

**Instructions:** 1. Answer all questions.

2. Answer the questions on the answer booklet provided

3. Write neatly and number your answers clearly.

4. Think clearly and read questions carefully.

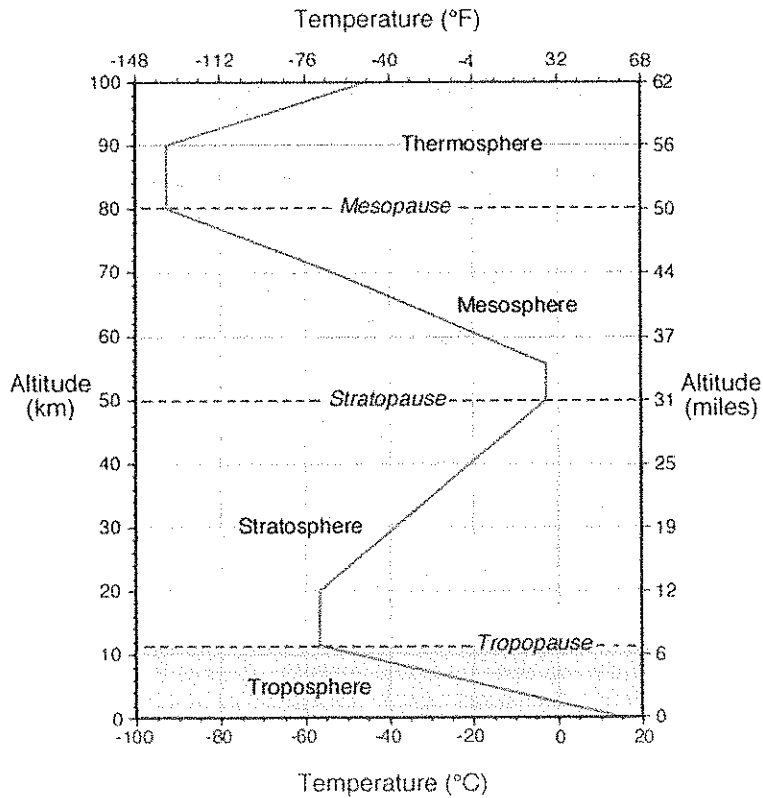
**Section A**

**Atmosphere, weather and climate.**

**Question One**

Study the temperature trace through the layers of the atmosphere

represented below:



1.1 Define "atmosphere". 2

1.2 The diagram shows lapse rates in the atmosphere what is lapse rate? 2

1.3 Is the lapse rate in the troposphere positive or negative? Why? 2

- 1.4 What is the temperature at the top of the troposphere? 1
- 1.5 State and give a reason for the temperature pattern observed in the stratosphere. 3
- 1.6 Name and give the approximate proportions of two gases that occur in the troposphere. 4
- 1.7 In which layer of the atmosphere is it easiest to fly an aeroplane? Explain why. 4
- 1.8 State two ways in which the atmosphere is important to us. 4

**Question Two** Match the descriptions in column A with the terms in column B. Write the number of the description and next to it the letter of the term you have chosen eg: 1.1 –A.

(10)

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Column A	Column B
2.1. A result of too many greenhouse gases in the atmosphere.	(A) Scattering
2.2. The percentage of water vapour in the atmosphere.	(B) Ultraviolet
2.3. The return of a wave from a surface like ice.	(C) Anticyclone
2.4. The energy taken in or released as a substance changes state from a solid to a liquid, or liquid to a gas.	(D) Local Humidity
2.5. The layer of the atmosphere where the ozone is found.	(E) Latent heat
2.6. When energy is transferred by heated air particles moving from one place to another.	(F) Agulhas
2.7. When incoming radiation is diverted by particles such as dust and smoke in the atmosphere.	(G) The visible spectrum
2.8. A pressure cell characterised by subsiding (sinking) air.	(H) Stratosphere
2.9. The ocean current dominating South Africa's west coast climate.	(I) Global warming
2.10. The longest wavelength in the electromagnetic spectrum.	(J) Benguella
	(K) Reflection
	(L) Radio
	(M) Insolation
	(N) Cyclone
	(O) Relative humidity
	(P) Convection

## Question Three

## Multiple choice

Write the number of the question and the letter of the correct answer for each of the options below.

