GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

# JUNE EXAMINATION
# GRADE 12

# 2025

## GEOGRAPHY

## (PAPER 1)

GEOGRAPHY P1

C2781E

**TIME:** 3 hours

**MARKS:** 150

**20 pages**

X05

## INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO SECTIONS:

   SECTION A:
   QUESTION 1: CLIMATE AND WEATHER (60)
   QUESTION 2: GEOMORPHOLOGY (60)

   SECTION B:
   QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES (30)

2. Answer ALL THREE questions.
3. All diagrams are included in the QUESTION PAPER.
4. Leave a line between the subsections of questions answered.
5. Start EACH question at the top of a NEW page.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Do NOT write in the margins of the ANSWER BOOK.
8. Draw fully labelled diagrams when instructed to do so.
9. Answer in FULL SENTENCES, except when you have to state, name, identify or list.
10. Units of measurement MUST be indicated in your final answer, e.g. 1 020 hPa, 14 °C and 45 m.
11. You may use a non-programmable calculator.
12. You may use a magnifying glass.
13. Write neatly and legibly.

## SPECIFIC INSTRUCTIONS AND INFORMATION FOR SECTION B

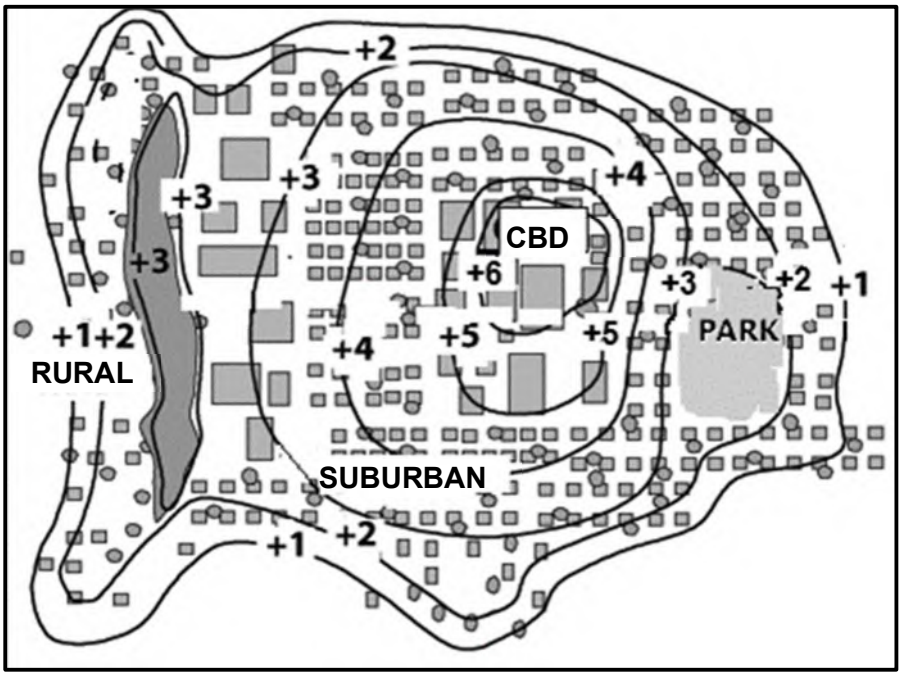
14. A 1 : 50 000 topographic map 2821 AD UPINGTON and a 1:10 000 orthophoto map 2821 AD 16 & 21 UPINGTON are provided.
15. The area demarcated in RED/BLACK on the topographical map represents the area covered by the orthophoto map.
16. Marks will be allocated for steps in calculations.
17. You must hand in the topographic and the orthophoto maps to the invigilator at the end of this examination session.

## SECTION A: CLIMATE AND WEATHER AND GEOMORPHOLOGY

## QUESTION 1: CLIMATE AND WEATHER

1.1 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 (1.1.1 to 1.1.7) in the ANSWER BOOK, e.g. 1.1.8 A.

Refer to the urban heat island isotherm map below to answer QUESTIONS 1.1.1 to 1.1.4.




**[Adapted from *the United States Environmental Protection Agency*]**

1.1.1 The temperature range between the CBD and the rural area is:

A 2 °C
B 3 °C
C 4 °C
D 5 °C

1.1.2 … increase the surface area for the absorption of solar radiation and restrict the cooling effect of wind in the CBD.

A Motor vehicles
B Tarred roads
C Tall buildings
D Natural surfaces

1.1.3 Rural areas have lower temperatures because they have a ... albedo and … water bodies than urban areas.

(i) higher
(ii) lower
(iii) fewer
(iv) more

A (i) and (iii)
B (ii) and (iii)
C (i) and (iv)
D (ii) and (iv)

1.1.4 Suburban areas are cooler than the CBD because they have … artificial surfaces and … evapotranspiration.

(i) fewer
(ii) more
(iii) higher
(iv) lower

A (i) and (iv)
B (ii) and (iii)
C (i) and (iii)
D (ii) and (iv)

Refer to the photo below of a pollution dome over Johannesburg to answer QUESTIONS 1.1.5 to 1.1.7.



