BERGVLIET HIGH SCHOOL

GEOGRAPHY
PAPER 1

GRADE 10 FINAL EXAMINATION

FRIDAY 8 NOVEMBER 2024

MARKS: 150	TIME: 3 HOURS
EXAMINER:	MR B. JOHNS
MODERATOR:	MR S. PATTENDEN

This question paper consists of 13 pages.

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)

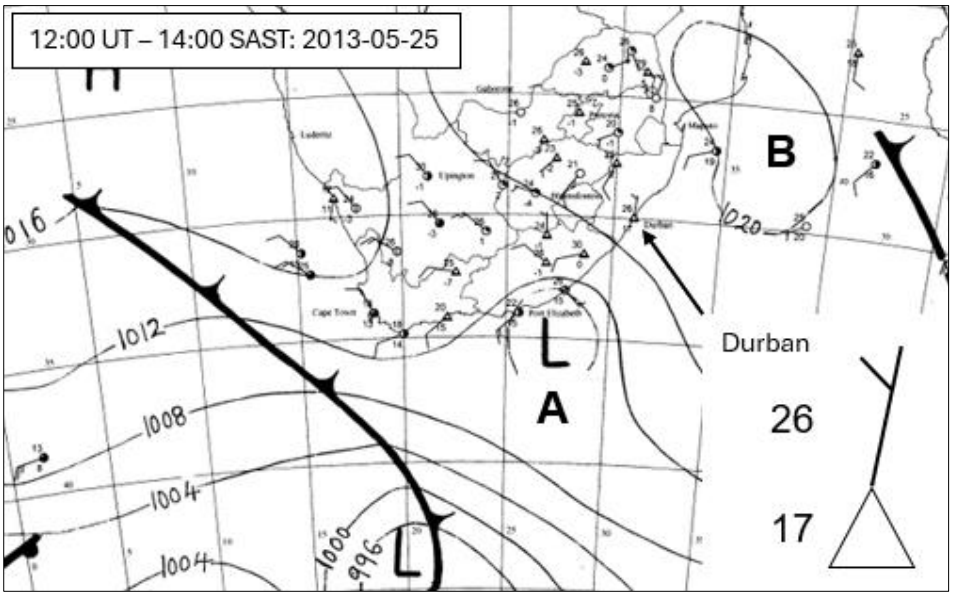
2. Answer all THREE questions.
3. ALL diagrams are included in the QUESTION PAPER.
4. Leave a line between subsections of questions answered.
5. Start EACH question at the top of a NEW page.
6. Number your answers correctly according to the numbering system used in this question paper.
7. Do NOT write in the margins of the answer book.
8. Draw fully labelled diagrams when instructed to do so.
9. Answer in FULL SENTENCES, except when asked to state, name, identify or list.
10. The unit of measurement MUST be given in the final answer, where applicable, for example 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 extract from 3126 DD 1 NOOITGEDACHT are provided.
15. The area demarcated in RED on the topographic map represents the area covered by the orthophoto map.
16. Show ALL calculations where applicable. Marks will be allocated for this.
17. You must hand in the topographic and orthophoto map to the invigilator at the end of this examination session.

QUESTION 1: THE ATMOSPHERE

1.1 Study the synoptic weather map below.



Choose the correct answer from the words given inside the brackets. Write only the answer next to the question number (1.1.1 to 1.1.8).

1.1.1 The synoptic weather map represents typical (summer / winter) conditions.

1.1.2 Isobars show places of equal air (pressure / temperature).

1.1.3 The value of the isobar at **A** is (1008 hPa / 1012 hPa).

1.1.4 A (low / high) pressure cell is located at **B**.

1.1.5 The (cold / warm) front is west of Cape Town.

1.1.6 The front to the west of Cape Town brings (clear / cloudy) weather.

The following questions refer to the enlarged weather station for Durban.

