GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

2024

GEOGRAPHY
NOVEMBER/DECEMBER 2024
PAPER 1
QUESTION PAPER
GRADE 10

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

This paper consists of 14 pages including cover page

INSTRUCTIONS AND INFORMATION

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

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

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

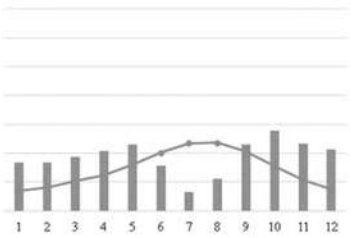
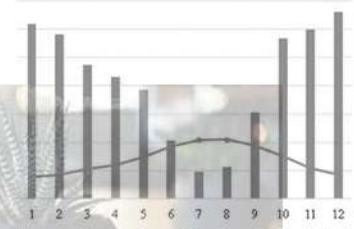
1.1.7 Which atmospheric layers experience a temperature increase with altitude?

(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)

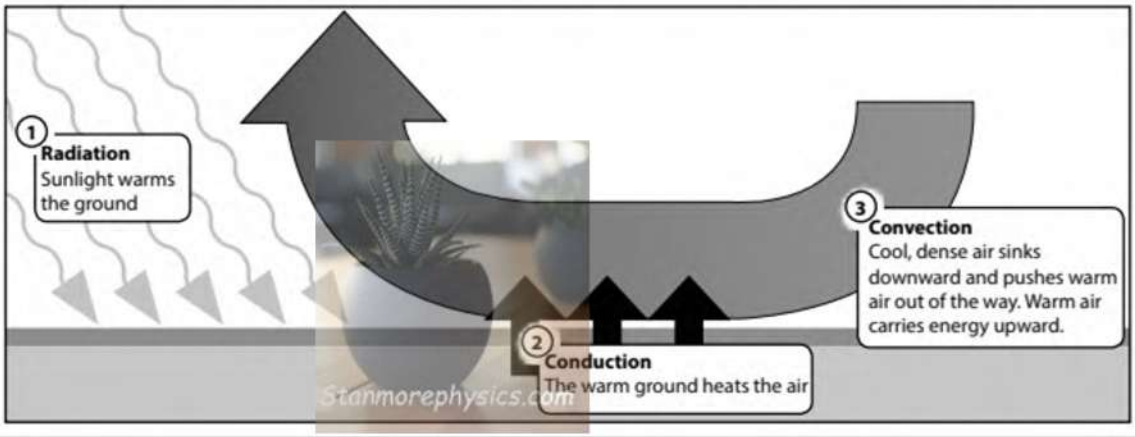
1.3 Refer to the diagram about heating of the atmosphere.

Heat or energy can be transferred in three ways:

1. Radiation
Short wave rays reach Earth's surface and are exposed to different elements and surfaces, they lose energy and are reradiated back into Earth's atmosphere.

2. Conduction
Heat is transferred from one molecule to another through contact.

3. Convection
When heat is transferred through the movement of the molecules.
Convection currents form when heating. Cold air sinks while warm air rises.



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

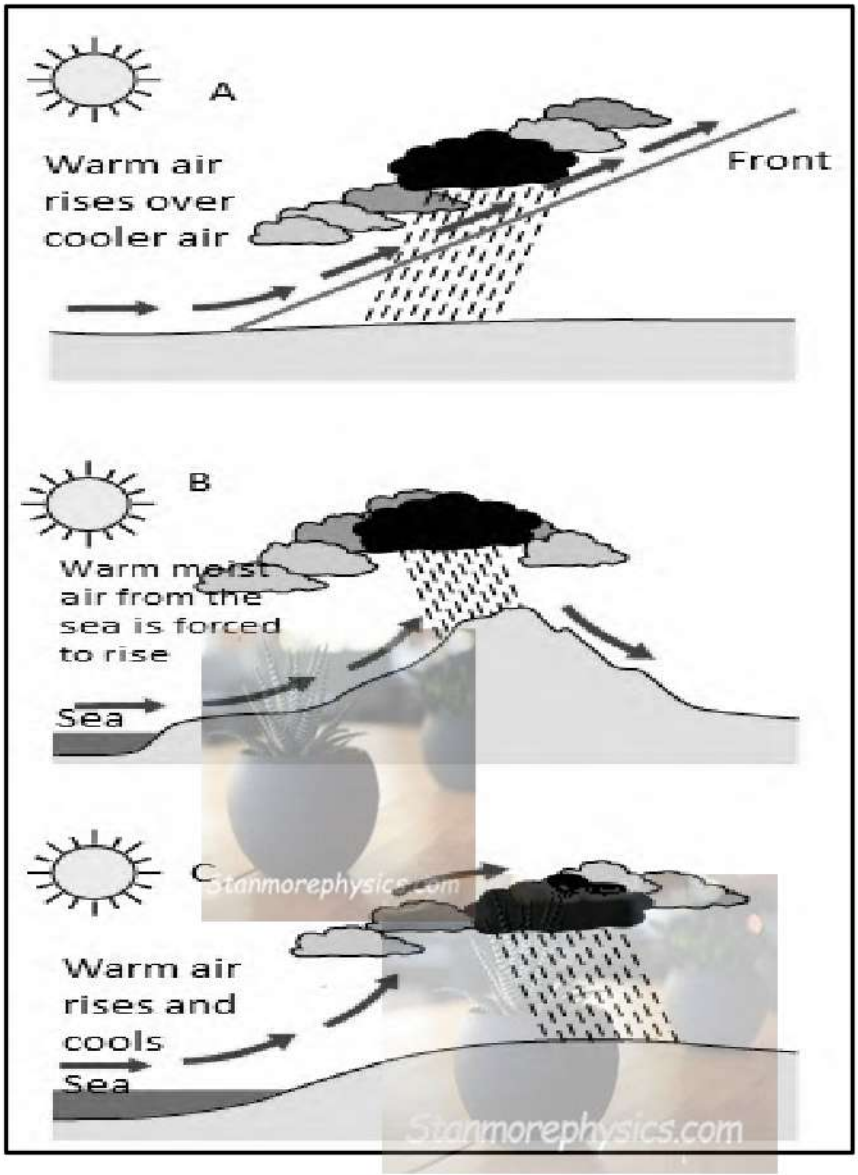
1.3.1 Define the term *terrestrial radiation.* (1 x 2) (2)

