GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

2024

GEOGRAPHY
NOVEMBER/DECEMBER 2024
PAPER 1
QUESTION PAPER
GRADE 10

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EXAMINER:	**PLC**
MODERATOR:	**PLC**
MARKS:	**150**
TERM WEIGHTING:	**60%**
DURATION:	**3 HOURS**

This paper consists of 14 pages including cover page

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1. This question paper consists of TWO SECTIONS:

   SECTION A:
   QUESTION 1: The Atmosphere (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 open between sub-sections 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

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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 3126 DD QUEENSTOWN and a 1: 10 000 orthophoto map 3126 DD 1 NOOITGEDACHT are provided.

15. The area demarcated in RED/BLACK on the topographic map represents the area covered by the orthophoto map.

16. Show ALL calculations. Marks will be allocated for this.

17. You must hand in the topographic and the orthophoto map to the invigilator at the end of this examination session.

SECTION A: THE ATMOSHERE 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 number (1.1.1–1.1.7) in the ANSWER BOOK, e.g. 1.1.8 A.

1.1.1 Which gas makes up the largest proportion of the Earth's atmosphere?

A Oxygen
B Nitrogen
C Carbon Dioxide
D Water Vapour

1.1.2 The layer of the atmosphere where most weather phenomena occur is the …

A Mesosphere
B Stratosphere
C Troposphere
D Thermosphere

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1.1.3 Which atmospheric layer contains the majority of the ozone layer?

A Stratosphere
B Exosphere
C Troposphere
D Mesosphere

1.1.4 . Which combination of gases are classified as greenhouse gases?

(i) Carbon Dioxide
(ii) Oxygen
(iii) Water Vapour
(iv) Methane

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

1.1.5 Which of the following statements about the troposphere are correct?

(i) It is the lowest layer of the atmosphere.
(ii) It contains the ozone layer.
(iii) Most clouds form in this layer.
(iv) Air temperature is highest in this layer.

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

1.1.6 Which gas plays a critical role in absorbing harmful ultraviolet radiation?

A Ozone
B Nitrogen
C Water vapour
D Carbon Dioxide

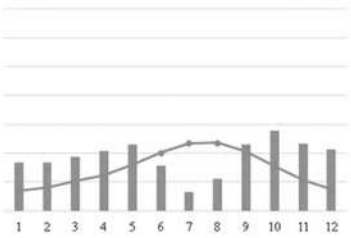
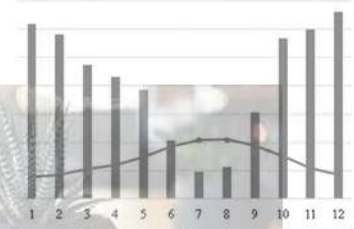
1.1.7 Which atmospheric layers experience a temperature increase with altitude?