1.1.7 The dew point temperature at Durban is (17°C / 26°C).

1.1.8 The wind speed is (above / below) 8 knots.

(8 x 1) (8)

1.2 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question numbers (1.2.1 to 1.2.7).

1.2.1 … is energy from the sun that reaches the earths' atmosphere.

A Long-wave radiation
B Insolation
C Radiation
D Terrestrial radiation

1.2.2 The transfer of heat from the earth to the lower part of the atmosphere is called …

A convection.
B conduction.
C Coriolis force.
D latent heat.

1.2.3 The layer of atmosphere closest to the earth's surface is the …

A thermosphere.
B stratosphere.
C mesosphere.
D troposphere.

1.2.4 The ozone layer is found inside the …

A thermosphere.
B stratosphere.
C mesosphere.
D troposphere.

1.2.5 Chemicals used in some aerosol sprays, refrigerants, air conditioners and industrial cleaning materials are known as …

A oxygen atoms.
B chlorine carbons.
C pollutants.
D chlorofluorocarbons.

1.2.6 What is the collective name for water, in any form, that falls from the atmosphere onto the earth's surface?

A Thunderstorm
B Fog
C Precipitation
D Rainfall

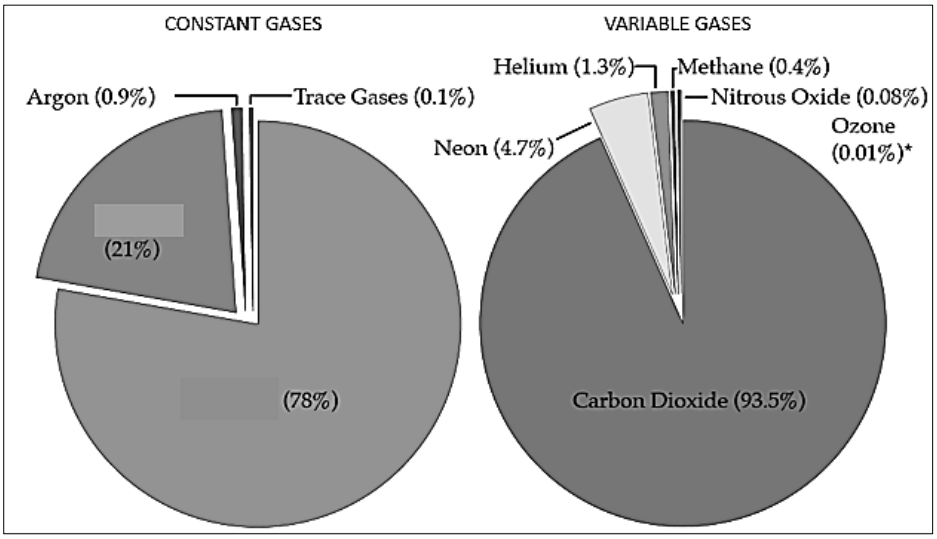
1.2.7 Which of the following are true when the air temperature increases?

(i) Air pressure increases.
(ii) Air pressure decreases.
(iii) Water vapour content increases.
(iv) Water vapour content decreases.

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

(7 x 1) (7)

