

HILLCREST HIGH SCHOOL

GEOGRAPHY

Time: 2 ½ hrs

JUNE 2018

Marks: 150

Examiners: CR Madeley, P Ramsern

INSTRUCTIONS

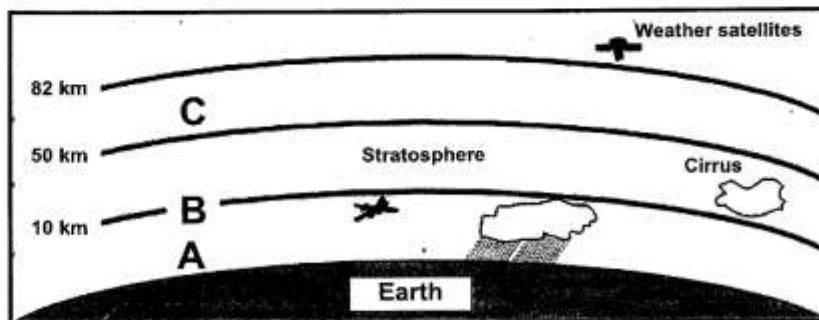
1. This paper consists of 2 sections- climate studies and a map work section.
2. You should aim to spend not much longer than 1 ½ hours on section A. You will need at least 45 minutes to complete section B.
3. Answer all questions in the answer booklet provided.
4. Start Section B (map work) on a separate page.

SECTION A

CLIMATOLOGY

QUESTION ONE

Refer to the diagram below, which shows a representation of the atmosphere and answer the questions which follow it.

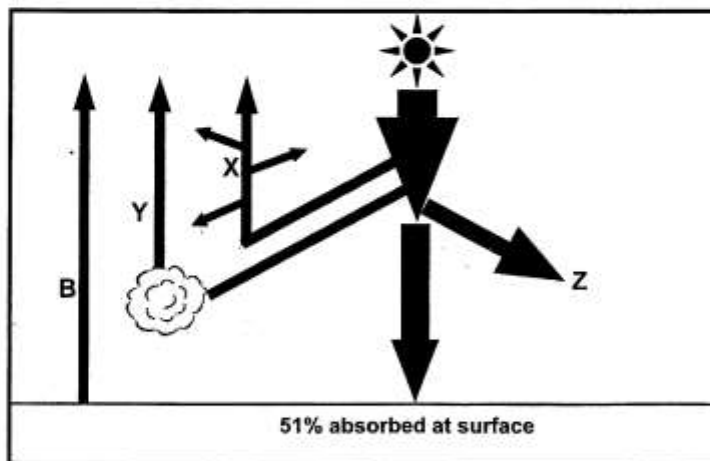


1.1 Supply labels for A, B and C. Write the letter and next to it the correct label.

(3)

- 1.2 Suggest why clouds occur most often in layer A. (2)
- 1.3 (a) Name ONE permanent gas found in layer A. (1)
- (b) State the percentage of the atmosphere that this gas makes. (1)
- 1.4 Name the spectrum in which radiation from the sun is measured. (1)
- 1.5 a. Describe the relationship between temperature and altitude in layer A. (2)
- b. Explain why this relationship exists. (2)
- 1.6 (a) What role does ozone play in protecting us on earth? (1)
- (b) Describe one human activity that has depleted ozone. (2)
- (c) How does ozone affect temperatures in the stratosphere? (1)
- [16]**

2. Study the source below showing heating of the atmosphere and answer the following questions.



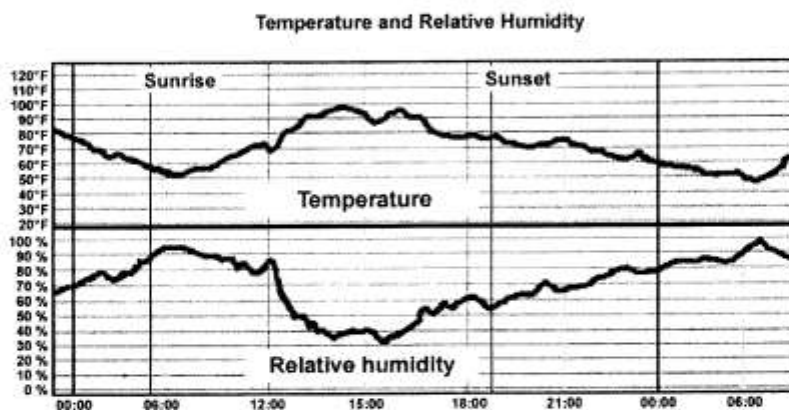
[Source: Google Image]

