KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P1

PREPARATORY EXAMINATION

SEPTEMBER 2021

MARKS: 150

TIME: 3 hours

This question paper consists of 12 pages.

Copyright Reserved

INSTRUCTIONS AND INFORMATION

1. This question paper consists of THREE questions:

   SECTION A

   QUESTION : 1 CLIMATE and WEATHER (60 MARKS)

   QUESTION : 2 GEOMORPHOLOGY (60 MARKS)

   SECTION B

   QUESTION : 3 MAP SKILLS AND CALCULATIONS (30 MARKS)

2. Answer ALL THREE questions in the answer book provided.
3. ALL diagrams are included in the ANNEXURE.
4. Leave a line open between subsections of questions answered.
5. Start EACH question at the top of a NEW page.
6. Number your answers correctly according to the numbering system used in this question paper.
7. Do NOT write in the margins of your ANSWER BOOK.
8. Where possible, illustrate your answers with labelled diagrams.
9. Write clearly and legibly.
10. You may use a magnifying glass.
11. The unit of measurement must be given in the final answer, where applicable, e.g. 10km, 4°C, east.

Copyright Reserved

SECTION B

QUESTION : 3 MAP SKILLS AND CALCULATIONS (30 MARKS)

INSTRUCTIONS AND INFORMATION

1. You are provided with a 1:50 000 topographical map (2527 CA RUSTENBURG (WEST) and an orthophoto map (2527 CA 15 TLHABANE) of a part of the mapped area.

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

3. Show ALL calculations and formulae, where applicable. Marks will be allocated for these.

4. Indicate the unit of measurement in the final answer of calculations.

5. You may use a non-programmable calculator.

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

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

Copyright Reserved

SECTION A

QUESTION 1: CLIMATE AND WEATHER

1.1 Refer to FIGURE 1.1 showing a cross section of a mid-latitude cyclone.

1.1.1 is the air warmer, at **A** or **B**?

1.1.2 Name the cloud type labelled **C**.

1.1.3 Identity the front labelled **D**.

1.1.4 State the intensity of the rainfall being experienced at **X** and **Y**.

1.1.5 State the general direction of movement of this system.

1.1.6 Name the wind that steers this weather system.

(7 x 1) (7)

1.2 Refer to FIGURE 1.2 showing a synoptic weather map.

1.2.1 Name the lines drawn on a synoptic weather map that depict (show) atmospheric pressure.

1.2.2 Determine the atmospheric pressure of the line labelled **A**.

1.2.3 Provide the name of the high pressure system labelled **B**.

1.2.4 State the air circulation around pressure system labelled **B.**

1.2.5 Give the general wind direction at station model labelled **C**.

1.2.6 Name of the low pressure system labelled **D**.

1.2.7 Name the season being depicted by the synoptic weather map.

1.2.8 The synoptic map illustrates winter conditions. State the name of the local wind associated with the relatively higher temperature of 20°C at **E**.

(8 x 1) (8)

Copyright Reserved

1.3 Refer to FIGURE 1.3 showing Hurricane **Delta.**

1.3.1 How many hurricanes preceded (occurred before) Hurricane Delta in 2020? (1 x 1) (1)

1.3.2 State two infrastructural damages caused by Hurricane Delta indicated in FIGURE 1.3. (2 x 1) (2)

1.3.3 Refer to the map and satellite image of hurricane Delta.

(a) Name the area labelled **A** which is the centre of the hurricane. (1 x 1) (1)

(b) In which direction is the converging air circulating around the centre of the hurricane. (1 x 1) (1)

(c) Suggest a reason why the centre of the hurricane is calm and cloud free. (1 x 2) (2)

1.3.4 In a paragraph of approximately 8 lines, explain why Hurricane Delta, weakened from a category 4 to a category 2 status and was finally downgraded, becoming a tropical low. (4 x 2) (8)

1.4 Study FIGURE 1.4 which shows the development of a line thunderstorm in South Africa.

1.4.1 Identify front labelled **A**. (1 x 1) (1)

1.4.2 Describe the position of the front labelled **A**. (1 x 1) (1)

1.4.3 Identify the winds labelled **B** and **C** that converge at front **A**. (2 x 1) (2)

1.4.4 Indicate which ONE of the two winds, **B** or **C,** mentioned in QUESTION 1.4.3 is colder and drier. (1 x 1) (1)

1.4.5 Give ONE reason for your answer to QUESTION 1.4.4. (1 x 2) (2)

1.4.6 Briefly explain why line thunderstorms develop east of the front labelled **A.** (2 x 2) (4)

1.4.7 Suggest TWO ways in which line thunderstorms can impact positively on the South African farming community. (2 x 2) (4)