**[Source: *Joburgetc.com*]**

1.1.5 The photo represents a pollution dome during a …

A night in summer.
B night in winter.
C day in winter.
D day in summer.

1.1.6 In the photo, pollutants are concentrated … the Earth's surface due to a … in the upper air.

(i) further from
(ii) closer to
(iii) low-pressure cell
(iv) high-pressure cell

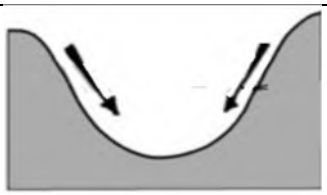
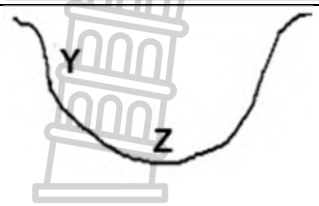
A (i) and (iv)
B (ii) and (iii)
C (i) and (iii)
D (ii) and (iv)

1.1.7 Pollutants, in the pollution dome, mix with radiation fog to form …

A acid rain.
B smog.
C mist.
D advection fog.

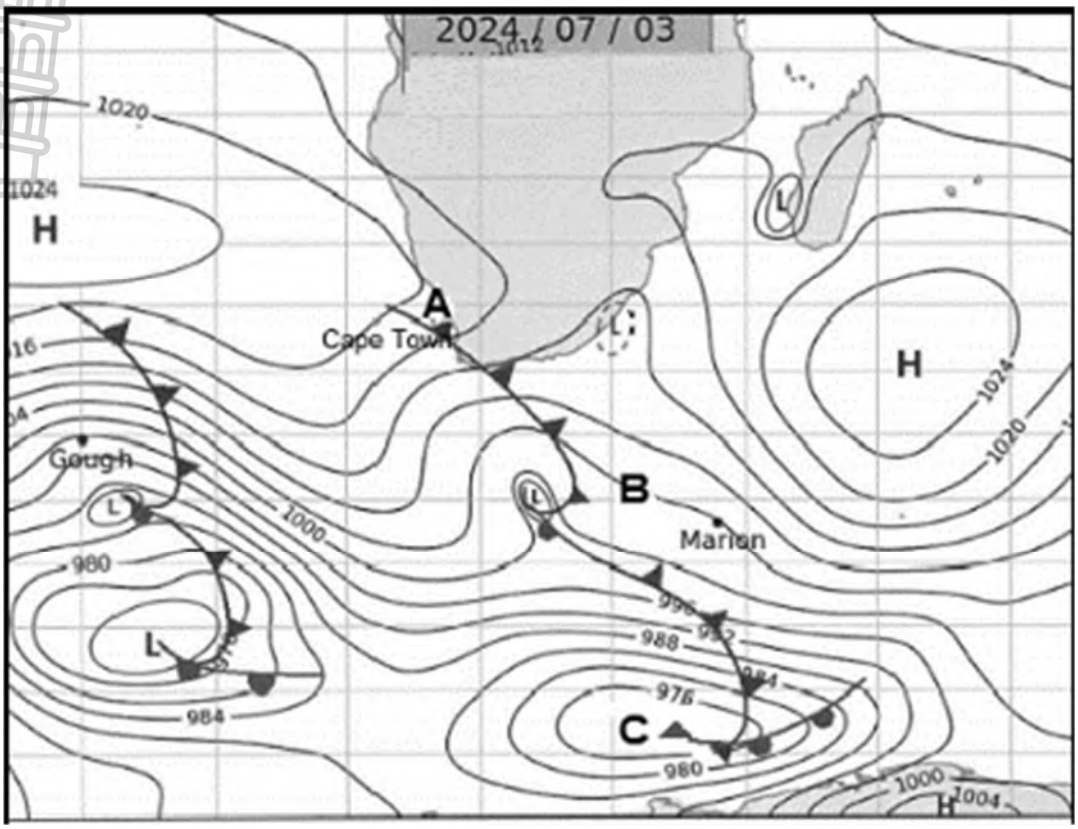
(7 x 1) (7)

1.2 Choose the correct term/concept on valley climate in COLUMN B that matches the descriptions/statements in COLUMN A. Write only **Y** or **Z** next to the question numbers (1.2.1 to 1.2.8) in the ANSWER BOOK, e.g. 1.2.9 Y.