- 2.1 Supply labels for:
- a. B (2)
- b. Y (2)
- 2.2 Z refers to absorption of radiant energy by the atmosphere. Explain the mechanism by which absorption occurs (4)
- 2.3 Explain why conduction is a poor method of heat transfer in the atmosphere. (2)

- 2.4 Name the other main method by which heat is transferred. (1)
- 2.5 Global warming is widely recognised by science as a phenomenon caused by the build-up of greenhouse gases in the atmosphere and causing temperature rise across the earth.
- 2.5.1 Explain how reliance on fossil fuels is adding to global warming. (2)
- 2.5.2 Describe two ways in which global warming is affecting life in Africa. (2)

[13]

3. Refer to the figure below depicting relative humidity and temperature over a 24 hour period.



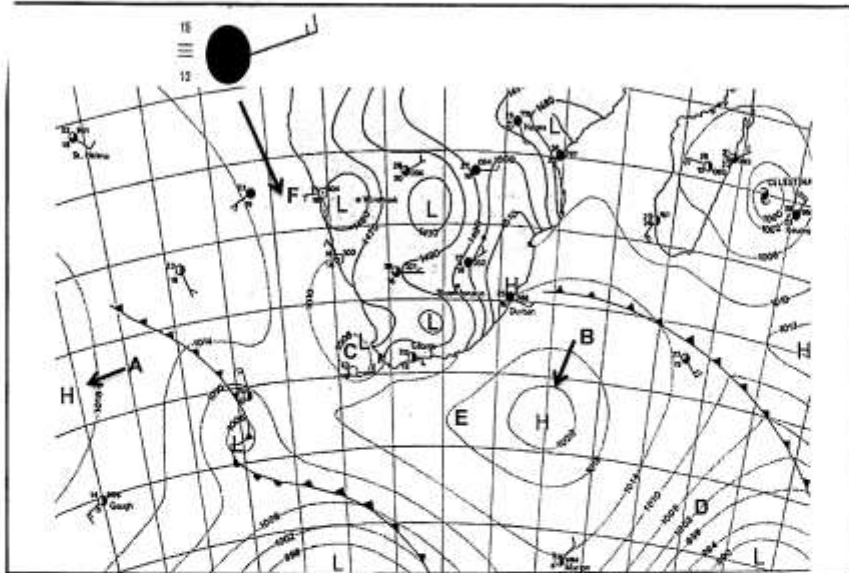
Michael Baker

Source: University corporation for atmospheric research- free education module

- 3.1 Define the term relative humidity (2)
- 3.2 Study the two traces and state what is happening to temperatures and relative humidity between sunset and sunrise. (2)
- 3.3 Explain why this is happening. (3)
- 3.4 Using this information state when and how dew is most likely to form. (4)
- 3.5 At what time was the air at this place closest to dew point? (1)
- 3.6 Explain your answer to 3.5. (1)
- 3.7 Name one instrument that is used to measure humidity. (1)

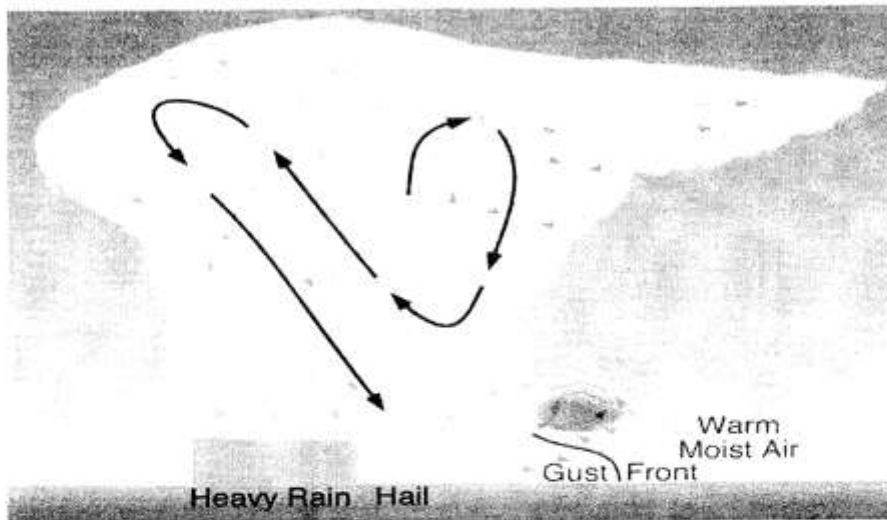
[14]

