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**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2021

GEOGRAPHY P1

MARKS: 150

TIME: 3 hours

This question paper consists of 11 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of THREE questions.
2. All diagrams are included in the ANNEXURE.
3. Where required, illustrate your answers with labelled diagrams.
4. Leave a line between subsections of questions answered.
5. Start EACH question at the top of a NEW page.
6. Number the questions correctly according to the numbering system used in this question paper.
7. Do NOT write in the margins of the ANSWER BOOK.
8. In SECTION B you are provided with a 1 : 50 000 topographical map (2329 BB LOUIS TRICHARDT) and an orthophoto map of a part of the mapped area.
9. Show ALL calculations, marks will be allocated for these.
10. The unit of measurement must be given in the final answer where applicable, for example 10 km, 4 °C, east.
11. You may make use of a non-programmable calculator and a magnifying glass.
12. The area demarcated in RED/BLACK on the topographical map represents the area covered by the orthophoto map.
13. Write neatly and legibly.

SECTION A: CLIMATOLOGY AND GEOMORPHOLOGY**QUESTION 1**

- 1.1 Choose a term in COLUMN B that matches a description in COLUMN A. Write only the letter (A–H) next to the question numbers (1.1.1 to 1.1.7) in the ANSWER BOOK, for example.1.1.8 I.

| COLUMN A | | COLUMN B | |
|----------|---|----------|----------------|
| 1.1.1 | Angle at which the sun's rays strikes the earth | A | heat island |
| 1.1.2 | Air rises up the valley slopes during the day | B | katabatic |
| 1.1.3 | Cold air from the easterly winds meet warm air from the westerly winds | C | polar front |
| 1.1.4 | High humidity and cloudless nights promotes the formation of this form of precipitation | D | aspect |
| 1.1.5 | Forms when a trough of low pressure develops over the interior | E | frost pocket |
| 1.1.6 | This wind forms at night due to the cooling of the earth's surface | F | radiation fog |
| 1.1.7 | May form on the valley floor if dew point temperature drops below 0 °C | G | anabatic |
| | | H | moisture front |

(7 x 1) (7)

1.2 Refer to FIGURE 1.2 showing the formation and characteristics of a tropical cyclone. Match the descriptions below with sketches A, B and C. Write only the letter A, B or C next to question numbers (1.2.1 to 1.2.8) in the ANSWER BOOK, for example, 1.2.9 B.

1.2.1 Cirrus and cumulus clouds produce light rain

1.2.2 Column of low pressure develops in the centre

1.2.3 Latent heat is released from the cooling air

1.2.4 Towering cumulonimbus clouds are evident around the eye

1.2.5 Tropical cyclone reaches up to 100 km in diameter

1.2.6 Pressure in the eye drops to below 1 000 hPa

1.2.7 Water evaporates from warm tropical oceans

1.2.8 Diameter of tropical cyclone extends up to 500 km (8 x 1) (8)

1.3 FIGURE 1.3 shows a synoptic weather map of Southern Africa.

1.3.1 State the isobaric interval on the synoptic weather map. (1 x 1) (1)

1.3.2 How does the location of anticyclones **A** and **B** suggest that this synoptic weather map is depicting winter? (1 x 2) (2)

1.3.3 Account for the lack of precipitation on the eastern half of this synoptic weather map during winter. (1 x 2) (2)

1.3.4 Weather system **C** is a mid-latitude cyclone in the occlusion stage.

(a) In which direction is the mid-latitude cyclone moving? (1 x 1) (1)

(b) Name the type of occlusion evident on this synoptic weather map. (1 x 1) (1)

(c) Discuss the formation of this type of occlusion (answer to QUESTION 1.3.4 (b)). (2 x 2) (4)

(d) Explain why the wind direction and precipitation will change, when the occlusion reaches Cape Town in the next 48 hours. (2 x 2) (4)

1.4 FIGURE 1.4 shows the development of berg winds.

- 1.4.1 Give evidence from the diagram that suggests that the berg wind blows from the interior to the coast. (1 x 1) (1)
- 1.4.2 Why do berg winds mostly affect the coast of South Africa in winter? (1 x 2) (2)
- 1.4.3 Describe the role that the coastal low plays in the formation of berg winds. (2 x 2) (4)
- 1.4.4 In a paragraph of approximately EIGHT lines, explain the negative impact of berg winds on the environment. (4 x 2) (8)