| | COLUMN A | COLUMN B |
|---|---|---|
| 1.2.1 | This slope is suitable for forestry in the Southern Hemisphere. | **Y** North-facing<br>**Z** South-facing |
| 1.2.2 | This precipitation forms when the temperature in the valley is above freezing point. | **Y** Dew<br>**Z** Frost |
| 1.2.3 | It traps pollution in the valley during the night. | **Y** Thermal belt<br>**Z** Inversion layer |
| 1.2.4 | The precipitation which will impact farming products. | **Y** Frost<br>**Z** Fog |
| 1.2.5 | Forms when air cools to dew point as a result of terrestrial radiation. | **Y** Frost pocket<br>**Z** Radiation fog |
| 1.2.6 | People living on the valley slopes experience this wind during the day. | **Y** Katabatic wind<br>**Z** Anabatic wind |
| 1.2.7 | A wind that develops in a valley during the night. | **Y** <br>**Z**  |
| 1.2.8 | Houses are built at this location to lower electricity bills. |  |

(8 x 1) (8)

1.3 Refer to the synoptic weather map below on mid-latitude cyclones.




[Source: ***South African Weather Services***]

1.3.1 What do we call a series of mid-latitude cyclones in succession? (1 x 1) (1)

1.3.2 Name front **A** and sector **B** on the synoptic weather map. (2 x 1) (2)

1.3.3 What influence does the South Indian Anticyclone, as shown on the synoptic weather map, have on the path followed by the mid-latitude cyclones?

(1 x 2) (2)

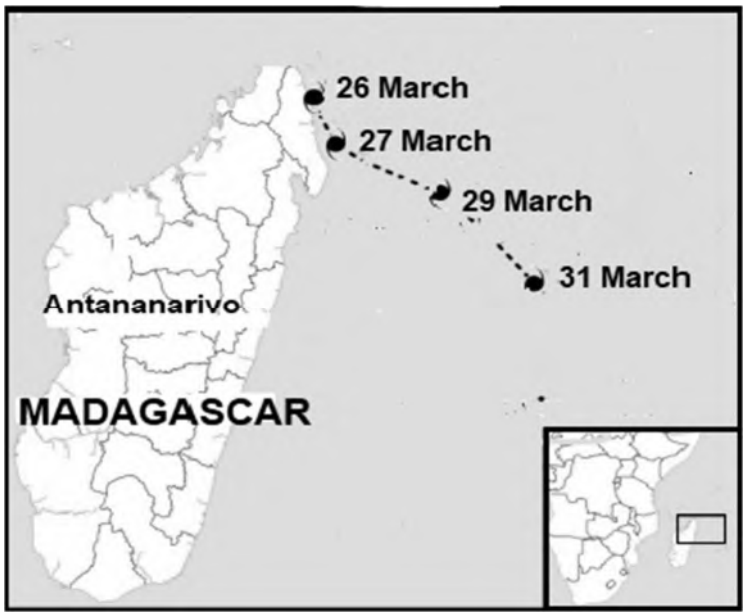
1.3.4 The mid-latitude cyclone at **C** is in the cold occlusion stage. Draw a labelled cross-section at **C** on the synoptic weather map. Marks will be awarded for the following:

(a) Cross-section (1 x 1) (1)
(b) Cold air (1 x 1) (1)
(c) Cool air (1 x 1) (1)
(d) Warm sector (1 x 1) (1)

1.3.5 Account for the development of the weather that Cape Town experienced on 3 July 2024. (3 x 2) (6)

1.4 Refer to the infographic below on Tropical Cyclone Gamane.

**PATH TAKEN BY TROPICAL CYCLONE GAMANE**




**[Source: GDACS,METEO Madagascar]**

Tropical Cyclone (TC) Gamane made landfall in the Ampisikinana Commune, Sava Region, bringing heavy rains and floods to the north and north-east, on 27 March. The ninth tropical depression system of the current cyclone season began developing along the north-eastern coast of Madagascar on 25 March. Some districts in the north-east have received heavy rainfall over the past few days, the Sambava district recorded 300 mm of rain on 26 March alone. Madagascar issued a red alert for imminent danger in the Diana and Sava regions; and a yellow alert of menace in the Ambatosoa and Analanjirofo regions on 27 March.

**[Adapted from *UN office for the coordination of Humanitarian Affairs, accessed on 19 November 2024*]**

1.4.1 How many tropical cyclones had developed before Tropical Cyclone Gamane? (1 x 1) (1)

1.4.2 When did Tropical Cyclone Gamane make landfall, according to the infographic? (1 x 1) (1)

1.4.3 Describe the general direction followed by Tropical Cyclone Gamane. (1 x 1) (1)

1.4.4 Discuss the negative environmental (natural) impact of Tropical Cyclone Gamane on the coastal regions mentioned in the case study. (2 x 2) (4)

1.4.5 In a paragraph of approximately EIGHT lines, explain why Madagascar is still vulnerable to the effects of tropical cyclones, despite huge improvements in early warning systems and disaster relief programmes. (4 x 2) (8)