(i) Stratosphere
(ii) Mesosphere
(iii) Troposphere
(iv) Thermosphere

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

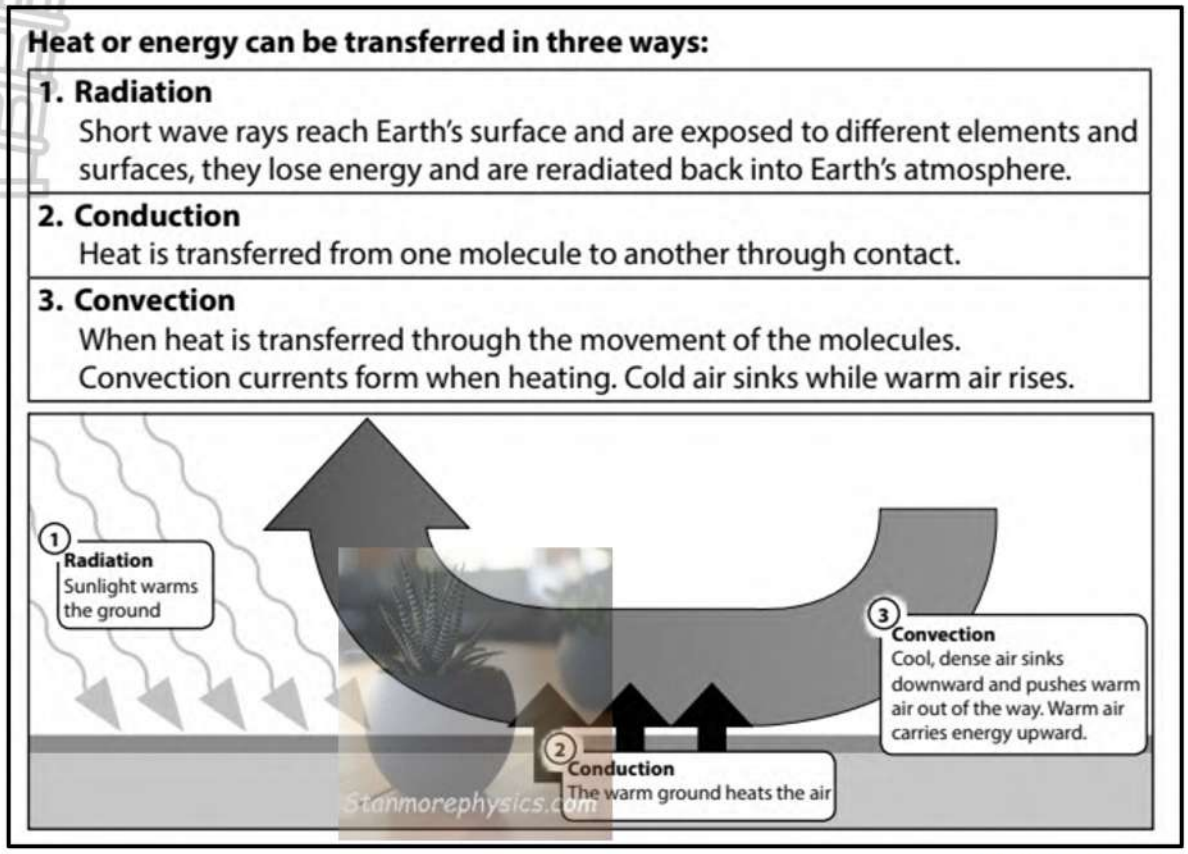
(7 x 1) (7)

1.2 Complete the statements in COLUMN A with the options in COLUMN B. Write down 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	The average weather patterns over long periods of time.	Y Weather Z Climate
1.2.2	The day-to-day atmospheric conditions.	Y Weather Z Climate
1.2.3	The amount of moisture present in the atmosphere.	Y Humidity Z Evaporation
1.2.4	A climatic region with temperatures never exceeding 10°C	Y Equatorial Z Polar
1.2.5	The type of rainfall caused by rising air over mountains.	Y Convectional Z Orographic
1.2.6	A climate graph which shows seasonal rainfall.	Y  1 2 3 4 5 6 7 8 9 10 11 12 source: examiners own sketch) Z.  1 2 3 4 5 6 7 8 9 10 11 12 (source: examiners own sketch)
1.2.6	The boundary between two different air masses.	Y Front Z Heat Balance
1.2.7	Clouds associated with thunderstorms and heavy rainfall.	Y Cirrus Z Cumulonimbus
1.2.8	The change of state from ice to water vapour.	Y Sublimation Z Crystallisation

(8 x 1 (8)