3.1. The amount of water vapour in the atmosphere measured in  $\text{g/cm}^3$  cubed is called...

- A) Unsaturated humidity
- B) Absolute humidity
- C) Relative humidity
- D) Latent humidity

3.2. If water vapour remains constant, decreasing the temperature will increase the...

- A) Relative humidity
- B) Latent humidity
- C) Unsaturated humidity
- D) Saturated humidity

3.3. Name the term for when water is continually cycled in the atmosphere, land and sea.

- A) The water cycle
- B) Sublimation
- C) Hydraulic cycle
- D) Hydro cycle

3.4. The amount of heat necessary to raise the temperature of 1g of a substance by 1 degree Celsius is called?

- A) Adiabatic cooling
- B) Latent heat
- C) Specific heat
- D) Adiabatic heating

3.5 The effect that oceans have on the climate of coastal areas is:

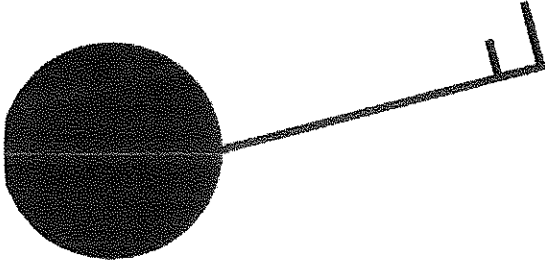
- A) making temperatures more extreme
- B) moderating temperatures
- C) decreasing rainfall
- D) No effect

(10)

Question Four Weather recording and representation

4.1 Complete the table next to the weather station model in your answer books by filling in the weather information. (6)

15  
 =  
 =  
 12



Weather Conditions
Cloud cover
Wind direction
Wind Speed
Temperature
Dew Point
Precipitation

4.2 What instruments are used to record:

a. precipitation

b. wind direction

2

4.3 On what type of map would you normally see this weather station model being used?

1

4.4 Atmospheric pressure is not represented here. Outline:

a. what atmospheric pressure is

b. how it is measured

c. how it is represented on the weather map you named in 4.3.

6

4.5 What is dew point?

2

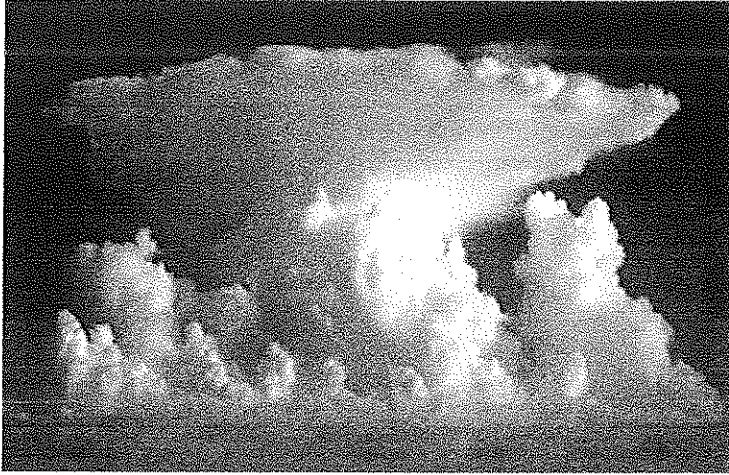
4.6 Comment on the moisture content of the air in this example by referring to the temperature and dew point.

3

[20]

Question Five

Moisture and types of rainfall



5. 1 The type of cloud represented here is:

- a. cumulonimbus
- b. Stratus
- c. Cirrus

2

5. 2 The type of rainfall most commonly associated with it is:

- a relief
- b. frontal
- c. convectional

2

5.3 Choose one of the types of rainfall in 5.2 and explain with the aid of sketches how it forms. 6

[10]

#### Question Six

#### Climate Change

Read the following extract from NASA regarding observations made on sea ice.

Since 1978, satellites have monitored sea ice growth and retreat, and they have detected an overall decline in Arctic sea ice. The rate of decline has steepened in the 21st century. In September 2002, the summer minimum ice extent was the lowest it had been since 1979. Although the September 2002 low was only slightly below previous lows, it was the beginning of a series of record or near-record lows in the Arctic.

The new summer lows, combined with poor wintertime recoveries, have fueled a persistent decline in Arctic sea ice. Since 2002, ice extent at the summer minimum has not returned to anything approaching the long-term average (1979-2000). Though winter ice extent has fluctuated, satellite and *in situ* observations have shown that there is much less multiyear ice and more annual ice. Source: NASA

The most striking evidence of a global warming trend is closely scrutinized data that show a relatively rapid and widespread increase in temperature during the past century. The 10 warmest years on record occurred during 1997-2008, according to NASA's Goddard Institute for Space Studies.