1.5 Study the diagram and case study on berg winds below.

**SAWS WARNING FOR DURBAN**

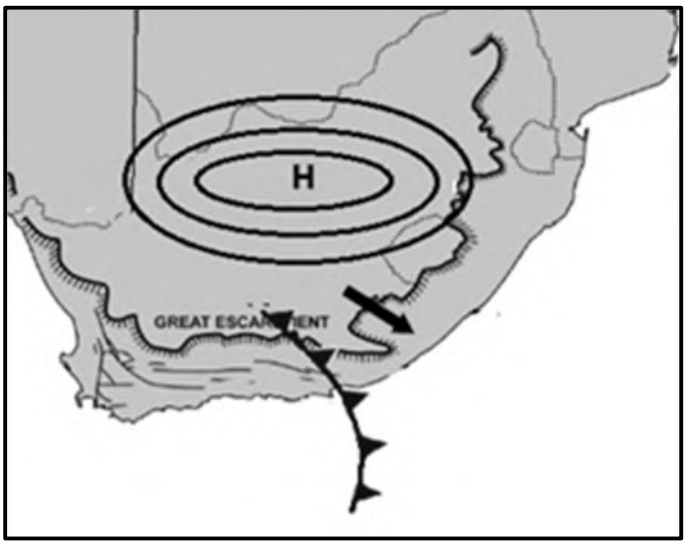
Durban – 4 August 2024

Nhlanhla Sithole, a weather forecaster from the South African Weather Service (SAWS), predicts that the province could experience damaging inland winds on Sunday. A yellow level 2 warning has been issued due to a cold front moving across the southern interior of the country.

"Ahead of the cold front, we have northwesterly berg winds. These winds lead to warmer temperatures, especially over the central and eastern parts of the province. As a result of these strong winds and warm temperatures, an FDI (Fire Danger Index) warning has also been issued for Sunday."

**[Adapted from https://www.iol.co.za/dailynews/news/immediate-warning-of-extreme-heat-and-elevated-fire-risk-across-kzn-3d15d9db-86f1-4d58-a085-167a03c648ac]**

**SIMPLIFIED WEATHER MAP**




**[Source: Examiner's own sketch]**

1.5.1 Define the concept *berg wind.* (1 x 2) (2)

1.5.2 According to the weather map, which TWO pressure cells are responsible for the occurrence of berg winds? (2 x 1) (2)

1.5.3 A berg wind is an (onshore/offshore) wind that develops due to the air circulation in the pressure cells identified in QUESTION 1.5.2. (1 x 1) (1)

1.5.4 Explain why the South African Weather Service issued a Fire Danger Index warning on 4 August 2024. (2 x 2) (4)

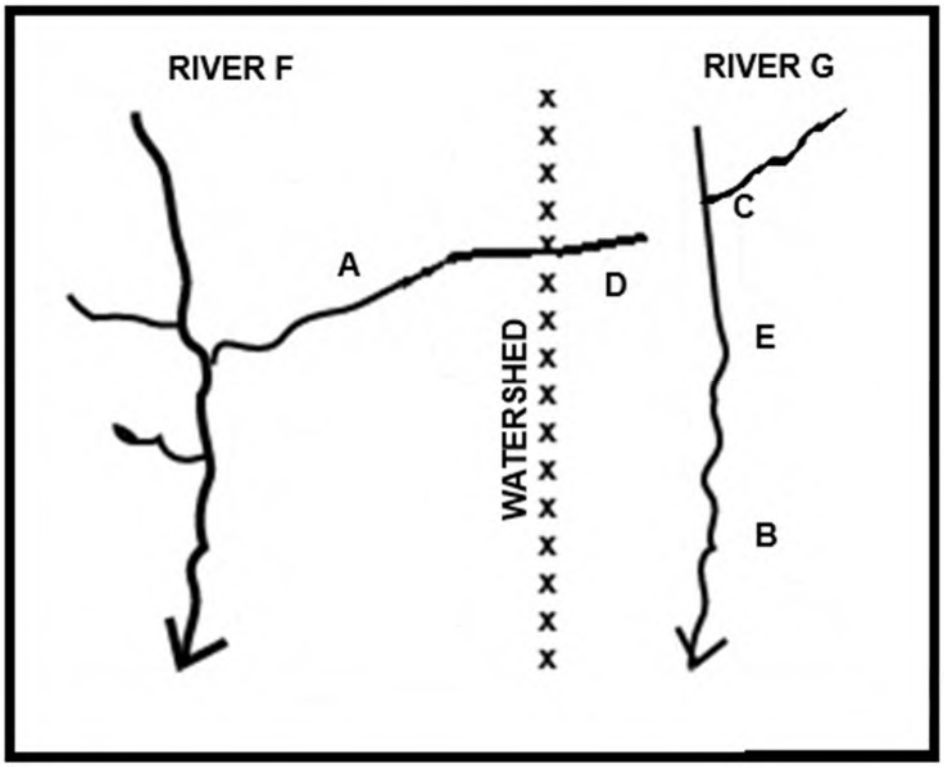
1.5.5 Suggest strategies that the local government can implement to reduce the impact of berg winds on the natural environment of the coastal regions of KwaZulu-Natal. (3 x 2) (6)

**[60]**

## QUESTION 2: GEOMORPHOLOGY

2.1 Refer to the diagram below on river capture.

Read the following statements and choose the appropriate letter/word in brackets to make the statements TRUE. Write down only the correct letter/word next to the question numbers (2.1.1 to 2.1.7) in the ANSWER BOOK. e.g. 2.1.8 H.




