basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS

GEOGRAPHY P2

2017

MARKING GUIDELINES

MARKS: 75

TIME: 1½ hours

These marking guidelines consist of 11 pages.

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1: 50 000 topographical map (2824DB KIMBERLEY), 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   Kimberley is a … town.

         A   farming
         B   mining
         C   recreation
         D   dormitory

                               B

1.2   2824 of the map index 2824DB indicates the …

         A   longitude and latitude.
         B   latitude and longitude.
         C   minutes south and minutes east.
         D   minutes east and minutes south.

                               B

1.3   The map index/reference of the orthophoto map to the north-east of Kimberley is …

         A   2824 DB 21.
         B   2824 DB 20.
         C   2824 DB 22.
         D   2824 DB 17.

                               D

1.4   The cultivated land in block **G9** is situated in …

         A   the Western Cape.
         B   the Free State.
         C   the Northern Cape.
         D   North West

                               B

1.5   The direction of **1** from **2** on the orthophoto map is …

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

                               A

1.6   The actual distance of the arterial road from **K** in block **I8** to **L** in block **H9** is … kilometres.

         A   415
         B   41,5
         C   4,15
         D   0,415

                               C

1.7   The feature found at grid reference 28°36'54"S 24°51'30"E/28°36.9'S 24°51.5'E is/a …

         A   hiking trail.
         B   windmill.
         C   open space.
         D   cultivated land.

                                                                                 D

1.8   The closest town west of Kimberley is …

         A   Barkly West.
         B   Beaconsfield.
         C   Hopetown.
         D   Douglas.

                                                                                 A/D

1.9   The race course found in blocks **I5** and **I6** is located in the …

         A   industrial zone.
         B   residential zone.
         C   rural-urban fringe.
         D   commercial zone.

                                                                                 C

1.10   Feature **3** on the orthophoto map is a …

         A   shopping centre.
         B   factory.
         C   church.
         D   school.

                                                                                 A

1.11   Recreational area **1** on the orthophoto map is used for …

         A   horse racing.
         B   athletics.
         C   swimming.
         D   polo.

                                                                                 B

1.12   Line feature **5** on the orthophoto map is a …

         A   national route.
         B   main road.
         C   arterial route.
         D   secondary road.

                                                                                 C

1.13   Area **M** on the topographic map indicates a …

         A   shopping mall.
         B   heavy industrial area.
         C   light industrial area.
         D   outlying business district.

                                                                                 B/C

1.14   The water supply source in block **J8** is a …

   A   dam.
   B   river.
   C   windmill.
   D   furrow.

   C

1.15   The dominant settlement pattern in block **D2** is …

   A   clustered/nucleated.
   B   dispersed/isolated.
   C   circular.
   D   linear.

   B

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

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

2.1   State the direction in which the height is decreasing between trigonometrical station 91, in block **A3**, and spot height 1176, in block **A2**. Give a reason for your answer.

Linked   Answer: *Northwest/North North West* ✓

          Reason: *The height of trigonometrical station 91 is 1185.4 m and the height of the spot height is 1176 m* ✓   (1 + 1)   (2)

2.2   Is the race course in block **I6** visible from the diggings at **P** in block **J4**? Give a reason for your answer.

          Answer: *No/It is not visible* ✓

Linked

          Reason *There is an obstruction/mine dump between the Race Course and the diggings* ✓
                 Trigonometrical station 96 is located between the Race Course and the diggings/shows higher lying ground in between ✓
                 [Any ONE]   (1 + 1)   (2)

2.3   Refer to demarcated area **4** on the orthophoto map. Calculate the surface area of area **4** in km². Indicate the unit of measurement in your final answer. Show ALL calculations. Marks will be awarded for calculations.

Formula: **Area = length (L) x breadth (B)**

Length   = 8 ✓ cm x 0.1 = 0.8 km   Range: 0.79 km–0.81 km (7.9 – 8.1)

Breadth = 4 ✓ cm x 0.1 = 0.4 km   Range: 0.39 km–0.41 km (3.9 – 4.1)

Area   = 0.8 ✓ km x 0.4 ✓ km

*   = 0.32 km² ✓   Range: 0.31 km² – 0.33 (0.3321) km²*

[Accept other formulas to calculate length and breadth. If the unit is not given in the final answer, NO marks will be awarded for the final answer.]   (5 x 1)   (5)

2.4   Refer to trigonometrical station 76 in block **D5** and spot height 1163 in block **F2**.

2.4.1   Determine the magnetic bearing of spot height 1163 from trigonometrical station 76 for 2017. The magnetic declination of Kimberley for 2017 is 20°17' West of True north.