1.5 FIGURE 1.5 shows a pollution dome.

- 1.5.1 Give TWO reasons why pollution domes are common in most cities. (2 x 1) (2)
- 1.5.2 Give evidence from the diagram that suggests that this pollution dome is occurring at night. (1 x 1) (1)
- 1.5.3 Suggest a reason why pollution domes are more concentrated at night. (1 x 2) (2)
- 1.5.4 How do pollution domes increase temperature in a city? (1 x 2) (2)
- 1.5.5 Explain why the negative impact of pollution domes on people are greater in winter. (2 x 2) (4)
- 1.5.6 Provide sustainable strategies that can reduce the occurrence of pollution domes in our cities. (2 x 2) (4)

[60]

QUESTION 2

- 2.1 Choose a term in COLUMN B that matches the description in COLUMN A. Write only the letter (A–H) next to the question numbers (2.1.1–2.1.7) in the ANSWER BOOK, for example 2.1.8 I.

| COLUMN A | | COLUMN B | |
|-----------------|---|-----------------|--------------|
| 2.1.1 | A river that is characteristic of arid areas | A | groundwater |
| 2.1.2 | Forms a gentle convex shaped slope | B | episodic |
| 2.1.3 | High levels of erosion on the outer bend of the meander | C | stream order |
| 2.1.4 | Process of a watershed lowering its position | D | misfit |
| 2.1.5 | A stream that is too small for the valley within which it flows | E | undercut |
| 2.1.6 | The water table is always high in this type of river | F | slip-off |
| 2.1.7 | Method of classifying the size of drainage basins | G | permanent |
| | | H | abstraction |

(7 x 1) (7)

- 2.2 Refer to FIGURE 2.2 showing types of drainage patterns. Match the descriptions below with sketches A, B, C and D. Write only the letter A, B, C or D next to question numbers (2.2.1 to 2.2.8) in the ANSWER BOOK, for example 2.2.9 B.

- 2.2.1 Tributaries join at acute angles
- 2.2.2 Found in areas where volcanoes and domes occur
- 2.2.3 Main streams are parallel to each other
- 2.2.4 Forms on igneous rocks that have many joints
- 2.2.5 Main streams have 90° bends along its course
- 2.2.6 Rivers flow away from a central point
- 2.2.7 Forms in areas of alternate layers of hard rock and soft rock
- 2.2.8 Occurs in rocks that have a uniform resistance to erosion (8 x 1) (8)

2.3 Study FIGURE 2.3 which illustrates river rejuvenation.

- 2.3.1 State ONE cause of river rejuvenation. (1 x 1) (1)
- 2.3.2 Describe the process of river rejuvenation. (1 x 2) (2)
- 2.3.3 Refer to landform feature **A**.
- (a) How does rejuvenation change the physical characteristics of feature **A**? (1 x 2) (2)
- (b) Explain how the changed characteristics of feature **A** will influence the construction of a bridge at this point of the river. (1 x 2) (2)
- 2.3.4 Describe how rejuvenation changed the grade of the river. (1 x 2) (2)
- 2.3.5 What is the significance of the knickpoint on the sketch? (1 x 2) (2)
- 2.3.6 Explain how the knickpoint can change due to river rejuvenation. (2 x 2) (4)

2.4 FIGURE 2.4 shows a floodplain.

- 2.4.1 In which course of the river is the floodplain likely to have formed? (1 x 1) (1)
- 2.4.2 Give evidence from FIGURE 2.4 to support your answer to QUESTION 2.4.1. (1 x 2) (2)
- 2.4.3 How does repeated flooding of the river contribute to increased levels of soil fertility on the floodplain? (2 x 2) (4)
- 2.4.4 Discuss TWO environmental benefits of a floodplain. (2 x 2) (4)
- 2.4.5 Explain the negative impact that heavy rainfall (flooding) can have on human activities on the floodplain. (2 x 2) (4)

2.5 FIGURE 2.5 is an extract on river management.

- 2.5.1 How many people depend on the Vaal River as indicated in the extract? (1 x 1) (1)
- 2.5.2 According to the extract, what is the cause of the untreated sewage entering the Vaal River? (1 x 1) (1)
- 2.5.3 What is the negative impact of untreated sewage on a river? (1 x 1) (1)
- 2.5.4 Discuss the importance of river management along a river catchment area. (2 x 2) (4)
- 2.5.5 In a paragraph of approximately EIGHT lines, suggest strategies that can be implemented to protect drainage basins from untreated sewage. (4 x 2) (8)
- [60]**

SECTION B: GEOGRAPHICAL SKILLS AND TECHNIQUES

The questions below are based on the 1 : 50 000 topographical map 2329 BB LOUIS TRICHARDT, as well as the orthophoto map of a part of the mapped area.

