PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. Write your examination number in the appropriate blocks provided above.

2. This question paper consists of 16 pages, a topographic map and a Colour Insert of one page (i). Please check that your paper is complete.

3. Read the questions carefully.

4. Answer ALL the questions in the spaces provided on the question paper.

5. Carefully study the 1:50 000 topographic map extract 2428CD BELA-BELA and the accompanying aerial photograph sheet (Photograph 2 of the Colour Insert) before answering the questions.

6. The topographic map has grid lines with markings A to G and 1 to 11 that may be used to identify locations according to blocks.

7. The topographic map extract, aerial photograph and your completed question paper must be handed to the invigilator at the end of the examination. The maps and photos may be retained by the school for future use.

8. On page 2 there is a glossary of words. This will help you understand what the words in bold in the questions are asking you to do. There is also an English-Afrikaans translation of some words appearing on the map.

9. A magnifying glass and calculator may be used.

10. It is in your own interest to write legibly and to present your work neatly.

11. You may use the back page for rough work. No marks will be allocated to rough work.

FOR MARKER’S USE ONLY

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks</td>
<td>25</td>
<td>24</td>
<td>35</td>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td>Obtained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Glossary of terms**

<table>
<thead>
<tr>
<th>WORD</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account for</td>
<td>To justify, and provide reasons for something, using a short explanation.</td>
</tr>
<tr>
<td>Calculate</td>
<td>To work out the value of something using a mathematical method.</td>
</tr>
<tr>
<td>Classify</td>
<td>To arrange in categories or groups according to shared qualities.</td>
</tr>
<tr>
<td>Compare</td>
<td>To estimate, measure, or note the similarity or dissimilarity between things.</td>
</tr>
<tr>
<td>Demonstrate</td>
<td>To show that you understand something, to illustrate and explain (can give examples).</td>
</tr>
<tr>
<td>Describe</td>
<td>To say what something is like.</td>
</tr>
<tr>
<td>Design</td>
<td>To explain step-by-step a process or plan of action.</td>
</tr>
<tr>
<td>Discuss</td>
<td>To write about something in detail.</td>
</tr>
<tr>
<td>Draw</td>
<td>To create a picture.</td>
</tr>
<tr>
<td>Explain</td>
<td>To describe something so that it can be understood.</td>
</tr>
<tr>
<td>Give</td>
<td>To provide.</td>
</tr>
<tr>
<td>Identify</td>
<td>To give the details or characteristics of something.</td>
</tr>
<tr>
<td>Justify</td>
<td>To support an answer by giving reason, argument or evidence.</td>
</tr>
<tr>
<td>Match</td>
<td>To connect similar things or things that belong together.</td>
</tr>
<tr>
<td>Provide</td>
<td>To give.</td>
</tr>
<tr>
<td>Suggest</td>
<td>To put forward ideas, a plan or reasons.</td>
</tr>
<tr>
<td>Verify</td>
<td>To prove that something is true.</td>
</tr>
</tbody>
</table>

**Translation of words**

*English to Afrikaans*

<table>
<thead>
<tr>
<th>Caravan Park</th>
<th>Karavaanpark</th>
<th>Marsh, swamp or wetland</th>
<th>Vlei</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutline</td>
<td>Snylyn/ kaplyn</td>
<td>Mineral hot springs</td>
<td>Warmwaterbronne</td>
</tr>
<tr>
<td>Diggings</td>
<td>Delwerye</td>
<td>Mountain</td>
<td>Berg</td>
</tr>
<tr>
<td>Farm</td>
<td>Plaas</td>
<td>Nature Reserve</td>
<td>Wildtuin</td>
</tr>
<tr>
<td>Fountain/ spring</td>
<td>Fontein</td>
<td>Ridge</td>
<td>Rant</td>
</tr>
<tr>
<td>Furrow</td>
<td>Kanaal/Voor</td>
<td>River</td>
<td>Rivier</td>
</tr>
<tr>
<td>Game Reserve</td>
<td>Wildtuin</td>
<td>Road</td>
<td>Pad</td>
</tr>
<tr>
<td>Golf course</td>
<td>Gholfbaan</td>
<td>Sewerage works</td>
<td>Rioolwerke</td>
</tr>
<tr>
<td>Holiday resort</td>
<td>Vakansieoord</td>
<td>Stream</td>
<td>Spruit/ stroom</td>
</tr>
<tr>
<td>Landing strip</td>
<td>Landingstrook</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Bela-Bela meaning ‘the pot that boils’, derives its name from the geothermic hot springs around which the town was built. Bela-Bela was originally known as Warmbaths or Warmbad. Bela-Bela is a popular health and holiday destination attracting both local and foreign tourists. The town lies on the Springbok Flats, a fertile basin, dominated by agricultural activities, conservation and wildlife farming.