Formula:
Magnetic bearing = true bearing + magnetic declination

228° ✓ + 20°17' = 248°17' ✓
Range: 227° - 229° (true bearing)
247°17' - 249°17' (magnetic bearing)   (2 x 1)   (2)

2.4.2   Why is the magnetic declination important in determining the current magnetic bearing?

The magnetic declination either changes eastwards or westwards over time/each year ✓
We need the correct magnetic declination in order to get the correct current magnetic bearing ✓   (2 x 1)   (2)

2.5   Refer to line **N** which runs from spot height 1171 in block **B1** to the contour line in block **B4**.

   2.5.1   Calculate the average gradient between spot height 1171 and the contour line. Indicate the unit of measurement in your final answer. Show ALL calculations. Marks will be awarded for calculations.

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

   VI = 1 200 m – 1 171 m = 29 ✓ m
   HE = 7.9 ✓ (7.8-8.0) cm x 500 m = 3 950 ✓ m | *7.9 cm x 0.5 km = 3.95 km*
   Range: 3 900 m to 4 000 m | *3.95 x 1 000 = 3 950 m*
   Gradient = 29
   3 950 ✓ (mark allocated for accurate substitution)
   = 1
   136,21
   = 1 : 136,21 ✓
   Range: 1 : 134.48 to 1 : 137.93   (5 x 1)   (5)

   2.5.2   With the aid of the topographic map and your answer to QUESTION 2.5.1, explain why it would be easy to construct transport routes in this area.

   Contours lines are very far apart ✓
   Gentle slope/ flat land/ gentle gradient ✓
   No obstructions evident ✓
   In this area for every 1 unit vertically the horizontal distance is
   136.21 /The average gradient is 1:136,21 ✓
   [Any TWO]   (2 x 1)   (2)
                                                                                [20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1   Give evidence from the topographic map that indicates that Kimberley has a
        low rainfall.

        Non-perennial water ✓
        Non-perennial rivers ✓
        Dam ✓
        Irrigation being implemented/wind pump ✓
        Furrows to transport water ✓
        Sparse vegetation ✓
        Limited agricultural activity ✓
        Reservoirs ✓
        Dry pan visible on the map ✓
        [Any TWO]   (2 x 1)   (2)

3.2   Refer to land-use zone at **6** on the orthophoto map.

        3.2.1   Identify land-use zone **6**. Give a reason for your answer.

        Linked   Answer: *Central Business District (CBD)/ Commercial area* ✓

                  Reason: *Tall buildings in the area* ✓
                           *The Market Square and Town Hall are situated in area **4*** ✓
                           High building density ✓
                           Most accessible area ✓
                           *Historical buildings/Monument/Alexander Mcgregor
                           Memorial Museum* ✓
                           [Any ONE]   (2 x 1)   (2)

        3.2.2   The street pattern in the area around **6** on the orthophoto map is
                 unplanned irregular.

                 Give evidence from the area around **6** to prove the statement above.

                 The roads have been haphazardly (no order) arranged ✓✓
                 The roads have many intersections at different angles ✓✓
                 The roads have no focal point ✓✓
                 Maze of streets ✓✓
                 Plots are not regular in shape and size ✓✓
                 [Any ONE]   (1 x 2)   (2)

3.2.3   Explain why it is important to maintain a large recreational area
(**7** on the orthophoto map), close to the centre of Kimberley.

*The vegetation absorbs carbon (greenhouse gases) therefore
reduces temperature/ decreases the heat island effect* ✓✓
*The vegetation absorbs carbon therefore reduces the air pollution
from the factories in the area* ✓✓
Green areas create a buffer which reduces noise pollution ✓✓
It has an aesthetic appeal and encourages relaxation ✓✓
It maintains the biodiversity of the area ✓✓
Protects indigenous vegetation ✓✓
Habitat for animals/birdlife ✓✓
Attracts tourists ✓✓
[Any TWO]   (2 x 2)   (4)

3.3   Refer to the orthophoto map.

3.3.1   Was the aerial photograph used to produce the orthophoto map
taken between 10:00 and 11:00, or between 13:00 and 14:00? Give
a reason for your answer.