1.3 Refer to the pie charts on the composition of the atmosphere.



1.3.1 Define the term *atmosphere*. (1 x 2) (2)

1.3.2 Match the constant gases in the atmosphere with the following percentages:

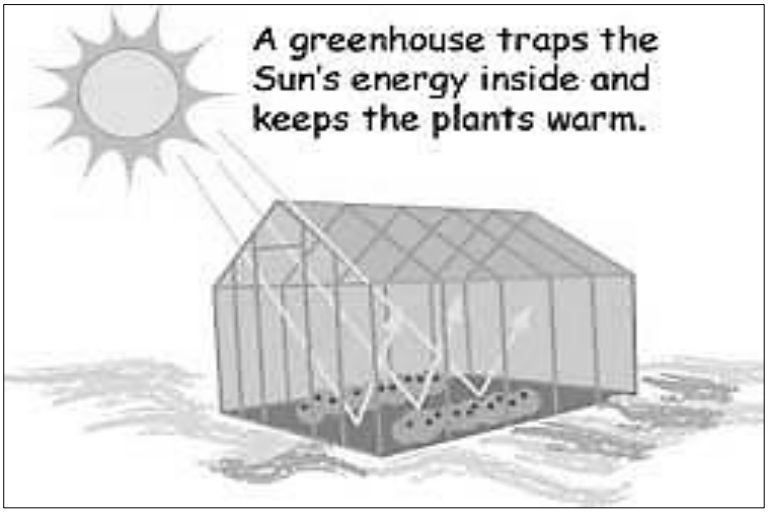
a) 21%
b) 78% (2 x 1) (2)

1.3.3 Identify ONE noble gas from the illustration. (1 x 1) (1)

1.3.4 Explain the importance of ozone (and the ozone layer) in the atmosphere. (2 x 2) (4)

1.3.5 Discuss why life on Earth is dependent on the atmosphere. (3 x 2) (6)

1.4 The illustration below references the way the atmosphere is heated.



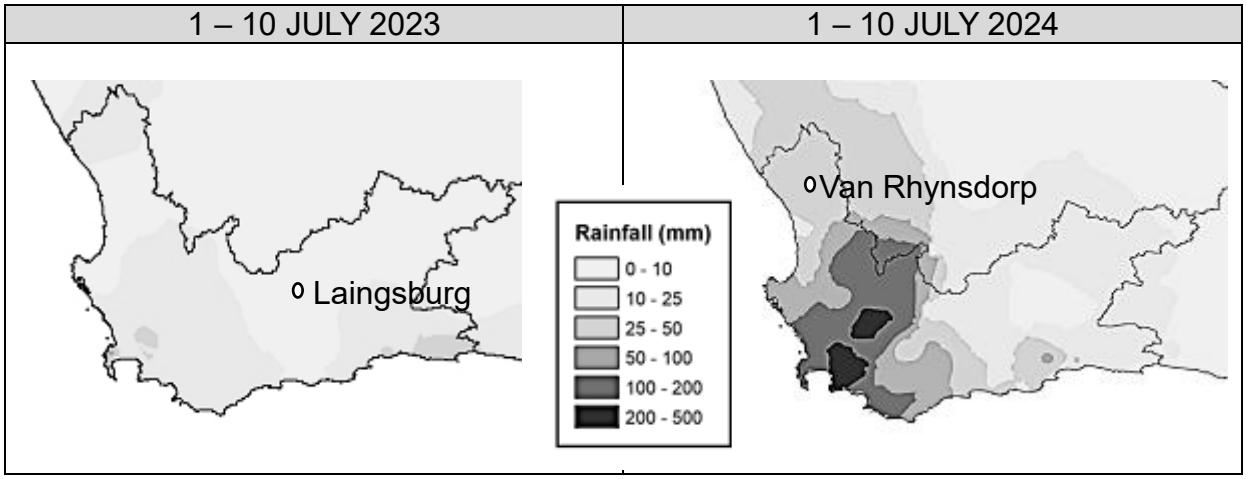
1.4.1 Provide a term to describe the phenomenon being illustrated. (1 x 1) (1)

1.4.2 Describe how the phenomenon (named in QUESTION 1.4.1) takes place in the atmosphere. (2 x 2) (4)

1.4.3 Explain why the enhanced version of the phenomenon is causing global warming. (1 x 2) (2)

1.4.4 In a paragraph of approximately EIGHT lines, suggest FOUR sustainable strategies (ways) to reduce global warming. (4 x 2) (8)

1.5 Study the rainfall distribution maps for the Western Cape below.



1.5.1 Did the Western Cape show a decreasing or an increasing trend in rainfall between July 2023 and July 2024? (1 x 1) (1)

1.5.2 Write down the rainfall range for each of the following towns:

a) Van Rhynsdorp (July 2024)

b) Laingsburg (July 2023) (2 x 1) (2)