QUESTION 3**MAPWORK SKILLS AND CALCULATIONS**

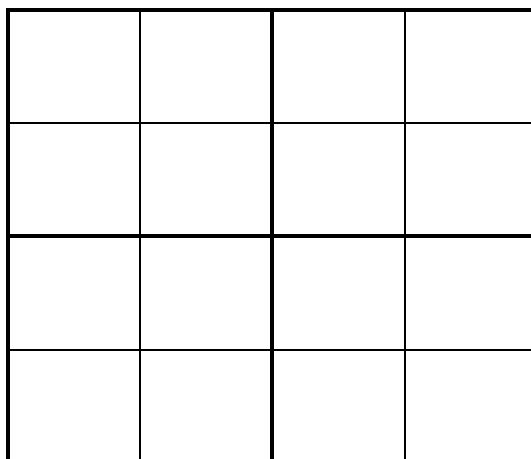
3.1 Co-ordinates for Louis Trichardt are 2329BB.

3.1.1 In the map index of 2329BB, the 29 represents ...

- A 29° south of the equator.
- B 29° west of the Greenwich Meridian.
- C 29° north of the equator.
- D 29° east of the Greenwich Meridian. (1 x 1) (1)

3.1.2 Redraw the grid below in your ANSWER BOOK and indicate the following on the grid:

- (a) The map index position of Louis Trichardt (shade the area) (1 + 1) (2)
- (b) The co-ordinates for the map (1 + 1) (2)



3.2 Refer to blocks **E4** and **G4** on the topographical map.

Calculate the average gradient between trigonometrical beacon 96 (block **E4**) and spot height 932 (block **G4**). Show ALL calculations. Marks will be awarded for calculations. (5 x 1) (5)

MAP INTERPRETATION

3.3 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (3.3.1 to 3.3.2) in your ANSWER BOOK, for example 3.3.3 C.

3.3.1 The slope between **2** and **3** on the orthophoto map is a ... slope.

- A convex
 - B terrace
 - C gentle
 - D concave
- (1)

3.3.2 The area at **5** on the orthophoto map has a lower temperature than area **4** on the orthophoto map due to the ...

- A aspect of slope.
 - B artificial surfaces.
 - C thermal belt.
 - D river's influence.
- (1)

3.4 Refer to the suburb Tshikota, situated in block **F5** on the valley floor, on the topographical map.

3.4.1 Is the local wind responsible for the cool conditions experienced in Tshikota at night-time, an *anabatic* or *katabatic wind*? (1 x 1) (1)

3.4.2 Why does this local wind, named in QUESTION 3.4.1, result in a high concentration of pollution in Tshikota at night? (1 x 2) (2)

3.4.3 With specific reference to the topographical map, what has helped the Tshikota local government (municipality) to reduce the high concentration of pollution in the area? (1 x 2) (2)

3.5 Refer to the non-perennial river **7** in block **A3** on the orthophoto map.

3.5.1 In which direction does this non-perennial river, at **7**, flow? (1 x 1) (1)

3.5.2 Explain TWO reasons for your answer to QUESTION 3.5.1 by providing both orthophoto and topographical map evidence. (2 x 2) (4)

GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

3.6 Louis Trichardt is in the Soutpansberg area where geologists are conducting research and collecting data regarding the impact of deforestation on an on-going basis.

- | | | | |
|-------|--|---------|-------------|
| 3.6.1 | Define the term <i>data</i> in GIS. | (1 x 2) | (2) |
| 3.6.2 | Is the data that is collected by geologists considered to be <i>primary</i> or <i>secondary</i> data? | (1 x 1) | (1) |
| 3.6.3 | Provide the topographic map data layer that will inform geologists regarding deforestation. | (1 x 1) | (1) |
| 3.6.4 | Refer to the dam at 8 on the orthophoto map. What information can geologists gather from this layer, regarding the influence of deforestation on the dam. | (2 x 2) | (4) |
| | | | [30] |

GRAND TOTAL: 150