1.3 Refer to the diagram about heating of the atmosphere.



Source: https://e-classroom.co.za/

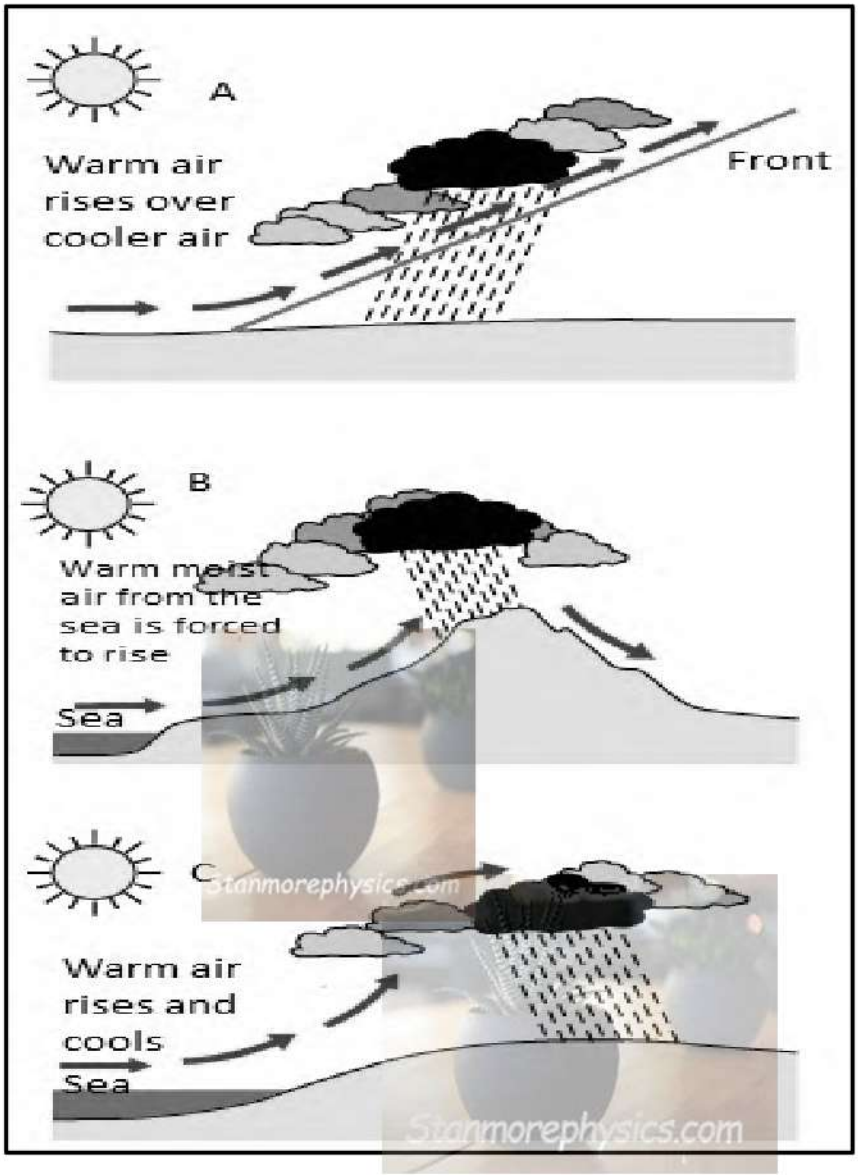
1.3.1 Define the term *terrestrial radiation.* (1 x 2) (2)

1.3.2 According to the source, how does convection currents occur?. (1 x 1) (1)

1.3.3 Discuss how convection currents influence weather patterns relating to global warming. (2 x 2) (4)

1.3.4 In a paragraph of approximately EIGHT lines, evaluate how specific human activities contribute to global warming and what can be done to reduce the impact of heat retention on ecosystems. (4 x 2) (8)

