a buffer zone ✓✓
   Creates shade for camping, fishing, picnicking, etc. ✓✓
   Windbreak to protect cultivated lands ✓✓
   [Any ONE]   (1 x 2)   (2)

3.5   The Vredefort Dome and Crater are tourist attractions associated with the town of Parys. Evaluate the positive economic impact of the Vredefort Dome and Crater on the economy of Parys.

   It is a World Heritage Site which will bring international tourists to the area and this will increase the business in Parys ✓✓
   Tourism and an increase in business (accept examples) will increase employment opportunities ✓✓
   The farmers will benefit because they will provide more farming products to the hospitality industry ✓✓
   The buying power and standard of living of the local people will improve because they earn more money ✓✓
   There will be an increase in the accessibility due to the development of infrastructure ✓✓
   Will give Parys international recognition, bringing in more foreign investment ✓✓
   [Any TWO]   (2 x 2)   (4)

3.6   Refer to industrial area **U** in block **I8**.

    3.6.1   Is industrial area **U** a heavy or light industrial zone?

        Heavy ✓   (1 x 1)   (1)

    3.6.2   Give ONE reason for your answer to QUESTION 3.6.1.

        It is near the bulk transport/railway line ✓
        (Less pollution) on the outskirts of the town ✓
        It is situated on flat land ✓
        There is sufficient space for expansion ✓
        It is situated near the low income area for labour supply ✓
        Situated close to the market ✓
        Close to power source/electricity line ✓
        Close to raw material/diggings ✓
        [Any ONE]   (1 x 1)   (1)
                                                                                   [25]

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.1   Refer to the protected area in block **H7**.

    4.1.1   Is the process during which an area is demarcated known as data
           layering or buffering?

        Buffering ✓   (1 x 1)   (1)

    4.1.2   Give reasons, evident on the topographical map, for the location of the
           protected area.

        It forms a buffer between the sewerage works and the built up area at
        W ✓✓
        It forms a buffer between the bad odours of the sewerage works and
        the built up area at ***W*** ✓✓
        It forms a buffer between the built up area at ***W*** *and the cemetery/ It*
        forms a buffer between the built up area at ***W****, which can be noisy and*
        the cemetery ✓✓
        Prevents urban sprawl into the rural-urban fringe ✓✓
        [Any TWO]   (2 x 2)   (4)

4.2   Attribute data provides useful information in a GIS.

    4.2.1   Define the term *attribute data*.

        It is descriptive information of any feature/object ✓
        [Concept]   (1 x 1)   (1)

4.2.2 Discuss TWO attributes that influenced the location of the hospital in block **G9**.

It is near the arterial route making it more accessible ✓✓
It is on the outskirts of the city/in the rural urban fringe where it is relatively quiet ✓✓
It is built on flat land and there is space for further expansion ✓✓
[Any TWO]   (2 x 2)   (4)

4.3 Refer to the orthophoto map.

4.3.1 The orthophoto map has a medium resolution. Does this mean that the orthophoto map has a high level of clarity?

No ✓   (1 x 1)   (1)

4.3.2 Explain your answer to QUESTION 4.3.1.

Fewer pixels have been used thus the orthophoto map is not very clear ✓✓
The features on the orthophoto map are not very clear/fuzzy ✓✓
[Any ONE]   (1 x 2)   (2)

4.3.3 Suggest ways in which data manipulation can improve the quality of the orthophoto map.

Making it lighter so features can be identified ✓✓
Making it smaller so features can be clearer ✓✓
Add more descriptive labels ✓✓
Making the image sharper in order to make it clearer ✓✓
[Any ONE]   (1 x 2)   (2)

[15]

TOTAL: 75