**[Adapted from *https://digitalteachers.co.ug/river-capture-meaning/*]**

2.1.1 River **F** is the (captured/captor) stream.

2.1.2 (Headward/Lateral) erosion is dominant at **D**.

2.1.3 The elbow of capture will most likely occur at (**E**/**C**).

2.1.4 A wind gap will most likely develop at (**E**/**A**).

2.1.5 A misfit stream will form in river (**F**/**G**).

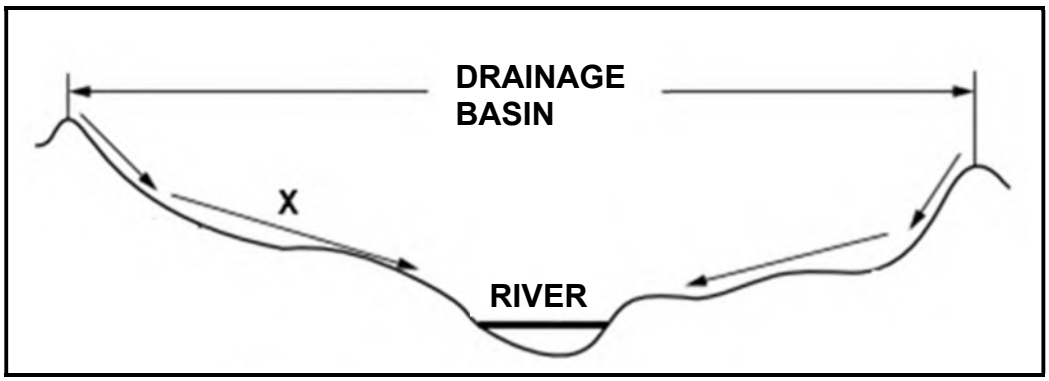
2.1.6 After river capture occurs, (erosion/deposition) will increase at **A**.

2.1.7 The velocity of river **G** will (increase/decrease) at **B** after river capture.

(7 x 1) (7)

2.2 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 (2.1.1 to 2.1.8) in the ANSWER BOOK, e.g. 2.1.9 A.

2.2.1 The water flowing at **X** in the sketch below is described as … flow.




**[Adapted from *https://www.researchgate.net/figure*]**

A sheet
B base
C laminar
D channel

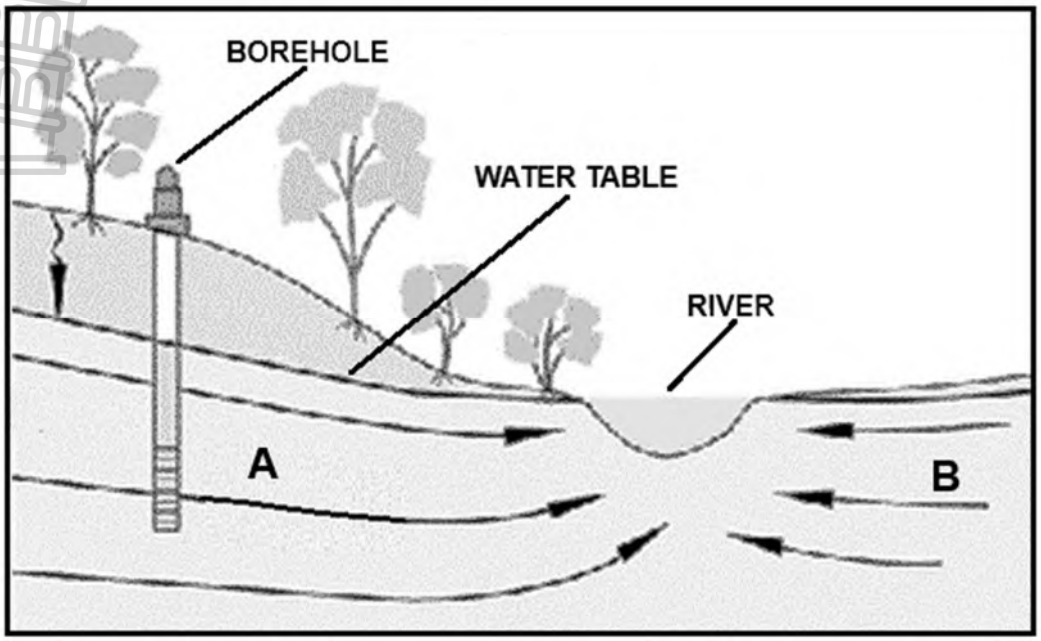
2.2.2 The feature at **A** in the photograph below indicates a/an …




**[Adapted from *https://stock.adobe.com/za/search/images?k=river*]**

A braided stream.
B tributary.
C confluence.
D interfluve.