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)

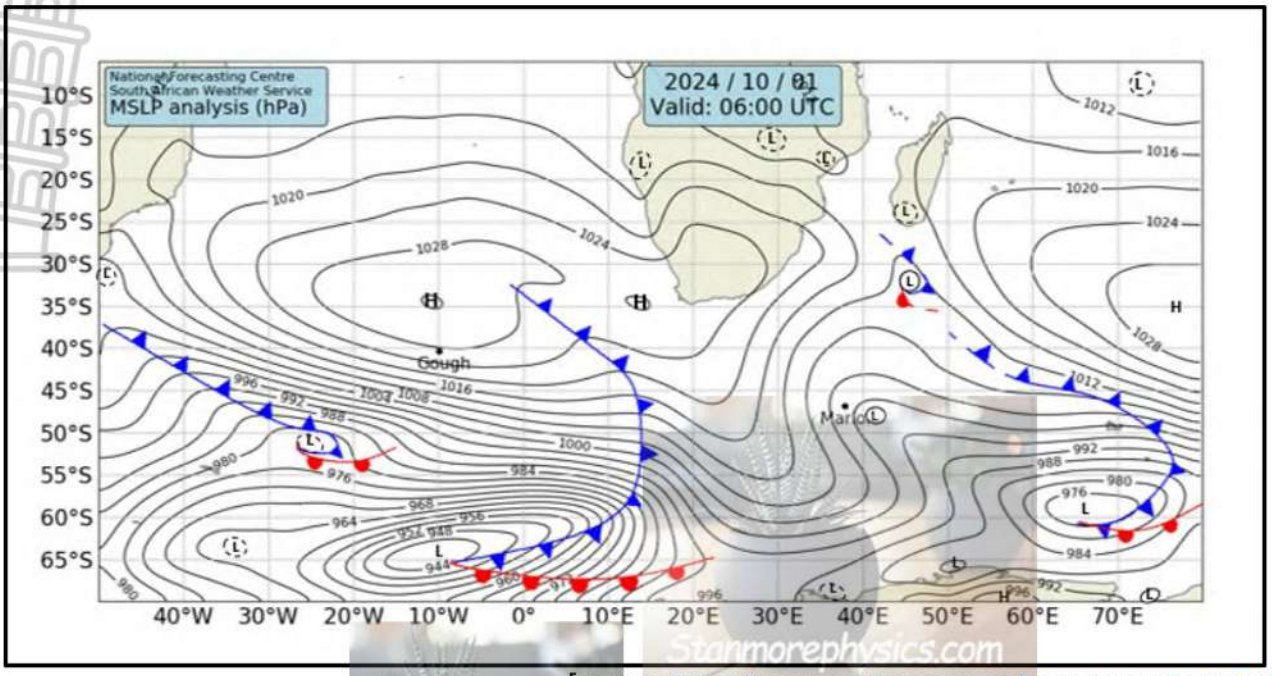
1.4 Refer to the diagram depicting moisture in the atmosphere.



[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]

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

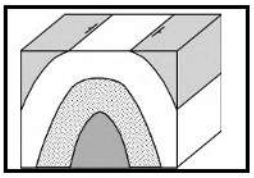
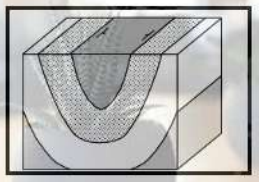
A (i) and (ii)
B (i) and (iv)
C (ii) and (iii)
D (ii) and (iv)

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.