1.5.3 The Western Cape receives different types of rainfall (shown in the table):

Convectional	Frontal (Cyclonic)	Relief (Orographic)

Match a type of rainfall that is most prevalent at a certain time of the year.

a) Winter

b) Summer

c) Any time of the year. (3 x 1) (3)

1.5.4 Name the type of clouds that generally produce convectional rainfall. (1 x 1) (1)

1.5.5 Describe the development of frontal (cyclonic) rainfall. (3 x 2) (6)

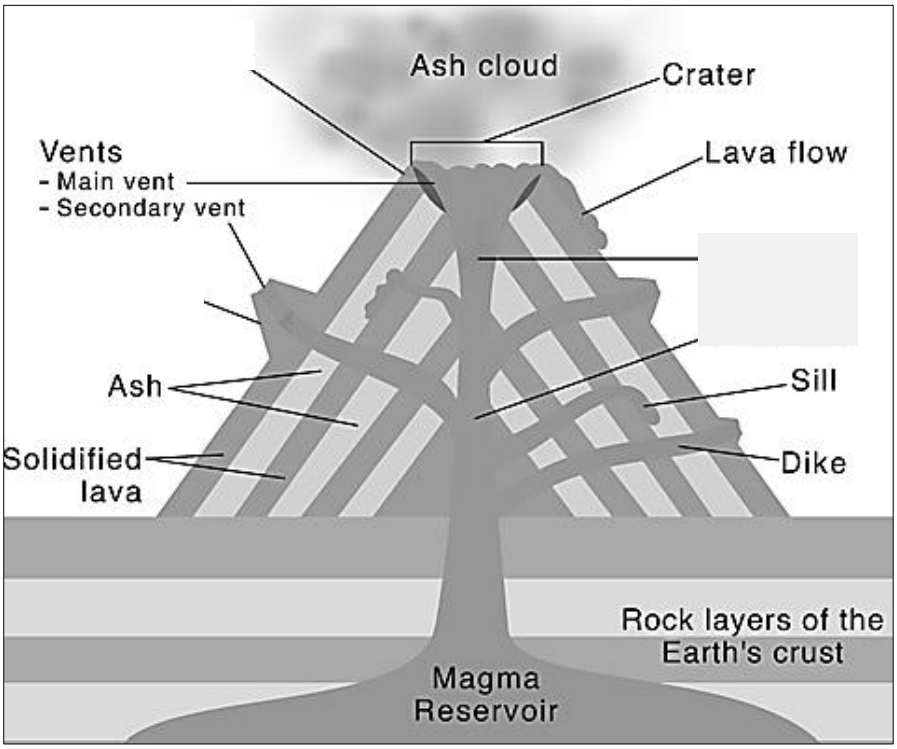
1.5.6 Discuss ONE benefit of winter rainfall for agriculture in the Western Cape. (1 x 2) (2)

[60]

QUESTION 2: GEOMORPHOLOGY

2.1 Study the diagram of a volcano, and then match a word/term from the diagram with a statement/definition.

Write only the word/term next to the question number (2.1.1 to 2.1.7).