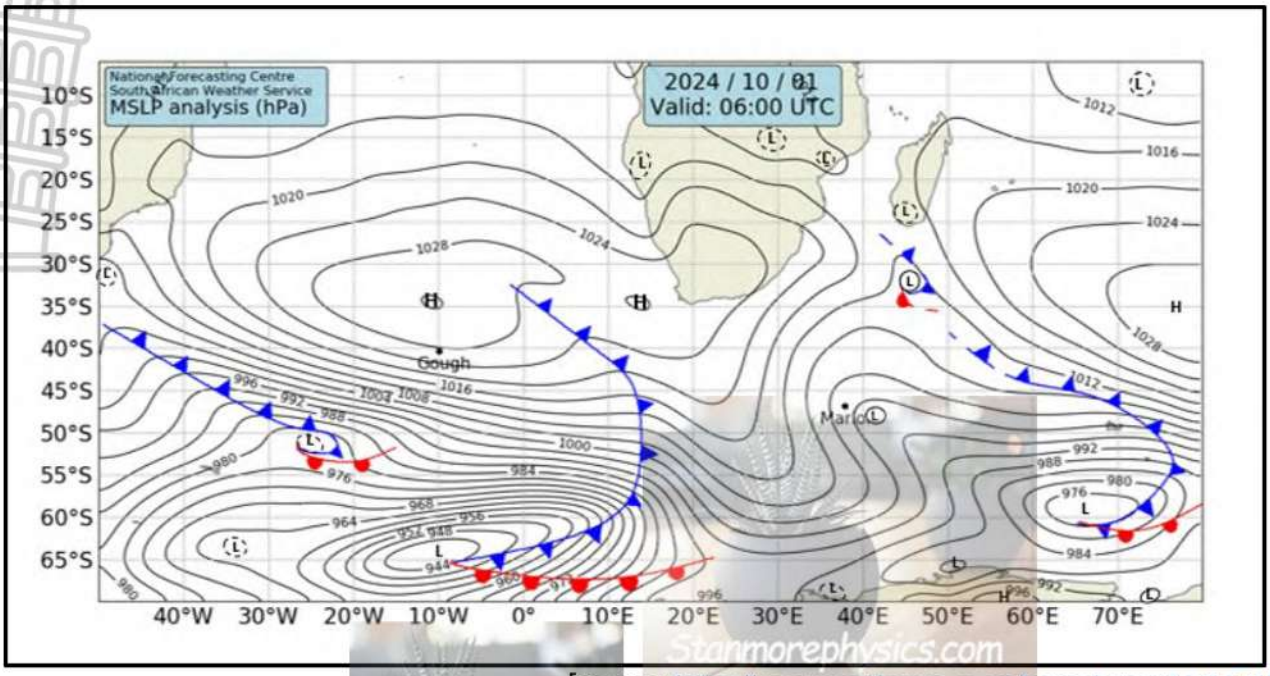
1.4 Refer to the diagram depicting moisture in the atmosphere.



[SOURCE: https://travellingacrosstime.com/2023/12/31/types-of-rainfall]

1.4.1	Identify the types of rainfall labelled **A – C**.	(3 x 1)	(3)
1.4.2	Differentiate between orographic rainfall and convectional rainfall in terms of their respective formation processes.	(2 x 2)	(4)
1.4.3	Explain the process of condensation and how it leads to the formation of clouds.	(2 x 2)	(4)
1.4.4	Discuss how rainfall influences agricultural practices such as irrigation needs, and how drought-prone regions may be negatively impacted.	(2 x 2)	(4)

1.5 Refer to a synoptic weather map below.



[Source: https://www.weathersa.co.za/home/synopticcharts]

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1.5.1	Define the term *isobar.*	(1 x 2)	(2)
1.5.2	State the season depicted (shown) on the synoptic weather map.	(1 x 1)	(1)
1.5.3	Provide TWO reasons for your answer in 1.5.2.	(2 x 1)	(2)
1.5.4	Differentiate between the weather conditions that occur with a cold front and with a warm front respectively.	(2 x 2)	(4)
1.5.5	Draw a weather station using weather conditions below, as cold front approaches Cape Town. Air temperature – 29 C Dew point temperature – 11 C Cloud cover – 1/2 Precipitation - none Wind direction - NW Wind speed – 10 knots	(6 x 1)	(6)

TOTAL: 60

QUESTION 2: GEOMORPHOLOGY

2.1 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 number (2.1.1–2.1.8) in the ANSWER BOOK, e.g. 2.1.9 A.

2.1.1 The study of the earth's physical features and the processes that formed them is …

A meteorology.
B climatology.
C geomorphology.
D demography

2.1.2 A mushroom–shaped structure which forms when magma forces the overlying areas upwards is a …

A laccolith.
B batholith.
C mesa.
D butte.

2.1.3 The theory that the continents were once one landmass but they drifted apart over time, is called …

A maritime drift.
B continental geomorphology.
C maritime continental.
D continental drift.

2.1.4 The single landmass that existed over millions of years ago is ….

A Australia.
B Pangaea.
C Laurasia
D Africa.