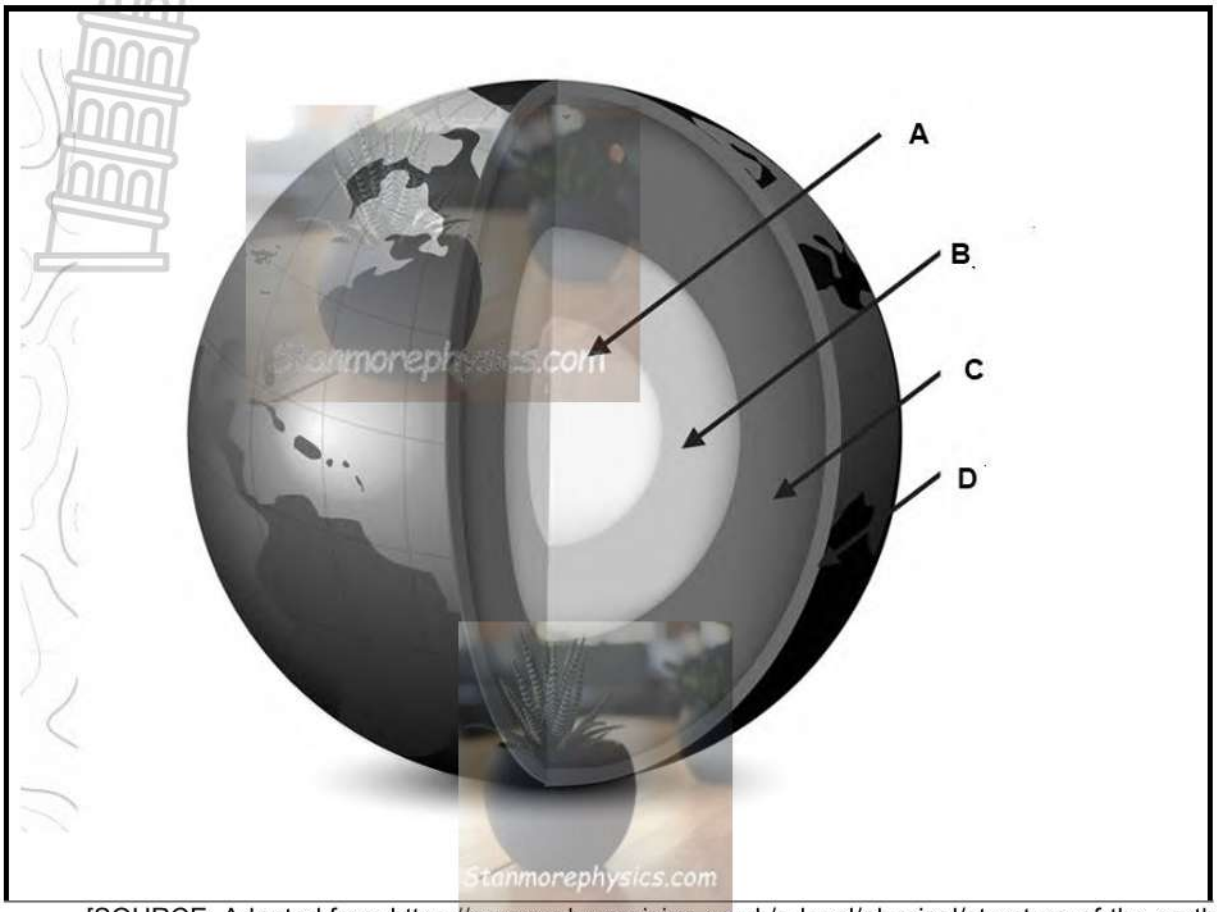
(8 x 1) (8)

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	

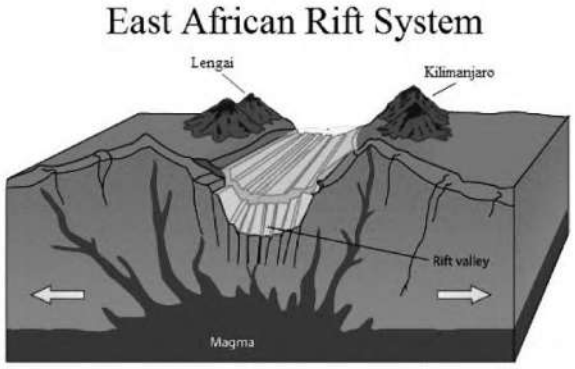
2.3.3 Is the temperature change decreasing or increasing as one moves from layer **A** to layer **D**? (1 x 1) (1)

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



[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]

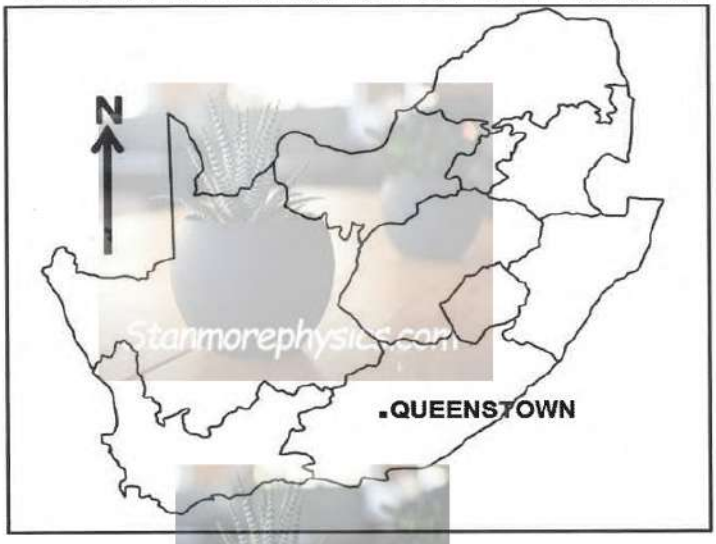
2.5.1	Define the term *earthquake.*	(1 x 2)	(2)
2.5.2	State the number of people who were injured in the earthquake.	(1 x 1)	(1)
2.5.3	Discuss the negative effects of the earthquake in Taiwan.	(2 x 2)	(4)
2.5.4	The survivors of the earthquake asked for assistance (help) from all over the world. In a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

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)

(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

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PAPER 1

MARKING GUIDELINE
GRADE 10

EXAMINER:	**PLC**
MODERATOR:	**PLC**
MARKS:	**150**
TERM WEIGHTING:	**60%**

PRINCIPLES FOR MARKING GEOGRAPHY - 2024

The following marking principles are developed to standardise marking processes.

MARKING

- ALL questions MUST be marked, irrespective of whether it is correct or incorrect
- Where the maximum marks have been allocated for a particular question, place an over the remainder of the text to indicate the maximum marks have been achieved.
- A clear, neat tick must be used: √
    - If ONE mark is allocated, ONE tick must be used: √
    - If TWO marks are allocated, TWO ticks must be used: √√
    - The tick must be placed at the FACT that a mark is being allocated for
    - Ticks must be kept SMALL, as various layers of moderation may take place
- Incorrect answers must be marked with a clear, neat cross: **X**
    - Use MORE than one cross across a paragraph/discussion style questions to indicate that all facts have been considered
    - Do NOT draw a line through an incorrect answer
    - Do NOT underline the incorrect facts

NOTE THE FOLLOWING

- If the numbering is incorrect or left out, as long as the sequence of answers to questions is followed candidates can be credited
- Spelling errors if recognisable, award the marks provided the meaning is correct.
- Be sensitive to the sense of an answer, which may be stated in a different way
- In questions where a letter is the accepted response, but the learner writes the actual answer- award marks. This concession remains until June 2022.