2.1.1 The outermost layer of the earth.

2.1.2 Molten rock material under the surface of the earth.

2.1.3 The main material making up a cinder cone of a volcano.

2.1.4 Molten rock material that flows over the surface of the earth.

2.1.5 Openings in the earth through which molten material flows onto surface.

2.1.6 An intrusive form where molten rock material spreads horizontally between layers and then solidifies.

2.1.7 A wall-like intrusion that cuts across layers of rock.

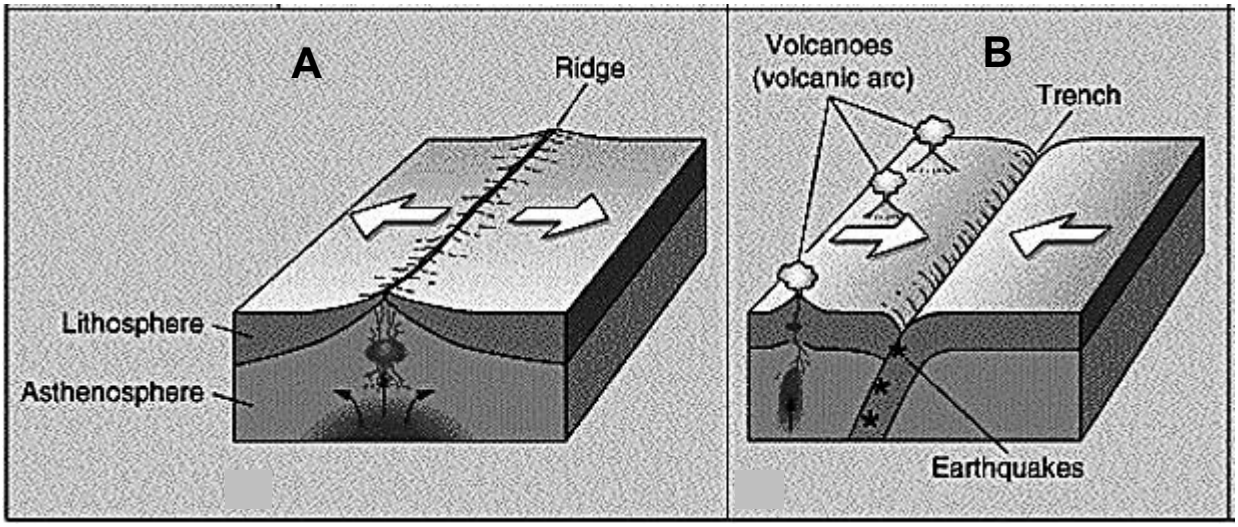
(7 x 1) (7)

2.2 Complete the statements in COLUMN A with the options in COLUMN B.
Write only **Y** or **Z** next to the question numbers (2.2.1 to 2.2.8).

COLUMN A		COLUMN B	
2.2.1	The Theory of … states that all the continents once formed part of one large continent.	**Y**	Continental Drift
		Z	Plate Tectonics
2.2.2	The one large continent (super continent) was called …	**Y**	Pandora
		Z	Pangaea
2.2.3	Once the super continent split into two parts the northern section was called …	**Y**	Gondwanaland
		Z	Laurasia
2.2.4	The west coast of Africa and the east coast of … fit together like a jigsaw puzzle.	**Y**	North America
		Z	South America
2.2.5	The fossil remains of a reptile, the … , were found in Africa and Antarctica.	**Y**	Lystrosaurus
		Z	Tyrannosaurus
2.2.6	Glacial deposits in … matched those found in West Africa.	**Y**	Brazil
		Z	Canada
2.2.7	The Theory of … explained why the continents are all able to move.	**Y**	Continental Drift
		Z	Plate Tectonics
2.2.8	The continents are said to float on the … mantle.	**Y**	liquid
		Z	solid

(8 x 1) (8)

2.3 Refer to the different plate boundaries/margins to answer the questions that follow.



2.3.1 Compare the plate boundaries by redrawing and completing the table:

	A	B
Type of Plate Margin		
Crust Created **or** Crust Destroyed		
Location: Edge of Continents **or** Middle of Oceans		