2.1.5 The outer layer of the earth that consists of solid rocks is/are the …

A crust.
B magma.
C crystals.
D inner core.

2.1.6 … is the largest of all igneous intrusions.

A Dyke
B Sill
C Batholith
D Laccolith

2.1.7 Which of the following are landforms associated with extrusive igneous rocks?

(i) Butte and conical hill
(ii) Batholith and laccolith
(iii) Sill and conical hill
(iv) Dyke and Sill

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

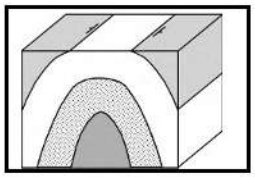
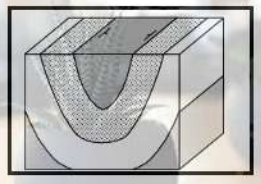
2.1.8 The cycle of rock formation, erosion of rocks, deposition of sediments and formation of new rocks is known as the …

A metamorphic cycle.
B hydrological cycle.
C geological cycle.
D rock cycle.



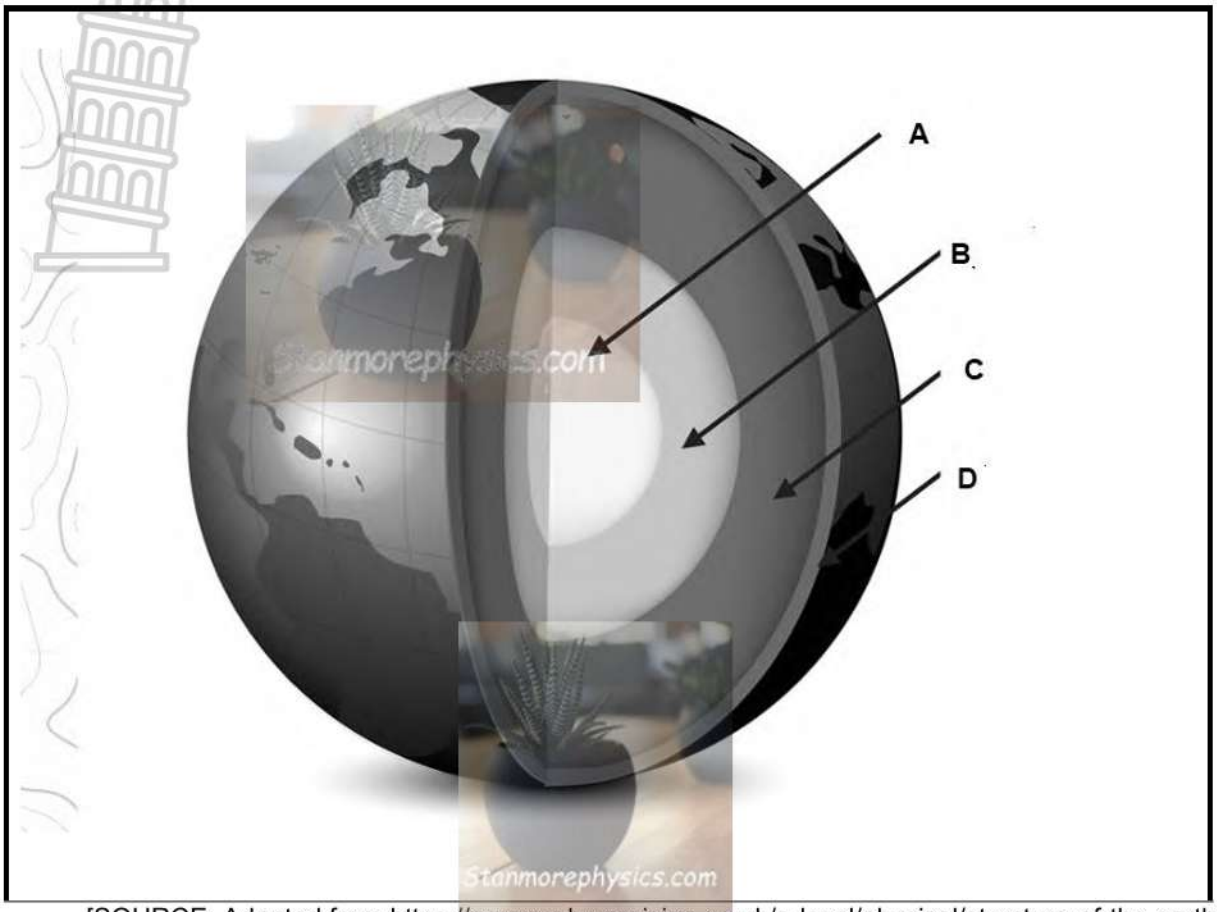
(8 x 1) (8)