TOTALLING AND TRANSFERRING OF MARKS

- Each sub-question must be totalled

- Questions in Section A has five sub-sections, therefore five sub-totals per question required. Section B has three sub-sections and three sub-totals.
- Sub-section totals to be written in the right hand margin at the end of the subsection and underlined
- Sub-totals must be written legibly
- Leave space to write in moderated marks on different levels

- Total sub-totals and transfer totals to top left hand margin next to question number
- Transfer total to cover of answer book

MODERATION

Marking on each level of moderation is done in the same way as the initial marking. All guidelines for marking must be adhered to.

If a mark for a sub-question is changed after moderation, the moderator must strike through the marker's mark and write down the new mark. ~~12~~ 16

The total for the question must be re-calculated, and similarly be struck off and the new total to be written down ~~26~~ 36

SECTION A: THE ATMOSHERE AND GEOMORPHOLOGY

QUESTION 1: CLIMATE AND WEATHER

1.1.1 ***B (1) / Nitrogen***

1.1.2 ***C (1) / Troposphere***

1.1.3 ***A (1) / Stratosphere***

1.1.4 ***B (1) / (i), (iii) and (iv)***

1.1.5 ***B (1) / (i) and (iii)***

1.1.6 ***A (1) / Ozone***

1.1.7 ***C (1) / (i) and (iv)***

(7 x 1) (7)

1.2.1. ***Z (1) / Climate***

1.2.2 ***Y (1) / Weather***

1.2.3 ***Y (1) / Humidity***

1.2.4 ***Z (1) / Polar***

1.2.5 ***Z (1) / Orographic***

1.2.6 ***Z (1)***

1.2.7 ***Z (1) / Cumulonimbus***

1.2.8 ***Y (1) / Sublimation***

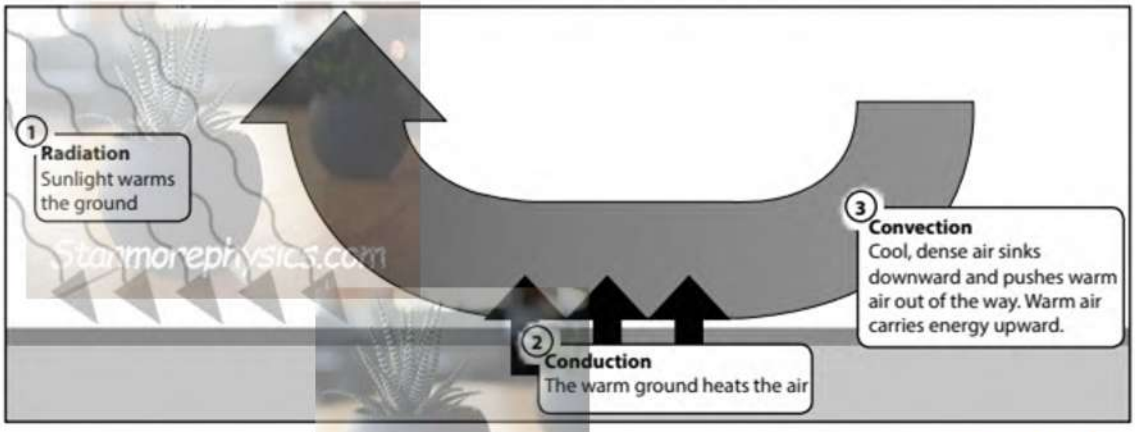
1.3 Refer to the diagram about heating of the atmosphere.

Heat or energy can be transferred in three ways:

1. Radiation
Short wave rays reach Earth's surface and are exposed to different elements and surfaces, they lose energy and are reradiated back into Earth's atmosphere.

2. Conduction
Heat is transferred from one molecule to another through contact.

3. Convection
When heat is transferred through the movement of the molecules. Convection currents form when heating. Cold air sinks while warm air rises.



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

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

The earth radiates energy to the atmosphere in the form of long waves (2)
[concept]

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

Cold air sinks and warm air rises. (1)