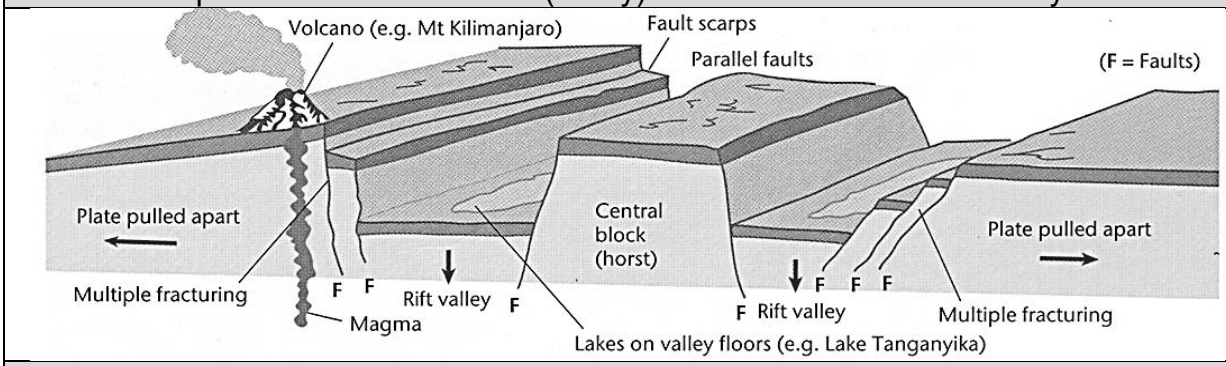
(6 x 1) (6)

2.3.2 Which plate margin (**A** or **B**) involves subduction of plates? (1 x 1) (1)

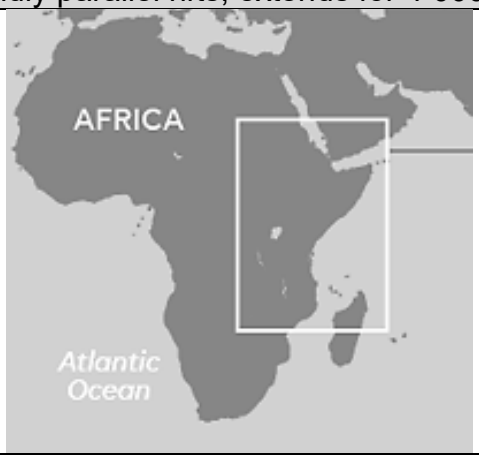
2.3.3 In a paragraph of approximately EIGHT lines describe the formation of volcanic arcs (volcanic island arcs) AND the reason for earthquakes developing as indicated in diagram **B**. (4 x 2) (8)

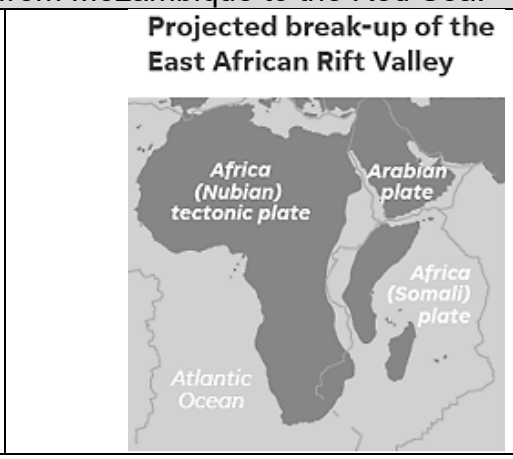
2.4 Study the infographic on rift valleys and the East African Rift System.

Rift valleys are narrow and long, some hundreds of kilometres in length. When a divergent boundary occurs beneath a thick continental plate, the pull-apart is not strong enough to create a clean, single break through the thick plate material. The thick continental plate breaks into a rift-shaped structure. As the two plates pull apart, normal faults develop on both sides of the rift (valley). The central floor of the valley sinks lower.



The East African Rift System extends from Jordan in southwestern Asia southward through eastern Africa to Mozambique. The East African Rift Valley formed around 25 to 30 million years ago where the Somalian and Nubian plates are pulling away from the Arabian Plate. The eastern branch of the rift passes through Ethiopia and Kenya, and the western branch from Uganda to Malawi. The valley, which consists of two broadly parallel rifts, extends for 4 000 km from Mozambique to the Red Sea.