2.2 Choose a term from COLUMN B that matches the description in COLUMN A. Write only Y or Z next to the question numbers (2.2.1 to 2.2.7) in the ANSWER BOOK, for example 2.2.8 Z.

COLUMN A		COLUMN B	
2.2.1	The force which forms folds is …	Y Z	Compressional Tensional.
2.2.2	Large cracks which form as a result of continuous tension and compression forces.	Y Z	Folding. Faulting.
2.2.3	Solid outer layer of the Earth, 5–70 km thick	Y Z	Crust Mantle
2.2.4	Pieces of rock, clay and other substances from eroded rocks which accumulate at the bottom of a lake or sea.	Y Z	Fossils quartzite
2.2.5	The remains of dead plants or animals that have been preserved in rock.	Y Z	Fossils sediments
2.2.6	A bending of rocks into folds due to strong compressional forces from the inside.	Y Z	Folding Faulting
2.2.7	Formed by the compression of sedimentary rock strata during plate movement	Y  Z  [SOURCE: Examiner's own sketch]	

(7 x 1) (7)

2.3 Refer to the FIGURE showing structure of the earth



[SOURCE: Adapted from https://geography-revision.co.uk/a-level/physical/structure-of-the-earth/]

2.3.1 Name the layers labelled **A, C** and **D** (3 x 1) (3)

2.3.2 Copy the table below and fill in the following thicknesses for each layer to complete it. 5 to 90 km, 1 200 km, and 2 900 km. (3 x 1) (3)

LAYER	THICKNESS
A	
C	
D	

2.3.3 Is the temperature change decreasing or increasing as one moves from layer **A** to layer **D**? (1 x 1) (1)

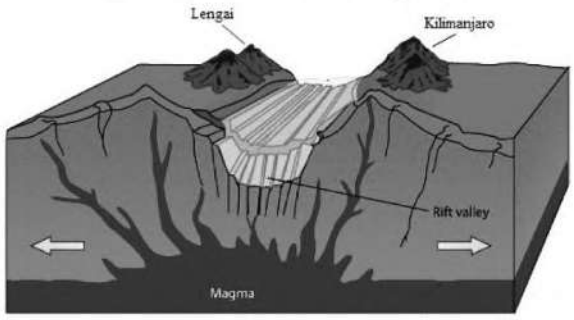
2.3.4 Explain how layer **C** results in volcanic activity (2 x 2) (4)

2.3.5 Describe TWO ways in which the layer labelled **D** is important to humans. (2 x 2) (4)

2.4 Refer to the infographic below.

THE GREAT RIFT VALLEY

East African Rift System



[SOURCE: https://www.safari-center.com/formation-of-east-african-rift-valley/]

The Great Rift Valley was formed due to the divergent tectonic plate movements involving the African Plate. The African Plate is splitting into two parts: the Nubian Plate to the west and the Somali Plate to the east. The rifting process involves the stretching and thinning of the Earth's lithosphere due to tectonic forces. As the plates pull apart, the crust becomes thinner, leading to volcanic activity where magma rises to fill the space.

The Eastern Rift is marked by numerous volcanoes and includes some of Africa's highest mountains, such as Mount Kilimanjaro and Mount Kenya. This valley is narrower and deeper than its western counterpart and is known for its volcanic activity.

The Western Rift, also known as the Albertine Rift, is home to some of the deepest lakes in the world, like Lake Tanganyika and Lake Malawi. This rift is less volcanic but features high escarpments and mountains.