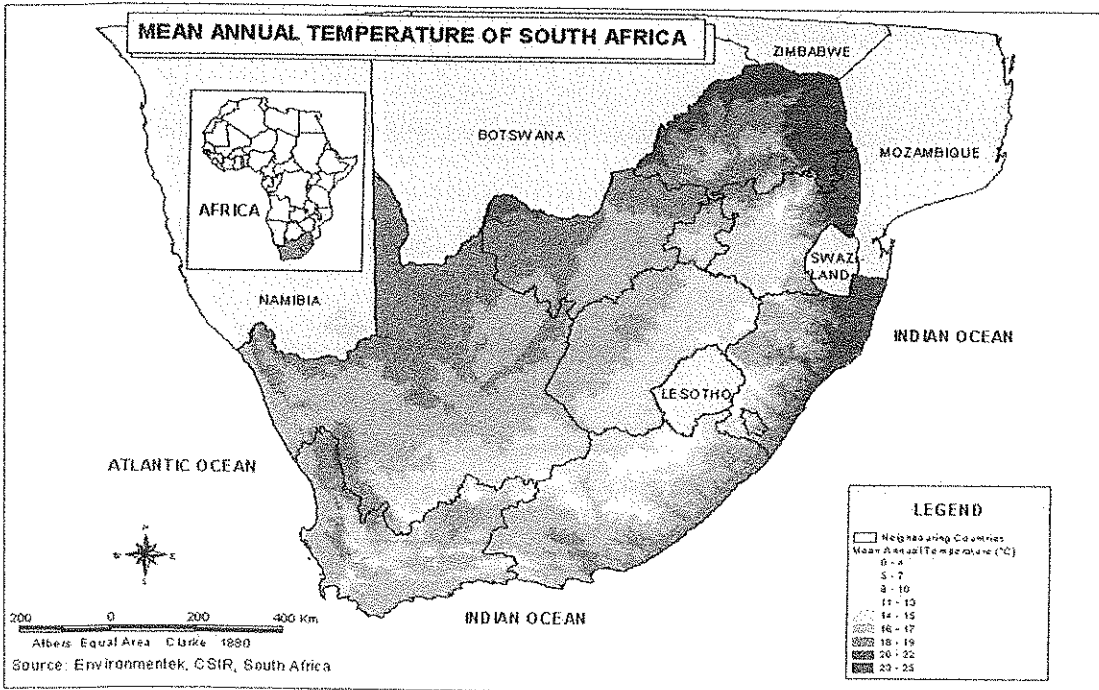
The rising temperatures observed since 1978 are particularly noteworthy because the rate of increase is so high and because, during the same period, the energy reaching the Earth from the Sun had been measured precisely enough to conclude that Earth's warming was not due to changes in the Sun.

Source: National wildlife federation

- 6.1 The temperatures in the arctic are low enough for the water in the upper layer of the sea to freeze. Explain why the temperatures are normally low in the Arctic. 4
- 6.2 Explain the effect of the polar ice on incoming solar radiation. 2
- 6.3 Suggest a reason why sea ice is being monitored. 2
- 6.4 If changes in the sun can not be blamed for rising temperatures, what can? Explain in a short paragraph. 6
- 6.5 Describe the effects which climate change associated with global warming is having on: agriculture, human settlements; ecosystems around the world. 6

[20]

Question Seven      The map below shows average temperatures across South Africa.



7.1 Name two factors that cause temperature variations across South Africa. 3

- 7.2 Explain how one of these factors affects temperatures. 4
- 7.3 Suggest a reason why Lesotho experiences low temperatures and frequent snow falls. 1
- [8]