2.4.1 Explain what a fault is, and how faulting can result in the formation of rift valleys. (3 x 2) (6)

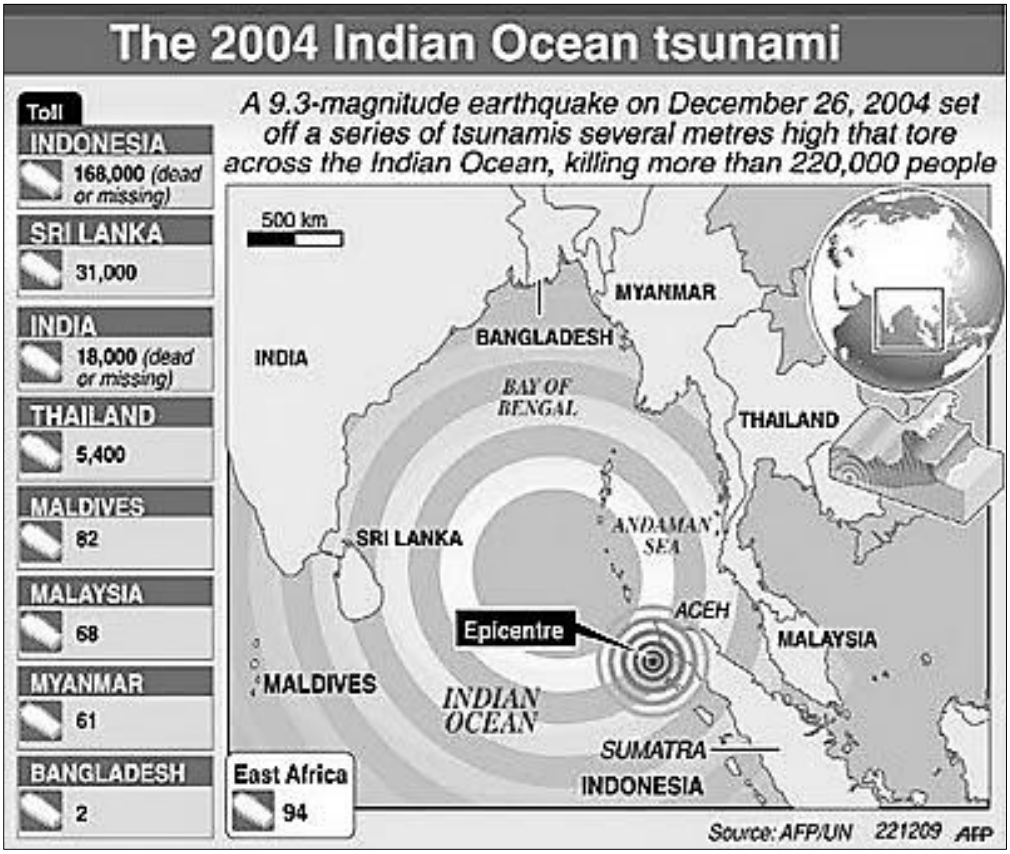
2.4.2 Identify TWO physical landforms/features that developed due to the faulting and rifting in East Africa. (2 x 1) (2)

2.4.3 Discuss ONE economic benefit for countries where the landforms/features identified in QUESTION 2.4.2 are located. (1 x 2) (2)

2.4.4 Provide another name for the Nubian Plate. (1 x 1) (1)

2.4.5 The Somali and Nubian Plates will eventually separate. Suggest TWO possible consequences for the natural environment of predicted split. (2 x 2) (4)

2.5 Study the data on the Indian Ocean Tsunami of 26 December 2004.



2.5.1 Define the concept of a *tsunami*. (2 x 1) (2)

2.5.2 State the death toll in Indonesia and Bangladesh respectively. (2 x 1) (2)

2.5.3 Explain the reason for the large difference in the death toll between Indonesia and Bangladesh. (2 x 2) (4)

2.5.4 Which country reported 5 400 deaths because of the tsunami? (1 x 1) (1)

2.5.5 Describe TWO other negative consequences of the tsunami for the people of the country named in QUESTION 2.5.4. (2 x 2) (4)

2.5.6 Recommend ONE strategy that could reduce the death toll associated with a tsunami. (1 x 2) (2)

[60]

SECTION B

QUESTION 3 GEOGRAPHICAL SKILLS AND TECHNIQUES

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 Which human-made feature is found at grid reference 31° 49' 41" S and 26° 45' 35" E on the topographical map?