[Source: https://www.ultimatekilimanjaro.com/great-rift-valley-everything-you-need-to-know/]

2.4.1	Define the term *plate tectonics.*		(1 x 2)	(2)
2.4.2	Which theory is illustrated in the infographic?		(1 x 1)	(1)
2.4.3	(a)	Quote evidence to show that the rift valley formed on the African plate.	(1 x 2)	(2)
	(b)	Name TWO plate that formed after the formation of the rift valley	(2 x 1)	(2)
2.4.4	Explain the movement of the plates to form the Great Rift Valley.		(1 x 2)	(2)
2.4.5	Identify TWO countries that are found on the western & eastern side of the rift valley respectively		(2 x 1)	(2)
2.4.6	Discuss TWO points of evidence that suggest that continents were once all joined in a single landmass.		(2 x 2)	(4)

2.5 Read the case study about earthquake below.

40,000 TREMORS A YEAR



Five days after a powerful earthquake between 7.2 and 7.4 on the Richter scale struck off the coast of Hualien Country in the east of Taiwan, the death toll has now risen to 13 people, with 1,133 injured and six still missing. This includes a Singaporean-Australian couple, whom rescuers were still searching for on the morning of Monday, April 8, amid the mountainous region's massive rockslides and landslides.

Several hundred buildings, a bridge and a section of road were also destroyed or damaged, but overall, most of the infrastructure held up well. On Sunday, crates of food and survival supplies were dropped by helicopter over an elementary school, a church and other places that are still blocked off, while several teams of engineers and heavy machinery continued to clear roads and tunnel entrances of the huge boulders blocking them.

records and analyses 40,000 earthquakes a year, with equipment that is constantly being improved. But only a fraction of these tremors are perceptible, and only a fraction of these cause damage. During the 20th century, 48 earthquakes resulted in deaths in Taiwan.

[Source: https://www.lemonde.fr/en/environment/article/2024/04/10/taiwan-earthquake-natural-disaster-expertise-helped-limit-death]

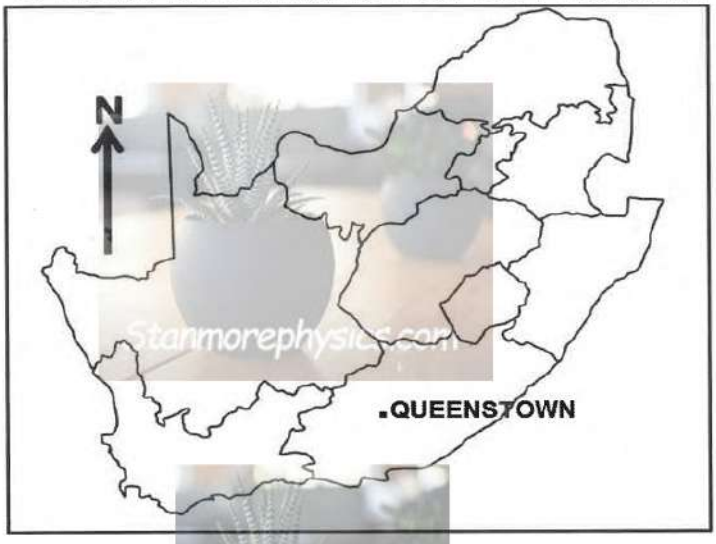
2.5.1	Define the term *earthquake.*	(1 x 2)	(2)
2.5.2	State the number of people who were injured in the earthquake.	(1 x 1)	(1)
2.5.3	Discuss the negative effects of the earthquake in Taiwan.	(2 x 2)	(4)
2.5.4	The survivors of the earthquake asked for assistance (help) from all over the world. In a paragraph of approximately EIGHT lines Suggest FOUR ways to assist the survivors.	(4 x 2)	(8)

[60]

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

GENERAL INFORMATION ON QUEENSTOWN



Co-ordinates: 31° 53' 60"S
26° 52' 60"E

Queenstown, now known as Komani, named after the Komani River, is situated 205 km North-West of East London. It is close enough to the Wild Coast and Karoo Heartland to make it a favoured stopover along the N6 National Freeway.