QUESTION 1 ATLAS USE, MAP ORIENTATION AND TECHNIQUES

1.1 Refer to the location map above, as well as the topographic map extract 2428CD BELA-BELA, to answer the following questions. Tick the correct box.

1.1.1 The neighbouring country labelled A on the location map above is …

- Botswana
- Lesotho
- Namibia
- Zimbabwe

1.1.2 The province labelled B on the location map above is …

- Free State
- Gauteng
- Mpumalanga
- North West

1.1.3 The map reference number for the map sheet to the north east of 2428CD BELA-BELA is …

- 2428CA
- 2428DA
- 2428DC
- 2429DA

[Adapted from: <www.warmbath.co.za> and <www.umbono.com>]
1.1.4 The road distance (km) to Mabula travelling along the R516 from point X (E3) is …

<table>
<thead>
<tr>
<th>Distance (km)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>

(2)

1.1.5 The approximate true bearing of trigonometrical beacon 65 (C2) from trigonometrical beacon 7 at Buyskop (C6) is …

<table>
<thead>
<tr>
<th>Bearing (°)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td></td>
</tr>
<tr>
<td>96</td>
<td></td>
</tr>
<tr>
<td>98</td>
<td></td>
</tr>
<tr>
<td>276</td>
<td></td>
</tr>
</tbody>
</table>

(2)

1.1.6 Refer to the topographic map extract 2428CD BELA-BELA and Figure 1 below.

Figure 1: Main communication links and drainage features, Bela-Bela, Limpopo
(a) In which general direction is the Moretele River draining at point Y on Figure 1?

_______________________________________________________  (2)

(b) Refer to the topographic map extract. **Verify** the statement that the Mineral Hot Springs in Bela-Bela (E3) are approximately 10 km from the N1.

_______________________________________________________  (2)

(c) The N1, R101 and R516 roads, as well as the railway links, generally follow straight routes. **Provide** map evidence to **suggest** what this tells us about the relief of the area.

_______________________________________________________  (2)

1.2 **Geographic techniques**

Refer to the topographic map extract 2428CD BELA-BELA to answer the questions. Tick the correct box.

1.2.1 The latitude reference of the ground sign \[ \text{G} \] in F4 is …

| 28º 18' 40" E |
| 28º 18' 40" S |
| 24º 54' 40" S |
| 24º 54' 40" E |

(2)

1.2.2 The mean magnetic declination for the topographic map extract 2428CD BELA-BELA in 2015 will be …

| 16º 35' W of True North |
| 16º 47' W of True North |
| 16º 23' W of True North |
| 16º 23' E of True North |

(2)

1.2.3 (a) There are several **cutlines** indicated on the mapped area (e.g. B2 and E6). **Draw** the correct map symbol for a cutline in the block below.

(1)
(b) Explain what a cutline is.

1.2.4 (a) The Waterberg range is sloping to the north (B3). Match this statement to the sketch cross section that represents the correct profile of the Waterberg on Bospoort farm (B3). Tick the correct option.

(b) (i) Is trigonometrical station 65 (C2) intervisible from spot height 1396 (B1)?

Tick the correct answer.

<table>
<thead>
<tr>
<th>YES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

(ii) Justify your answer to (i) above.

Justification: __________________________

Q1 subtotal
QUESTION 2   CLIMATE AND DRAINAGE OF THE AREA

2.1 Study Figure 2, a climate graph for Bela-Bela.

![Climate graph: Bela-Bela](Source: <www.en.climate-data.org>)

Figure 2: Climate graph: Bela-Bela

2.1.1 **Calculate** the approximate total annual rainfall (mm) for Bela-Bela.