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

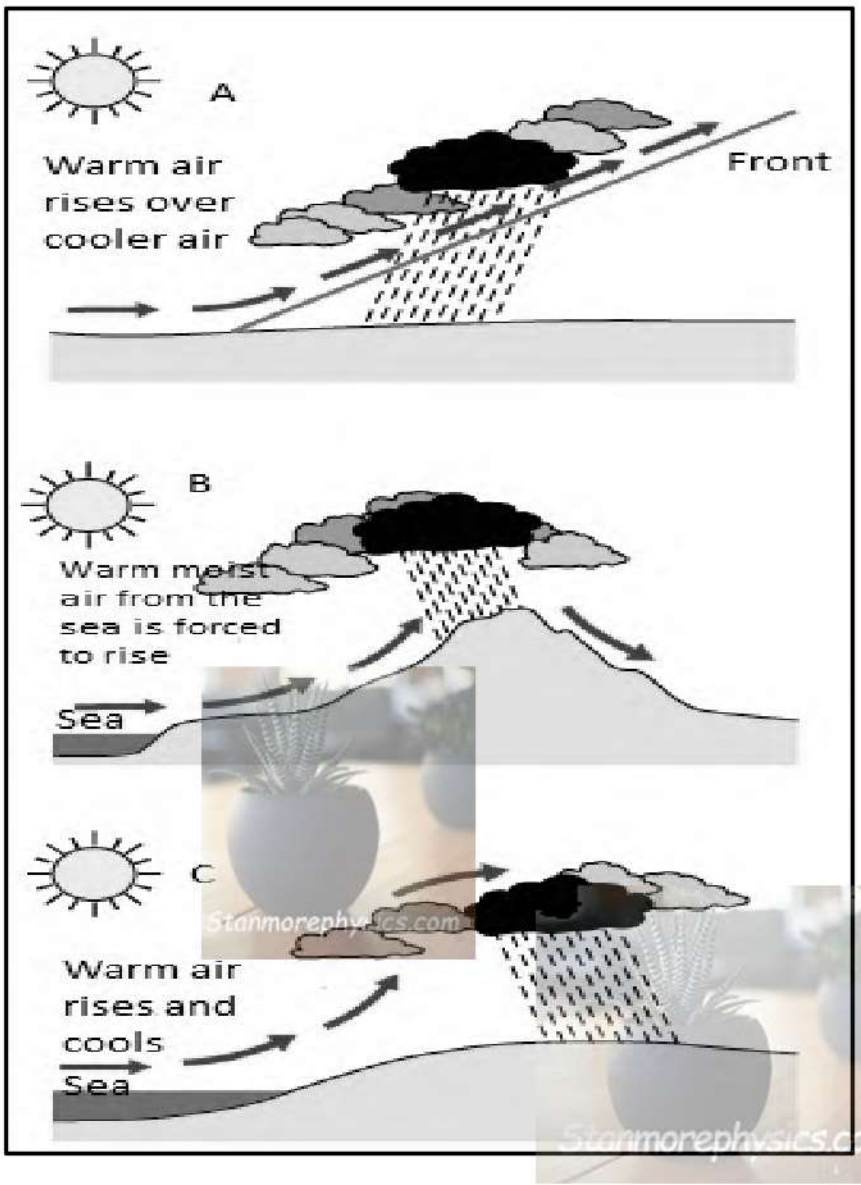
This circulation of air drives weather patterns by influencing wind systems, cloud formation, and precipitation. (2)
Global warming leads to higher temperatures at the Earth's surface. (2)
This causes more intense convection currents because warm air rises more rapidly. (2)
The faster rising air can lead to the formation of stronger and more frequent storms, such as hurricanes and thunderstorms. (2)
Warmer air can hold more moisture. (2)
As global temperatures rise, there is an increase in water vapor in the atmosphere, which fuels more intense precipitation. (2)

This means heavier rainfall in some areas, leading to floods, while other regions might experience more prolonged droughts due to shifting weather patterns. (2)
[ANY TWO]

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)

Human activities such as burning fossil fuels (coal, oil, and natural gas) for energy, deforestation, and industrial processes release large amounts of greenhouse gases, particularly carbon dioxide (CO_2) and methane (CH_4), into the atmosphere. (2)
These gases trap heat and contribute to the greenhouse effect, leading to global warming. (2)
Increased transportation, agricultural practices, and waste disposal also exacerbate heat retention. (2)
To mitigate the impact, reducing reliance on fossil fuels by shifting to renewable energy (solar, wind), reforestation efforts, and adopting sustainable agricultural practices can significantly lower greenhouse gas emissions. (2)
Additionally, energy-efficient technologies and conservation efforts play a critical role in protecting ecosystems from further damage caused by climate change. (2)
[ANY FOUR]

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)

A – Frontal Rainfall (1)
B – Orographic (Relief) Rainfall (1)
C – Convectional Rainfall (1)

1.4.2 Differentiate between orographic rainfall and convectional rainfall in terms of their respective formation processes. (2 x 2) (4)

Orographic rainfall occurs when moist air is forced to ascend over a mountain or highland. (2)
As the air rises, it cools and condenses to form clouds, resulting in precipitation on the windward side of the mountain. (2)

Orographic rainfall is driven by air forced over topographical features like mountains, leading to precipitation on the windward side. (2)
Convectional rainfall occurs when the Earth's surface heats up, causing the air above it to warm and rise. As this warm, moist air rises, it cools and condenses to form clouds, eventually leading to rainfall. (2)
Convectional rainfall results from the surface heating the air, causing it to rise, cool, and condense, usually producing thunderstorms in hot climates. (2)
[Any TWO]