A Trees
B Spot height
C Ruin
D Building (1 x 1) (1)

3.1.2 The contour interval on the orthophoto map is … metres.

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

3.1.3 The photo number for the orthophoto map of NOOITGEDACHT is …

A 31
B 26
C DD
D 1 (1 x 1) (1)

3.1.4 Calculate the average gradient from **6** in block **D4** to **7 (**spot height 1567) in block **D2** on the orthophoto map. Use a HE of 950 m.
Write answer to TWO decimal places.

Formula: $\frac{\boldsymbol{Vertical\ Interval\ (VI)}}{\boldsymbol{Horizontal\ Equivalent\ (HE)}}$

(4 x 1) (4)

3.1.5 Use the given information to calculate the area (in m²) of the farm labelled **F** in block **E3** on the topographical map.

Length on map: 0.9 cm
Breadth on map: 0.7 cm

Formula: $\boldsymbol{Length\ x\ Breadth}$

(3 x 1) (3)

3.2 MAP INTERPRETATION

3.2.1 Map evidence indicates … rainfall because of the … blue lines and dams on the topographical map.

(i) annual
(ii) seasonal
(iii) continuous
(iv) dashed

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

3.2.2 The monthly temperatures for Queenstown are shown below:

AVERAGE TEMPERATURE (°C)												
J	F	M	A	M	J	J	A	S	O	N	D	Total
12.5	12.4	10.7	7.3	3.8	0.4	-0.6	0.5	2.8	5.1	8.2	11.1	**74.2**

a) Calculate the average monthly temperature for Queenstown. Write the answer correct to TWO decimal places. (1 x 1) (1)

b) During which month is precipitation likely to be in solid form? (1 x 1) (1)

Refer to the river at **10** on the orthophoto map to answer QUESTIONS 3.2.3 and QUESTION 3.2.4.

3.2.3 Does the river at **10** generally flow in a south-westerly or north-easterly direction. (1 x 1) (1)

3.2.4 Give a reason for your answer to QUESTION 3.2.3. (1 x 2) (2)

Refer to feature **11** on the orthophoto map to answer QUESTIONS 3.2.5 and QUESTION 3.2.6.

3.2.5 Identify the feature marked **11** on the orthophoto map. (1 x 1) (1)

3.2.6 Explain the specific purpose of the feature marked **11**. (1 x 2) (2)

Consider the slopes in block **C2** and block **C5** on the topographic map.

3.2.7 Which slopes (**C2** or **C5**) are more gentle? (1 x 1) (1)

3.2.8 Provide evidence from the map to support the answer to QUESTION 3.2.7. (1 x 2) (2)

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

The following questions refer to the orthophoto map. Choose the correct answer from inside each bracket.

3.3.1 The latitude for spot height 1558 (**E1**) is (31° / 26°) south. (1 x 1) (1)

3.3.2 (Oblique / Vertical) aerial photos are used to create orthophoto maps. (1 x 1) (1)

3.3.3 The orthophoto map is made up of (pixels / polygons). (1 x 1) (1)

Refer to block **A1** of the topographic map, and the photograph of the geographic feature shown below.



3.3.4 Identify the geographical feature shown in the photograph. (1 x 1) (1)

3.3.5 State the type of vector symbol used to indicate the location of the feature in **A1** on the topographic map. (1 x 1) (1)

3.3.6 Identify another geographical feature in **A1** that is indicated using the same kind of vector symbol as the one stated in QUESTION 3.3.2. (1 x 1) (1)

3.3.7 Explain the importance of using GIS in today's fast changing world. (1 x 2) (2)

[30]

TOTAL: 150