Refer to the following diagram to answer QUESTION 2.2.3 and 2.2.4.




**[Adapted from *https://speedeck.uk/news/*]**

2.2.3 … is being extracted by the borehole in the sketch.

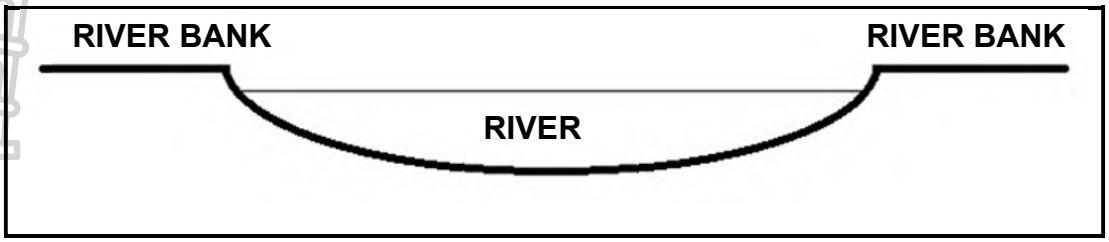
A Surface run-off
B Groundwater
C Sheet flow
D Channel flow

2.2.4 The level of the water table will be … at **A** because of the … vegetation cover.

(i) higher
(ii) lower
(iii) presence
(iv) absence

A (i) and (iii)
B (i) and (iv)
C (ii) and (iii)
D (ii) and (iv)

2.2.5 The sketch below shows a … river profile.



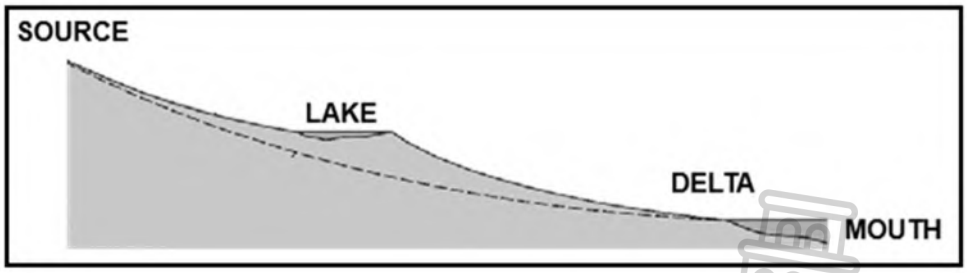

**[Source: *Examiner's own sketch*]**

A transverse
B universal
C longitudinal
D latitudinal

2.2.6 The dominant fluvial process in the upper course of the river is …

A deposition.
B saltation.
C erosion.
D abrasion.

2.2.7 The presence of a … in the river profile indicates that this river is ungraded.




**[Adapted from *https://www.coolgeography.co.uk/A-level/AQA/Year%2012/Rivers*]**

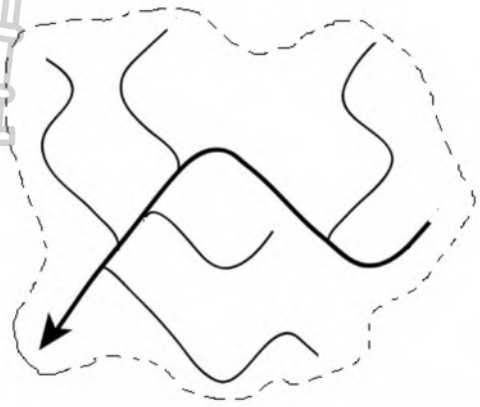
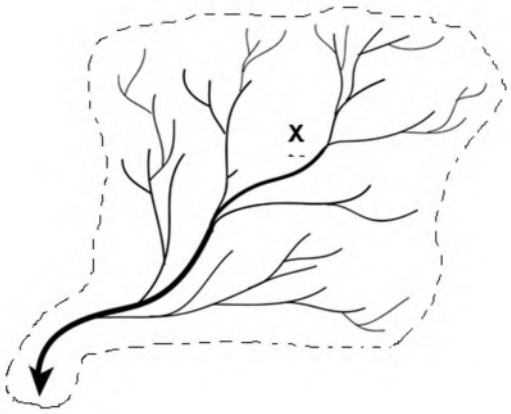
A mouth
B source
C delta
D lake

2.2.8 The presence of a knickpoint waterfall in a river course indicates that … has occurred.

A undercutting
B abstraction
C rejuvenation
D deposition

(8 x 1) (8)