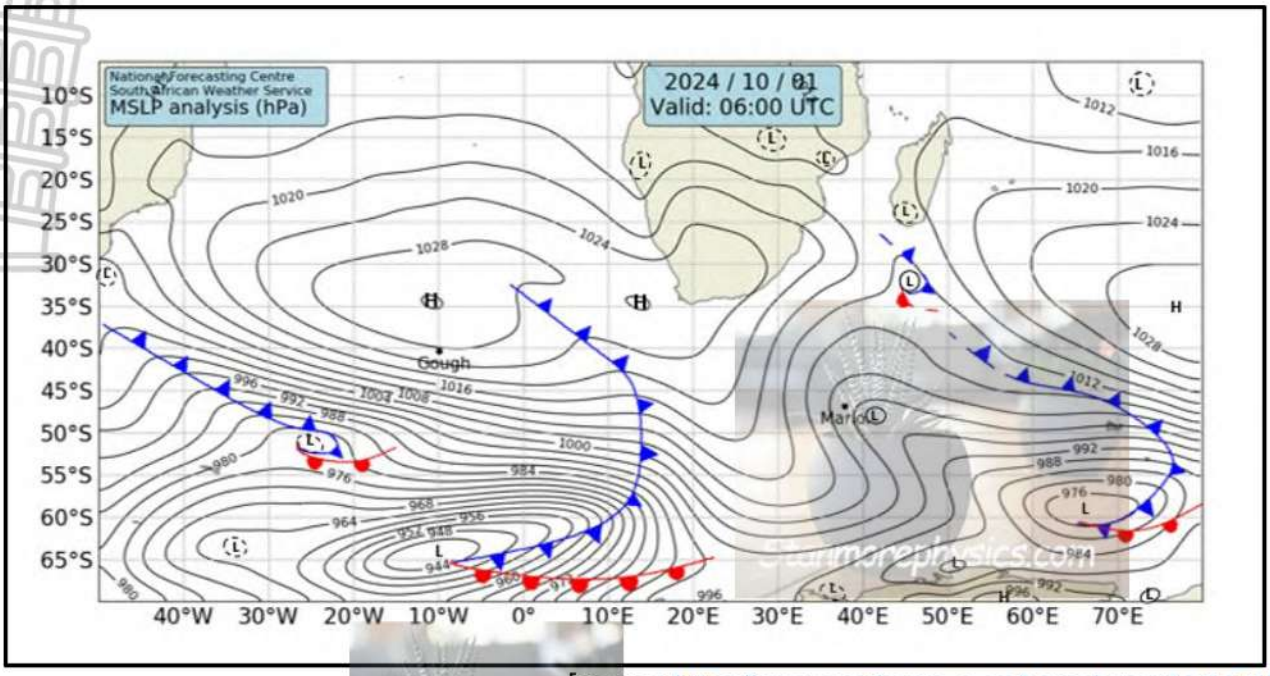
1.4.3 Explain the process of condensation and how it leads to the formation of clouds. (2 x 2) (4)

Condensation is the process by which water vapor in the air cools and changes into liquid water droplets. (2)
As warm, moist air rises into the atmosphere, it cools and the water vapor condenses onto tiny particles in the atmosphere, such as dust, salt, or smoke, known as condensation nuclei. (2)

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)

Regular and sufficient rainfall helps meet crops' water needs, reducing the reliance on artificial irrigation systems. (2)
When rainfall is unpredictable or insufficient, farmers must turn to irrigation to ensure their crops receive enough water for growth and survival. (2)
This can increase the cost of farming due to the need for infrastructure, energy to pump water, and maintenance of irrigation systems. (2)
[Any TWO]

1.5 Refer to a synoptic weather map below.



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

1.5.1 Define the term *isobar.* (1 x 2) (2)

An isobar is a line on a weather map that connects points of equal atmospheric pressure. (2)

1.5.2 State the season depicted (shown) on the synoptic weather map. (1 x 1) (1)

Spring (1)
Also accept Summer (1)

1.5.3 Provide TWO reasons for your answer in 1.5.2. (2 x 1) (2)

The date provided on the map is indicative of a Spring season (October) (1)
Low-Pressure Systems: Spring is often associated with unstable weather, including storms, which are driven by low-pressure systems. (1)

1.5.4 Differentiate between the weather conditions that occur with a cold front and with a warm front respectively. (2 x 2) (4)

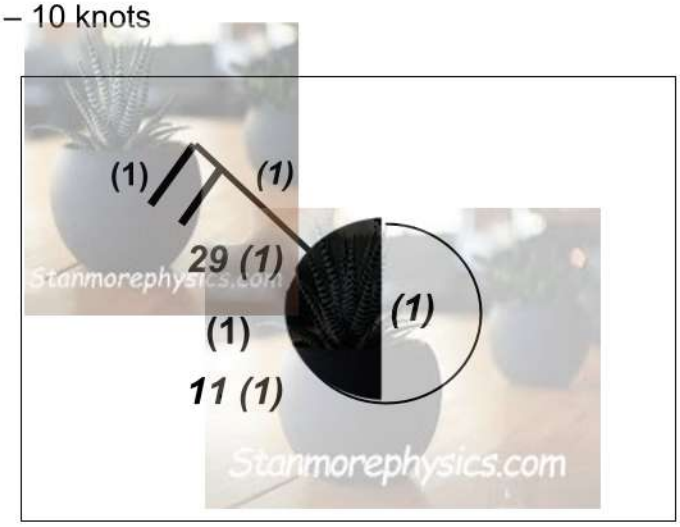
Cold fronts typically bring short, intense periods of rainfall or thunderstorms as the warm air cools and condenses rapidly. Showers are often heavy but brief. (2)
OR
A noticeable drop in temperature usually follows the passage of a cold front OR

Winds often shift direction and can become gusty OR Cumulonimbus clouds may develop, leading to thunderstorms (2)
Warm fronts typically bring prolonged, steady precipitation that can last for hours or days (2) OR
Following a warm front, temperatures usually rise as the warm air mass settles in (2) OR
Winds typically shift direction but may not be as gusty as with cold fronts (2)

1.5.5 Draw a weather station using weather conditions below, as cold front approaches Cape Town. (6 x 1) (6)

Air temperature – 29 C
Dew point temperature – 11 C
Cloud cover – 1/2
Precipitation - none
Wind direction - NW
Wind speed – 10 knots

1 mark if there is nothing where precipitation must be indicated



TOTAL: 60

QUESTION 2: GEOMORPHOLOGY

2.1.1 ***C (1) / geomorphology***

2.1.2 ***A (1) / laccolith***

2.1.3 ***D (1) / continental drift***

2.1.4 ***B (1) / Pangaea***

2.1.5 ***A (1) / crust***

2.1.6 ***C (1) / batholith***

2.1.7 ***D (1) / (ii) and (iv)***

2.1.8 ***D (1) / rock cycle***

(8 x 1) (8)