Answer: *Between 10:00 and 11:00* ✓

Linked   Reason: *The shadows from the high rise buildings fall to the
southwest* ✓ ✓   (1 + 2)   (3)

3.3.2   Why is it ideal to take these aerial photographs as close to midday
(12:00) as possible?

Shadows are limited/short ✓✓
Shadows do not hide features ✓✓
[Any ONE]   (1 x 2)   (2)

3.4   Refer to the De Beers Mine in block **J2**. Use both the topographic map and
the orthophoto map to answer the questions below.

3.4.1   Is the De Beers Mine an open-cast mine or a shaft mine?

Open cast ✓   (1 x 1)   (1)

      3.4.2   Discuss TWO negative social impacts that the type of mining mentioned in QUESTION 3.4.1, had on the people living in Kimberley.

Greater health risks/respiratory problems due to the mine dust and chemicals/polluted air affects the health of people ✓✓
People had to move or relocate as the mine/mine dumps expanded ✓✓
Acid mine drainage pollutes the groundwater which is used by people ✓✓
Sides of mines may collapse posing a danger for inhabitants ✓✓
Explosions in mine may cause damage/noise to nearby property/people ✓✓
Unsightly appearance of the open cast mine detracts from the aesthetic appeal of the area ✓✓
[Any TWO]   (2 x 2)   (4)

3.5   Refer to block **I10**.

      3.5.1   Identify the drainage pattern found in block **I10**.

Centripetal ✓   (1 x 1)   (1)

      3.5.2   Give a reason for your answer to QUESTION 3.5.1.

Streams flow from all directions into a (non-perennial) water source ✓✓   (1 x 2)   (2)

      3.5.3   Explain the impact that increased rainfall will have on the stream order of the streams in block **I10**.

The stream order will be higher/increase (if the rainfall increases) ✓   (1 x 2)   (2)
                                                  [25]

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.1   Which component of GIS is the orthophoto map?

        Data ✓   (1 x 1)   (1)

4.2   Answer the following questions with reference to data layering:

        4.2.1   Define the term *data layering*.

                  *It is the combination of different layers of information placed on top
                  of each other (in order to make it more useful)* ✓
                  [Concept]   (1 x 1)   (1)

        4.2.2   Name TWO data layers found in block **D2**.

                  Infrastructure ✓ *roads* ✓, *railway lines* ✓, *power lines* ✓, *hiking trail* ✓
                  National route ✓
                  Drainage ✓ *dam* ✓
                  Topography ✓ *Relief* ✓ *contour lines* ✓
                  Settlement ✓ *houses* ✓, *buildings* ✓
                  [Any TWO]   (2 x 1)   (2)

        4.2.3   Explain TWO advantages of data layering.

                  Different layers can be organised (for display) ✓✓
                  *Different layers can be linked to understand relationships between
                  features* ✓✓
                  Different layers can be compared between features ✓✓
                  Information can easily be manipulated ✓✓
                  *Information becomes more useful towards sorting/analysing a
                  specific query/decision* ✓✓
                  [Any TWO]   (2 x 2)   (4)

4.3   Refer to block **G2**.

        4.3.1   Is the information represented in block **G2** raster data or
                  vector data?

                  Vector ✓   (1 x 1)   (1)

        4.3.2   Name the dominant polygon (area) feature in block **G2**.

                  Kamfersdam Golf Course/ Golf Course /Kamfersdam ✓   (1 x 1)   (1)

4.3.3   Name ONE attribute of the polygon (area) feature, mentioned in QUESTION 4.3.2.

Kamfersdam/Golf Course ✓
Name of the golf course/Kamfersdam ✓
A grassed area ✓
Club house ✓
Drainage and watering from the reservoir ✓
Area covered in km²/m²/size ✓
Membership information ✓
Type of vegetation and animal life ✓
Names of transport routes nearby ✓
The number of holes on the golf course ✓
Recreational area ✓
[Any ONE]   (1 x 1)   (1)

4.4   A businessman wants to build a shopping centre at **O** in block **J3**. Explain how the businessman can use GIS to determine if the site at **O** is suitable for the building of the proposed shopping centre.

The future growth of the city in the direction of the shopping centre ✓✓
The topography of the surrounding area for future expansion ✓✓
Accessibility of the site/Availability of transport/roads/rail ✓✓
The drainage/geology appropriate in the area ✓✓
The type and amount of products the market requires ✓✓
Crime rate in the area ✓✓
The demographic structure (economic status/size/age structure/sex) of the surrounding area ✓✓
The size of the population/market of the area ✓✓
[Any TWO]   (2 x 2)   (4)
                                                                                [15]

                                                                   TOTAL: 75