2.3 Refer to the following diagrams showing different drainage basins.

| DRAINAGE BASIN A | DRAINAGE BASIN B |
|---|---|
|  |  |

**[Adapted from *https://sageography.co.za/wiki/grade-12-caps/geomorphology/drainage-systems-in-south-africa/drainage-patterns/]***

2.3.1 Name the drainage pattern evident in drainage basin **A**. (1 x 1) (1)

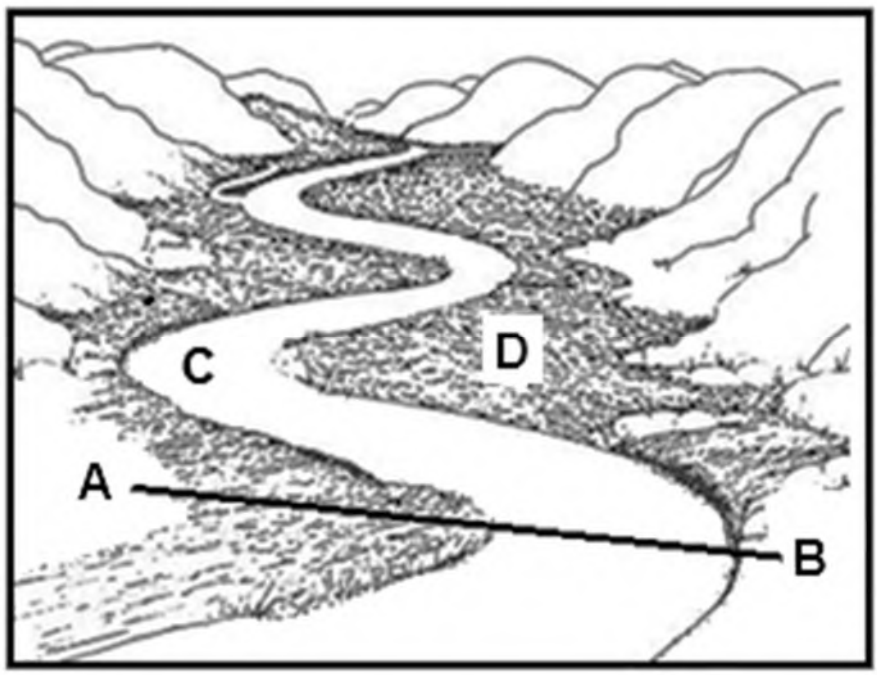
2.3.2 Mention ONE characteristic (feature) of the drainage pattern evident in drainage basin **A**. (1 x 2) (2)

2.3.3 Describe the underlying rock structure that influenced the development of the drainage pattern in drainage basin **A**. (2 x 2) (4)

2.3.4 Compare the drainage density of drainage basins **A** and **B**. (1 x 2) (2)

2.3.5 Discuss how vegetation contributes to a lower drainage density in a drainage basin. (3 x 2) (6)

2.4 Refer to the diagram of a river meander below.




**[Adapted from *https://link.springer.com/chapter/10.1007/978-3-642-52338-0_34*]**

2.4.1 Name the course of the river where a meander would usually form. (1 x 1) (1)

2.4.2 Draw a labelled cross-section of the meander loop long line **A** – **B**. Marks will be awarded for the following:

(a) Cross-section sketch (1 x 1) (1)
(b) Slip-off slope (1 x 1) (1)
(c) Undercut slope (1 x 1) (1)
(d) Area of fastest current flow (1 x 1) (1)

2.4.3 Explain how the continued erosional and depositional processes in the meander loop will lead to the development of an ox-bow lake at **C**. (3 x 2) (6)

2.4.4 A developer has chosen to build a holiday resort at area **D**. Explain why this choice of site is a favourable (good) location for construction. (2 x 2) (4)

2.5 Refer to the following extract on river management.

**DWS OFFICIALLY OPENS THE BOATING SEASON ON THE VAAL RIVER**

The DWS officially opened the boating season on the Vaal River on Saturday, 7 September 2024. This event marked a significant achievement in the battle against invasive (alien) aquatic plants that had been damaging the river.

For several months, the Vaal River had been plagued by the rapid spread of water lettuce and water hyacinth. These invasive species had taken over large areas of the river, choking out native plant and animal life. The situation was worsened by high levels of pollution in the catchment area, which accelerated the growth of these plants.

Recognising the seriousness of the problem, the DWS took action to address the issue. Through combined efforts, the water lettuce and water hyacinth were successfully removed, allowing the river to start the process of recovery.

By taking a proactive approach, the DWS hopes to prevent future infestations and to protect the health of the river.