2.2.1 ***Y (1) compressional***

2.2.2 ***Z (1) / faulting***

2.2.3 ***Y (1) / crust***

2.2.4 ***Z (1) / Quartzite***

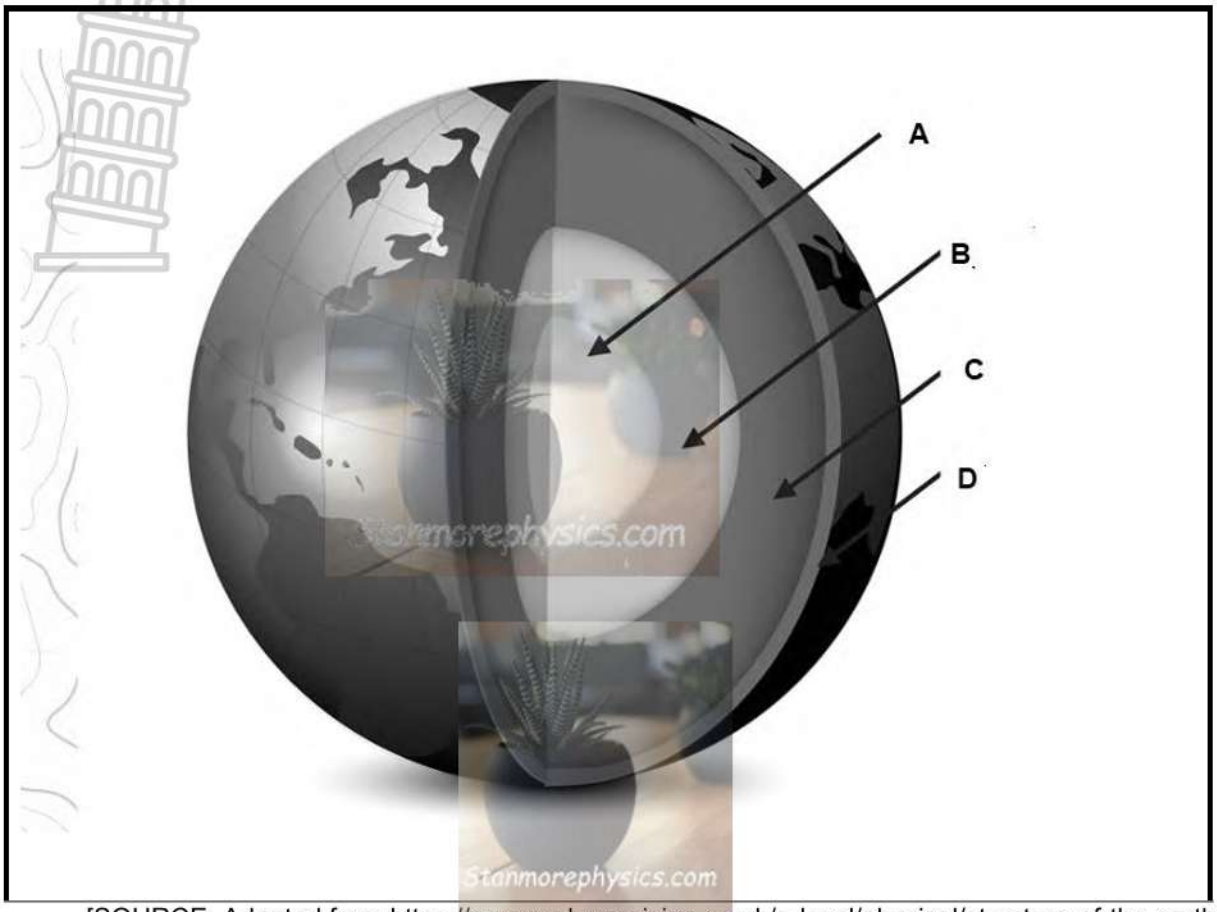
2.2.5 ***Y (1) / Fossils***

2.2.6 ***Y (1) / Folding***

2.2.7 ***Y (1)***

(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)

A – Inner core (1)
C – Mantle (1)
D– Crust (1)

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	***1 200 km (1)***
C	***2 900 km (1)***
D	***5 to 90 km (1)***

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

Decreasing (1)

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

Layer X is formed of rocks that are in a hot, thick molten state (2)
Magma has a plastic consistency that allows it to move and flow slowly (2)

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

It is suitable for buildings (2)
It is suitable for agricultural activities (2)

2.4 Refer to the infographic below.

THE GREAT RIFT VALLEY

[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)

Plate tectonics is the theory of formation and motion of the plates that make up the Earth's crust (Concept) (2)

2.4.2 Which theory is illustrated in the infographic? (1 x 1) (1)

Continental drift (1)

2.4.3 (a) Quote evidence to show that the rift valley formed on the African plate. (1 x 2) (2)

"The African Plate is splitting into two parts" (2)

(b) Name TWO plate that formed after the formation of the rift valley (2 x 1) (2)

Nubian Plate (1)
Somali Plate (1)

2.4.4 Explain the movement of the plates to form the Great Rift Valley. (1 x 2) (2)

The divergent tectonic plate movements (2)

2.4.5 Identify TWO countries that are found on the western & eastern side of the rift valley respectively (2 x 1) (2)

Western - Malawi (1)
Eastern - Kenya (1)
(Western and Eastern must be indicated)

2.4.6 Discuss TWO points of evidence that suggest that continents were once all joined in a single landmass. (2 x 2) (4)

Rocks of similar type (2)
The continents fit together like a jigsaw puzzle (2)
Fossils of similar reptiles were also found (2)
Fold mountain systems (2)
The Rift Valley (2)
Glaciers that covered large parts of the continents (2)

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)

Earthquake is a vibration in the earth's crust (2)