__________________________________ mm  (2)

2.1.2 Given the above rainfall data (Question 2.1.1), **suggest** why there are many non-perennial rivers surrounding the Bela-Bela area.

_____________________________________________________________

_____________________________________________________________ (2)

2.1.3 **Calculate** the range (ºC) in the average annual temperature.

_________________________________________________________ ºC (2)
2.2 **Drainage of the area**

Refer to the topographic map extract 2428CD BELA-BELA.

2.2.1 **Identify** the dominant drainage pattern in B3-4.

_____________________________________________________________ (2)

2.2.2 Refer to B3 and C3. **Provide** evidence that **suggests** that water is critical to farming in the area.

- • __________________________________________________________
  __________________________________________________________

- • __________________________________________________________
  __________________________________________________________ (4)
2.3 **Flooding at Klein-Kariba Holiday Resort**

Refer to A5 and B5 on the topographic map extract 2428CD BELA-BELA, the Fact File and Photographs 1A and 1B below.

**FACT FILE**

The Klein-Karibo Holiday Resort is located in a beautiful gorge in the Waterberg Mountains. A variety of self-catering accommodation is offered and there is a supermarket, restaurant and 9-hole golf course. Hiking, game viewing and water sports are favourite activities.

In March 2014 two *flash floods* hit the resort, damaging the electricity and sewage systems, accommodation and entertainment areas.

The resort’s buildings had been built above the 100-year flood mark as required by law.

[Adapted from: <www.atkvkleinkariba.caravanparks.co.za> and <www.thebeat.linmedia.co.za>]

Photograph 1A: Flood damage at Klein-Kariba Holiday Resort  
Photograph 1B: The river in flood at Klein-Kariba Holiday Resort

[Source: Lessing, V, 2014]

2.3.1 **Give TWO characteristics of a flash flood.**

- ____________________________________________________________
- ____________________________________________________________

- ____________________________________________________________
- ____________________________________________________________ (4)
2.3.2 Using the flow diagram below, **demonstrate** your understanding of why a devastating flash flood occurred in *this* river gorge of Klein-Kariba. Complete the information on the flow diagram.

2.3.3 The Klein-Kariba Holiday Resort is being rebuilt after the floods. **Discuss** TWO recommendations you would make to the redevelopers and owners of the resort to avoid future flood damage.

- ____________________________________________________________
  ____________________________________________________________
  ____________________________________________________________
  ____________________________________________________________

- ____________________________________________________________
  ____________________________________________________________
  ____________________________________________________________
  ____________________________________________________________

(Q2 subtotal [24])
QUESTION 3 PHOTOGRAPH ANALYSIS, GIS CONCEPTS, RURAL AND URBAN LAND-USE

Refer to Photograph 2 below as well as the topographic map extract 2428CD BELA-BELA to answer the following questions. A colour image is provided in the Colour Insert. The area shown on Photograph 2 is marked by a black block on the topographic map extract 2428CD BELA-BELA.

Photograph 2: Land-use to the south of Bela-Bela

3.1 FOUR features (A – D) have been labelled on Photograph 2. Identify these features.

A _________________________________________

B _________________________________________

C _________________________________________

D _________________________________________ (8)
3.2 Refer to the topographic map extract 2428CD BELA-BELA.

3.2.1 The street pattern of Bela-Bela (Y in D3) is predominantly ... (Tick the correct option)

<table>
<thead>
<tr>
<th>Grid</th>
<th></th>
<th>Haphazard</th>
<th></th>
<th>Modern planned</th>
<th></th>
<th>Radial</th>
<th></th>
</tr>
</thead>
</table>

(2)

3.2.2 The farming activity at Welgelee (F6-7) is … (Tick the correct option)

<table>
<thead>
<tr>
<th>Extensive</th>
<th></th>
<th>Intensive</th>
<th></th>
<th>Plantations</th>
<th></th>
<th>Orchards/ vineyards</th>
<th></th>
</tr>
</thead>
</table>

(2)

3.2.3 **Provide** ONE reason why Bela-Bela is classified as a central place town.