**[Adapted from *https://www.dws.gov.za/Communications/PressReleases/2024*]**

2.5.1 What is *river management*? (1 x 2) (2)

2.5.2 What does the abbreviation *DWS* stand for? (1 x 1) (1)

2.5.3 Provide a quote from the extract showing how water lettuce and water hyacinth disrupted the Vaal River ecosystem. (1 x 2) (2)

2.5.4 Explain why it is important to ensure the health of the Vaal River for Gauteng. (1 x 2) (2)

2.5.5 In a paragraph of approximately EIGHT lines, propose measures that the DWS can implement to ensure the future health of the Vaal River. (4 x 2) (8)

**[60]**

**TOTAL SECTION A: 120**

## SECTION B

## QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

### GENERAL INFORMATION ON UPINGTON




**Coordinates: 28.45°S; 21.25°E**

Upington is a town located in the Northern Cape province of South Africa, on the banks of the Orange River. It sits at an elevation of 835 metres above sea level. Upington is the closest large centre to the Augrabies Falls (arguably the greatest of the South African waterfalls) and the Kgalagadi Transfrontier Park. The landscape is very arid, but the soil is fertile, allowing crops such as fruit to be grown in irrigated fields. Upington has a hot desert climate with long, hot summers and short, mild winters. Precipitation peaks during the late summertime.

**[Source: *https://en.wikipedia.org/wiki/Upington#Geography_and_climate*]**

| **ENGLISH** | **AFRIKAANS** |
|---|---|
| Rifle range | Skietbaan |
| Sewage works | Rioolwerke |
| Furrow | Voor |
| Canal | Kanaal |

## 3.1 MAP SKILLS AND CALCULATIONS

3.1.1 The contour interval on the topographical map is …

A 5 m.
B 10 m.
C 15 m.
D 20 m. (1 x 1) (1)

3.1.2 Upington is situated in the … province, which has a … climate.

(i) Western Cape
(ii) Northern Cape
(iii) desert
(iv) subtropical

A (i) and (iii)
B (ii) and (iii)
C (ii) and (iv)
D (iii) and (iv) (1 x 1) (1)

3.1.3 Identify the map which is located west of 2821AD. (1 x 1) (1)

3.1.4 Refer to the orthophoto map.

Calculate the area of the recreational ground labelled **6** in blocks **A3/A4**, and **B3/B4** in metres. Use the following information: Breadth is 80 m.

Formula: **Length x Breadth** (3 x 1) (3)

3.1.5 Refer to the topographical map.

Calculate the gradient from spot height **815** in block **C4** to trigonometrical station **71** in block **D5**. Use the following information: Height measurement as 24,2 m.

Formula: $\frac{\text{Vertical Interval (VI)}}{\text{Horizontal Distance (HE)}}$ (3 x 1) (3)

3.1.6 Refer to the area between spot height **815** (block **C4**) to trigonometrical station **71** (block **D5**).

The area is unsuitable for crop farming. Provide evidence from the topographical map to support this statement. (1 x 1) (1)

## 3.2 MAP INTERPRETATION

Refer to the topographical map.

3.2.1 (a) The temperatures at the built-up area in block **B1** is warmer than the surrounding countryside areas in block **D3**. The concept describing this phenomenon is …

A pollution dome.
B urban profile.
C urban heat island.
D temperature inversion. (1 x 1) (1)

(b) A solution to this phenomenon, answer to QUESTION 3.2.1(a), is creating more greenbelts in this built-up area.

Define the concept *greenbelt.* (1 x 2) (2)

(c) Provide evidence of greenbelts from block **B1**. (1 x 1) (1)

3.2.2 Refer to block **C4** and block **D4** on the topographical map.

(a) Calculate the stream order at **X** in block **D4.** (1 x 2) (2)

(b) Where is the drainage density higher, in block **C4** or in block **D4**? (1 x 1) (1)

3.2.3 Refer to the orthophoto and topographical map.

(a) The stream channel flowing between **7** in block **D1** and **8** in block **E2** is braided. Provide evidence from the orthophoto to justify this statement. (1 x 2) (2)

(b) What is the name of this braided stream? (1 x 1) (1)

(c) Explain with evidence, the main reason for the development of the braided stream identified in QUESTION 3.2.3 (a). (1 x 2) (2)

## 3.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

3.3.1 Choose the correct option to make these statements true.

(a) Descriptive data on a map is also referred to as (spatial data/ attribute data). (1 x 1) (1)

(b) (Data manipulation/Data integration) involves combining data from different sources to create a more comprehensive view. (1 x 1) (1)

3.3.2 Refer to block **C5** on the topographical map and identify the following features:

(a) A natural line (water) feature (1 x 1) (1)

(b) A human-made polygon feature (1 x 1) (1)

(c) A point feature (1 x 1) (1)

3.3.3 (a) Refer to the statement below about the Orange River, located in block **B4** on the topographical map.

Buffering is evident on either side of the Orange River. Define the concept *buffering*. (1 x 2) (2)

(b) Provide evidence from the topographical map that buffering is occurring on either side of the Orange River in block **B4**. (1 x 1) (1)

**TOTAL SECTION B: 30**

**TOTAL: 150**