Copyright Reserved

1.5 Refer to FIGURE 1.5 showing an urban heat island.

1.5.1 Define the concept *urban heat island.* (1 x 2) (2)

1.5.2 Calculate the difference in temperature between the CBD and the rural areas with forest. (1 x 1) (1)

1.5.3 Discuss how building density contributes to the CBD having higher temperatures. (2 x 2) (4)

1.5.4 (a) Draw a labelled diagram, showing the structure of a pollution (dust) dome occurrence during the night for FIGURE 1.5. (2 x 1) (2)

(b) Explain the impact of pollution dome on the heat island effect. (1 x 2) (2)

1.5.5 Suggest TWO sustainable solutions city planners can introduce to reduce the temperature in the CBD. (2 x 2) (4)

[60]

Copyright Reserved

QUESTION 2: GEOMORPHOLOGY

2.1 Refer to the drainage basin and its profile in FIGURE 2.1 and answer the questions that follow. Write only the answer next to the question number (2.1.1 – 2.1.7) in the ANSWER BOOK. Example, 2.1.8 Run-off.

2.1.1 Name the source of water for the drainage basin illustrated.

2.1.2 State the term that is used to describe the starting point of a river labelled **A**.

2.1.3 What term is used to describe the movement of water at **B**?

2.1.4 Name the high-lying area **C** that separates two streams of the same river system.

2.1.5 Name the fluvial feature that will develop at **D.**

2.1.6 State the geomorphological (fluvial) process that gives rise to the alluvium being found at **E.**

2.1.7 Give the term that describes the lowest point to which a river erodes.

(7 x 1) (7)

2.2 Choose the correct word(s) from those given in brackets. Write only the correct word(s) next to the question number (2.2.1 – 2.2.8) in the ANSWER BOOK. Example, 2.2.9 parallel.

2.2.1 A (delta/rapid) is formed where the river enters the sea.

2.2.2 A (graded/ungraded) river profile is smooth and concave.

2.2.3 The (superimposed/antecedent) drainage system maintains its original course over a landscape that has undergone uplift.

2.2.4 The (trellis/rectangular) stream pattern forms in jointed igneous rocks.

2.2.5 A (confluence/tributary) is a point along a river course where two streams meet.

2.2.6 (Permanent/Periodic) rivers flow during rainy seasons.

2.2.7 A (levee/ox-bow lake) is a naturally raised bank of a river.

2.2.8 (Stream discharge/Drainage density) refers to the amount of water in a river passing a specific point at a specific time. (8 x 1) (8)

Copyright Reserved

2.3 Study FIGURE 2.3, a photograph showing the course of a river.

2.3.1 Identify the fluvial landform created by the river channel represented in FIGURE 2.3. (1 x 1) (1)

2.3.2 In which course of the river is this fluvial landform predominant? (1 x 1) (1)

2.3.3 Decribe the flow characteristic of this course of the river. (1 x 2) (2)

2.3.4 Draw a rough cross-section from river bank **A** to river bank **B.** Label the slopes found along river bank **A** and river bank **B.** (3 x 1) (3)

2.3.5 Provide reasons for the shape of the river bank **A.** (2 x 2) (4)

2.3.6 Explain to a canoeist (someone who rows a small boat) why it is not recommended to follow the inner banks of the river in this course of the river. (2 x 2) (4)

2.4 Refer to FIGURE 2.4, showing river capture.

2.4.1 Define the concept *river capture*. (1 x 2) (2)

2.4.2 Identify the feature of river capture labelled **A** evident in FIGURE 2.4. (1 x 1) (1)

2.4.3 Why is stream **B** most likely to be the captor stream? (1 x 2) (2)

2.4.4 Explain why the captor stream becomes rejuvenated after river capture. (1 x 2) (2)

2.4.5 In a paragraph of approximately EIGHT lines, explain the physical and environmental impact that river capture will have on stream **C.** (4 x 2) (8)