________________________________________________________________________
________________________________________________________________________

(2)

3.3 Refer to the topographic map extract 2428CD BELA-BELA as well as Photograph 2 on page 11/ page (i) of the Colour Insert. There are numerous agricultural small holdings to the west of the Aventura Warmbad Game Reserve (E1-2, F1-2, G1-2).

3.3.1 In which land-use zone are these small holdings found?

________________________________________________________________________

(1)

3.3.2 **Account for** the location of these small holdings.

- _______________________________________________________________________
- _______________________________________________________________________
- _______________________________________________________________________
- _______________________________________________________________________

(4)
3.4 3.4.1 Study the Aventura Warmbad Game Reserve (E2-3, F2-3, G2-3) and Sondela Nature Reserve (C8-11, D8-11, E8-11, F9-11, G9-10).

Complete Table 1 below to compare various features of the two reserves.

Table 1: Comparing Aventura Warmbad Game Reserve and Sondela Nature Reserve

<table>
<thead>
<tr>
<th>Features</th>
<th>Aventura Warmbad Game Reserve</th>
<th>Sondela Nature Reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amenities and/or facilities</td>
<td>____________________________</td>
<td>_______________________</td>
</tr>
<tr>
<td></td>
<td>____________________________</td>
<td>_______________________</td>
</tr>
<tr>
<td>Recreational activities</td>
<td>____________________________</td>
<td>_______________________</td>
</tr>
<tr>
<td></td>
<td>____________________________</td>
<td>_______________________</td>
</tr>
<tr>
<td>Access to the freeway (N1)</td>
<td>____________________________</td>
<td>_______________________</td>
</tr>
<tr>
<td></td>
<td>____________________________</td>
<td>_______________________</td>
</tr>
</tbody>
</table>

3.4.2 Circle the correct underlined answer in the statements below.

(a) The information you have entered in Table 1 above is referred to as raster/attribute/spatial data. (2)

(b) The area within the boundary of Sondela Nature Reserve forms a point/line/polygon data set. (2) [35]

Q3 subtotal
QUESTION 4 ECONOMIC ACTIVITIES

Study the Fact File below.

FACT FILE
Umbono Mining is currently conducting an Environmental Impact Assessment of the Springbok Flats, an area shown on Figure 1 (page 4). The coalfield to be fracked is a remnant of the main Karoo basin. The area is dominated by maize, sorghum, cotton, sunflower and cattle farming activities as well as a variety of conservation and wildlife farming activities such as game farms, tourist lodges and hunting operations.

There are a number of major holiday resorts in the area such as Bela-Bela Forever and ATKV Klein Kariba, many game farms, a few golf estates and nature reserves such as Sondela. Industry and mining are not significant in the area.

[Source: <www.umbono.com>]

4.1 **Classify** the type of economic activity that is taking place at:

Towoomba Research Farm (F5, 6).  _____________________________________  (2)

4.2 **Describe** TWO advantages of the proposed coal mining (fracking) for the area.

• __________________________________________________________________________

• __________________________________________________________________________  (4)

4.3 Various stakeholders have met at several public meetings and are against fracking occurring in the area.

**Design** a PowerPoint presentation to persuade the mining company not to go ahead with the proposed mining.

**Slides should include:**

• Impact on game/ nature reserves
• Impact on agriculture
• Impact on water (surface and ground)

You will be marked on the geographical content and concepts of your slides. You must make specific reference to places that will be affected (block/ grid references).

Use relevant points and suitable titles or subtitles on your slides (on page 15).

**Marking rubric for presentation**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Maximum marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevant geographical points or factors:</td>
<td></td>
</tr>
<tr>
<td>• Reference to location is important; it may include a map</td>
<td>6</td>
</tr>
<tr>
<td>• Factors not favourable to mining in the area – use of specific subheadings provided</td>
<td></td>
</tr>
<tr>
<td>• 3 slides</td>
<td></td>
</tr>
<tr>
<td>Title slide</td>
<td>2</td>
</tr>
<tr>
<td>Overall presentation</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

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POWERPOINT PRESENTATION

Slide 1  (Title)

Slide 2  Impact on game/ nature reserves

Slide 3  Impact on agriculture

Slide 4  Impact on water (surface and ground)

Q4 subtotal

Total: 100 marks
Rough work (Not for marks)