Total Section A: 100

**Section B Geomorphology**

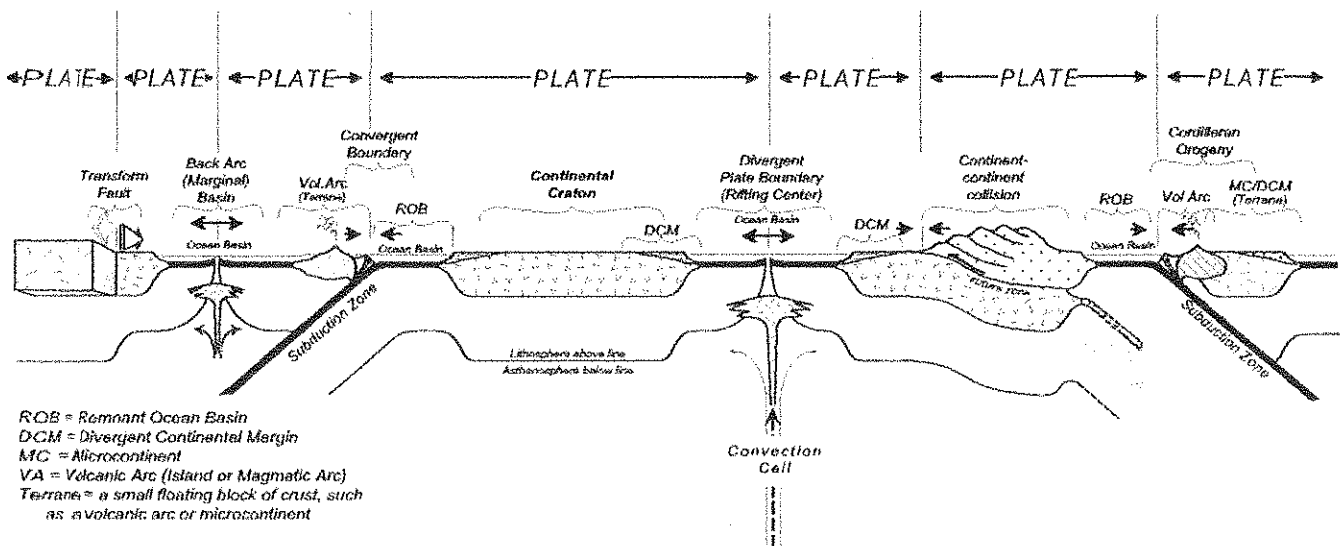
**Question One General questions**

Complete the sentences /statements below by filling in the missing information. Write only the question number and your answer.

- 1.1 Geomorphology is the study of \_\_\_\_\_ 2
- 1.2 Volcanic features formed beneath the earth's surface are termed \_\_\_\_\_ a \_\_\_\_\_ while those formed on the surface are called \_\_\_\_\_ b \_\_\_\_\_. 2
- 1.3 The mantle is made up of semi-\_\_\_\_\_ a \_\_\_\_\_ material and is important to plate tectonic theory because of \_\_\_\_\_ b \_\_\_\_\_ currents which occur in it.
- 1.4 The \_\_\_\_\_ a \_\_\_\_\_ crust is more dense than \_\_\_\_\_ b \_\_\_\_\_ crust which results in the process of subduction at plate boundaries.
- 1.5 Alfred \_\_\_\_\_ a \_\_\_\_\_ was mainly responsible for explaining \_\_\_\_\_ b \_\_\_\_\_ drift theory.

(10)

**Question Two Study the following representation of plate tectonics carefully.**



2.1 Write a brief explanation of each of the following that appear on the sketch:

- a. Fault 4
- b. Subduction 4

2.2 Explain why a volcanic arc occurs at the places indicated on the sketch. 4

2.3 Name one real example of a volcanic arc from your studies. 2

2.4 Explain the formation of a mid ocean ridge in the ocean basins. 4

2.5 Name the seismic event that often occurs at transform faults. 2

2.6 Explain why this event would occur here. 4

2.7 Name the feature/landform that is forming where continental crust is meeting continental crust on this sketch. 2

2.8 How are volcanic cones classified? 2

2.9 What type of volcano is likely to form at the subduction zone shown? 2

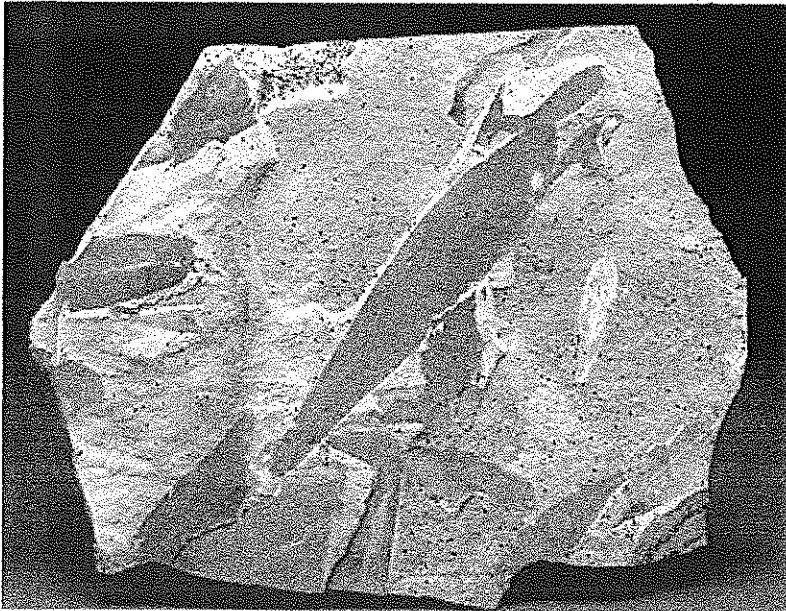
2.10 What type of rock is likely to be found on the sea bed around the volcanic arc? 2

2.11 Name two examples of the rock type you named in 2.9 2

[30]

### Question Three

Examine the photograph below of fossils of the plant glossopteris that existed on earth roughly 300 million years ago.



3.1 What type of rock is this? 2

3.2 Explain how this type of rock normally forms. 4

3.3 Why would students of the history of the continents be interested in fossils? 4

3.4 The continents are thought to have been fused into a single large continent at one time. What was this super continent named? 2

[12]