2.5 Study FIGURE 2.5, a case study on human impact on the Vaal River.

2.5.1 Which department is responsible for South Africa's water resources? (1 x 1) (1)

2.5.2 Why has the pollution in the Vaal River become beyond acceptable levels? (1 x 1) (1)

2.5.3 From which neighbouring country does South Africa import fresh water? (1 x 1) (1)

Copyright Reserved

2.5.4 Excluding Gauteng, name TWO other provinces that depend on the Vaal Dam. (2 x 1) (2)

2.5.5 Assess the impact pollution in the Vaal River has on the natural ecosystem of the river as well as recreational activities along the river. (2 x 2) (4)

2.5.6 Recommend possible strategies that can be put in place to reduce the impact of sewage waste on rivers. (3 x 2) (6)

[60]

Copyright Reserved

SECTION B

QUESTION 3: MAP SKILLS AND CALCULATIONS

The questions below are based on the GENERAL INFORMATION OF RUSTENBURG (FUGURE 3), 1:50 000 topographic map (2527CA RUSTENBURG WEST) as well as the orthophoto map (2527 CA 15 TLHABANE) as part of the mapped area.

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 Calculate the length of the dam wall in block **C4** in metres. Show all calculations. (2 x 1) (2)

3.1.2 Various options are provided as possible answers to the following question. Choose the answer and write only the letter (A–D)

The true bearing of the railway station **4** from the school **2** on the orthophoto map is ...

A 240°
B 120°
C 300°
D 60° (1 x 1)(1)

3.1.3 Calculate the magnetic bearing of the railway station (4) from the school (2) on the orthophoto map for the current year.

Steps for magnetic declination:

1. Difference in years.
2. Mean annual change.
3. Total change
4. Magnetic declination for the current year.

Formula for magnetic bearing:
MB = TB + MD (6 x 1) (6)

3.1.4 Why it is important to correct the magnetic declination when using A topographical map and a magnetic compass on a hike on the Magaliesberg? (1 x 1)(1)
[10]

Copyright Reserved

3.2 APPLICATION AND INTERPRETATION

3.2.1 There are sections of greenery within and surrounding the area of Rustenburg West. With reference to climate explain the importance of these green areas to the city. (1 x 2) (2)

3.2.2 Refer to the orchards (fruit farms) at Rietvlei in block **G6** on the topographic map, located in a valley, and give reasons why it regularly experiences frost during winter nights. (1 x 2) (2)

3.2.3 Refer to the orthophoto map and topographic map. Suggest how the Townlands Platinum Mines can severely impact on the health of the people of the area of Tlhabane, especially if the prevailing wind is blowing from a north easterly direction. (1 x 2) (2)

3.2.4 Refer to the drainage basin in blocks **D1** and **D2** on the topographic map.

(a) Various options are provided as possible answers to the following question. Choose the answer and write only the letter (A–D).

The drainage pattern formed by the river system in blocks **D1** and **D2** is **...**

A Trellis.
B Rectangular.
C Dendritic.
D Radial. (1 x 1) (1)

(b) State the underlying rock structure of the area found in blocks **D1** and **D2**. (1 x 1) (1)

(c) In which fluvial stage is the river? (1 x 1) (1)

(d) The dominant river flow that one can expect in this stage of the river course is (laminar/ turbulent). (1 x 1) (1)

(e) Give a reason for your answer to QUESTION 3.2.4 (d). (1 x 2) (2)

[12]

Copyright Reserved

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

3.3.1 Define the concept *attribute data.* (1 x 2) (2)

3.3.2 Refer to river marked **R** (block **C7**) on the topographic map. Choose the correct word from those given in brackets. Write only the correct word next to the question number in the ANSWER BOOK. Example 3.3.2 (b) raster data

(a) What type of vector data is used to represent the river R in block C7? (lines / polygon) (1 x 1) (1)

(b) Give ONE attribute of river **R**. (1 x 1) (1)

(c) Explain the importance of using vector data on topographic maps. (1 x 2) (2)

3.3.3 Remote sensing refers to getting information about the earth's surface from a vertical distance e.g. satellite images. How would remote sensing assist environmentalists to evaluate the impact of the Townlands Platinium mines (block **F9**) on the environment? (1 x 2) (2)

[8]

TOTAL: 30
GRAND TOTAL: 150

Copyright Reserved