The town serves as a commercial centre for the surrounding farming community. Lying in a temperate plateau climate region, it is covered by tall native grasses and a distribution point for wheat-, cattle- and wool-production.

Climate data

Mean annual maximum	22,92°C
Mean annual minimum	11.14°C
Mean annual rainfall	90.83mm

The town was laid out in 1853 and attained Municipal Status in 1855. Named after Queen Victoria of England, Queenstown was originally intended as a military outpost and as such is designed in a central hexagon meant to serve as a protective lager for its town's people, who fortunately never had to use it for this purpose.

[Adapted from https://rb.gy/yz65vd, https://rb.gy/11lxdq and https://rb.gy/z06ibb]

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 The orthophoto map is …compared to the topographic map as it shows …

i) larger scale map
ii) smaller scale map
iii) a larger area
iv) more detail

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

3.1.2 The map reference/index of the map sheet situated directly southeast of 3126DD Queenstown is …

A 3126 AA
B 3127 CC
C 3227 AA
D 3226 BB (1 x 1) (1)

3.1.3 Determine the direction of point **11** (block **E5**) from point **9** (block **D2**) on the orthophoto map. (1 x 1) (1)

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3.1.4

(a) Draw a freehand cross section on your answer sheet, from spotheight 1493 (block **C4**) to spotheight 1485 (block **D4**). (2 x 1) (2)

(b) Indicate the position of the non-perennial river found between these two points (in block **C4**) with and arrow labelled **R**. (1 x 1) (1)

(c) Identify the landform in which this non-perennial river is found. (1 x 1) (1)

(d) In which general direction is this non-perennial river (in block **C4**) flowing? (1 x 1) (1)

3.1.5 Calculate the straight line distance in reality, between point **8** (in block **D4**) and point **10** (in block **B5**) on the orthophoto map in metres, if the map distance measured is 10,2cm. (2 x 1) (2)

3.2 MAP INTERPRETATION

3.2.1 A … is a man-made feature found at **31°48'30" S; 26°47'52"E.**

A ruin
B cultivated land
C reservoir
D non-perennial river (1 x 1) (1)

3.2.2 Refer to the background information

A dyke is a … and a sill is a …

A horizontal intrusive feature | vertical intrusive feature
B vertical intrusive feature | horizontal intrusive feature
C mushroom shaped intrusive feature | saucer shaped intrusive feature
D saucer shaped intrusive feature | mushroom shaped intrusive feature (1 x 1) (1)

3.2.3 (a) Calculate the mean annual temperature range for Queenstown, using the information from the background. (2 x 1) (2)

(b) What type of climate does Queenstown experience? (**maritime or continental climate**) (1 x 1) (1)

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(c) Provide one piece of evidence from the background information provided, to support your answer. (1 x 2) (2)

3.2.4 (a) Identify the feature labelled **I** (block A2) on the topographical map. (1 x 1) (1)

(b) How does the dominate type of rock found in this region, cause the feature you identified in Question 3.2.3(a). (1 x 2) (2)

3.2.5 What is the altitude of the trig. beacon found in block E3 on the topographic map. (1 x 1) (1)

3.2.6 Give the number on the orthophoto map that labels the same feature as the letter **J** on the topographic map. (1 x 1) (1)

3.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

3.3.1 Spatial data refers to the … and … of geographical features on earth.

A description and location
B position and description
C location and shape
D description and image (1 x 1) (1)

3.3.2 Define *Geographical Information System*. (1 x 2) (2)

3.3.3 Why is the information used in GIS referred to as geographical? (1 x 1) (1)

3.3.4 Refer to the diagram below.



[SOURCE: bit.ly/48X1vXv]

(a) Identify the component labelled **A.** (1 x 1) (1)

(b) Give an example of the hardware. (1 x 1) (1)

3.3.5 Refer to block **D4** on the topographic map. Identify the following spatial data:

(a) A point feature. (1 x 1) (1)

(b) A line feature. (1 x 1) (1)

TOTAL SECTION B: [30]

GRAND TOTAL: 150