2.5.2 State the number of people who were injured in the earthquake. (1 x 1) (1)

1,133 (1)

2.5.3 Discuss the negative effects of the earthquake in Taiwan. (2 x 2) (4)

Damage to infrastructure (2)
Loss of lives (2)

Injury to people (2)
Buildings destroyed (2)
Destroys farmlands (2)
Destroys the natural environment (2)
Objects swallowed by the earth (2)
[Any TWO]

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)

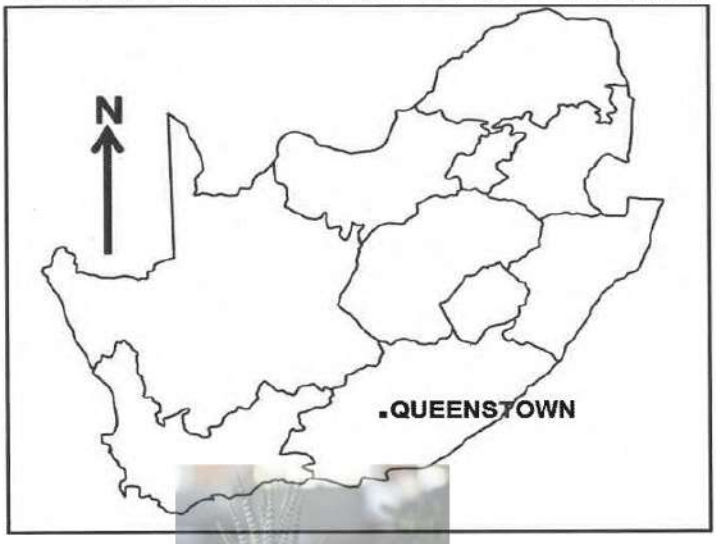
Provide them with shelter (2)
Provide them with food (2)
Doctors and social workers must be sent there to treat those who were
Injured (2)
Firefighters must be sent to Taiwan (2)
Give them money to start their lives again (2)
Provide them with clean water (2)
[Any FOUR]

[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]

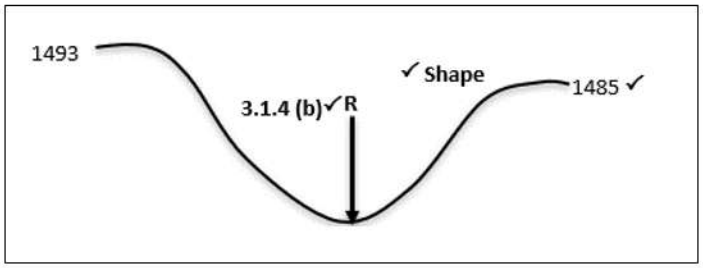
3.1 MAP SKILLS AND CALCULATIONS

3.1.1 ***D (1) / (ii) and (iii)***

3.1.2 ***C (1) / 3227 AA***

3.1.3 ***ESE (1)***

3.1.4 (a)



Note to the marker:

(1) mark for labelling the start and the end point (the one must be slightly higher than the other)

(1) mark for the shape

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

Valley (1)

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

East (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)

10,2cm x 100 (1) (indicting the steps in calculation)
= 1020m (1)
(The unit must be indicated in the answer)

3.2 MAP INTERPRETATION

3.2.1 ***B (1) / cultivated land***

3.2.2 ***B (1) / vertical intrusive feature | horizontal intrusive feature***

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

22,92 – 11,14(1) (correct substitution)
= 11,78°C (1)
(The unit must be indicated in the answer)

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

Continental Climate (1)

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

205 km from East London which is a coastal town (2)
Temperate plateau climate region (2)
(Any ONE)

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

Erosion (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)

Sandstone is less resistant to weathering and erosion (2)
Sandstone is soft and easy to weather and erode (2)
(Any ONE)

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)

11 (1)

3.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

3.3.1 ***C (1) / location and shape***

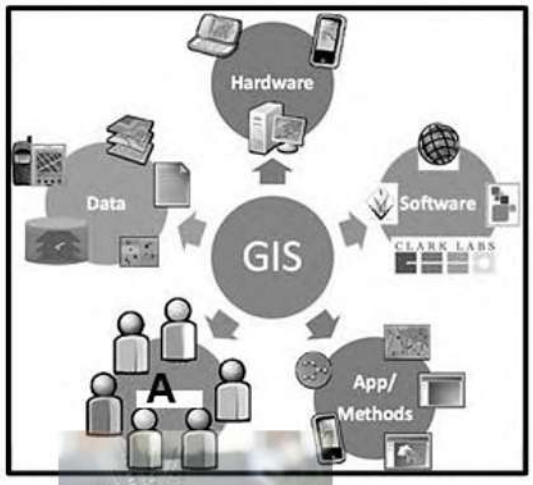
3.3.2 Define *Geographical Information System*. (1 x 2) (2)

A computer system that links geographical information with descriptive information about those places and uses that information to produce new maps (2)

3.3.3 Why is the information used in GIS referred to as geographical? (1 x 1) (1)
It can be placed on a map (1)

It has co-ordinates (1)
Information about things that exist and events that happen anywhere on Earth (1)
[Any ONE]

3.3.4 Refer to the diagram below.



[SOURCE: bit.ly/48X1vXv]

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

People (1)

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

Keyboard (1)
Screen (1)
Mouse (1)
Printer / plotter (1)
Visualizer (1)
Digitizer (1)
GPS (1)
Drone (1)
[Any ONE]

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

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

Spot height (1)
A Tree (1)
Reservoir (1)
[Any ONE]

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

Non-perennial river (1)
Contour line (1)
Other road (1)
[Any ONE]

TOTAL SECTION B: [30]

GRAND TOTAL: 150