4. Study the synoptic weather map and answer the questions that follow.



- 4.1 Name the lines labelled D used on the map. Explain their purpose. (2)
- 4.2. What unit is the atmospheric pressure represented in?
Write the full name. (1)
- 4.3 Refer to station model F and identify the following weather phenomena:
- (a) Precipitation
 - (b) Cloud cover
 - (c) Wind speed
 - (d) Wind direction (4)
- 4.4 Frontal rainfall is likely to occur in the next day or two over the Western Cape. Provide evidence from the map for this fact. (2)
- 4.5 Explain with the aid of a diagram how this type of rainfall forms. (4)
- [13]

5. Refer to the diagram below of a typical thunderstorm.

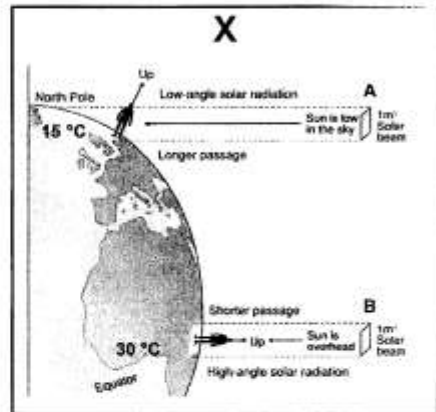


- 5.1 Identify the cloud type shown in the diagram (1)
- 5.2 Describe one characteristics of the cloud in question 4.1. (1)
- 5.3 What type of rainfall is represented here? (1)
- 5.4 Briefly explain the formation of hail in this example. (4)
- 5.5 Suggest why this type of precipitation occurs mainly in summer over South Africa. (3)
- 5.6 Hail is a threat to farming and property. Name one other type of precipitation apart from rain that occurs in South Africa and explain a negative effect of this precipitation. (4)

[14]

6. Study the diagram below and answer the question that follow.

Figure (X) shows the way in which the sun's rays reach the earth's surface.



6.1 Name the factor affecting temperature distribution in

FIGURE X.

(1)

6.2 Explain two reasons for the differences in temperature between the equator and the

North Pole.

(4)

6.3 Describe two effects of this temperature difference on the natural environment at the

equator.

(4)

[9]

7. Refer to the map of South African cities and towns below:



Using your knowledge of factors affecting temperature answer the following questions. You must use the map to answer the questions.

7.1 Name a city that experiences:

A. a maritime climate. (1)

B. a continental climate (1)

7.2 State two factors that may cause Upington to be hotter in summer than Mossel bay. (2)

7.3 Explain how the ocean is able to moderate temperatures at Mossel bay in summer and winter. (4)

7.4 State a reason why Johannesburg is colder in winter than Nelspruit although they are at approximately the same latitude. (2)

7.5 The Benguella and Agulhas ocean currents also affect temperatures along South Africa's east and west coasts. Name a city that is affected by:

a. the Agulhas current

b. The Benguella current (2)

7.6. Valleys in the Pietermaritzburg area often experience frost as a result of temperature inversions that develop during the night.

- a. Define temperature inversion. (2)
- b. State one other negative of temperature inversions. (1)

Total section A: 95 marks

Section B Topographical map skills

Refer to the topographical map extract of Middelpos attached and answer the questions that follow.

Ensure that you set your answers out neatly. Show your working for calculations.

Middelpos is a tiny settlement in the western part of the Karoo. The Great Karoo is a semi desert region stretching from the Western Cape to the Northern Cape. It is mainly a sheep farming area with some cultivation.

- 1.1 State the latitude and longitude of Middelpos using the map reference. 2
- 1.2 State the contour interval used on this 1: 50 000 Map. 1
- 1.3 An orthophoto of this area would have scale of 1: 10 000. Is this a bigger or a smaller scale than that of the map? Why? 4
- 1.4 Would an orthophoto give an oblique or vertical view of the landscape. Why? 2
- 1.5 Provide two pieces of evidence from the map that this is a dry region. 4
- 1.6 Locate the two hills Groot-Berg and Nuwelandsberg in the south east of the mapped area.
- 1.7 State the difference in altitude between these two hills. 2
- 1.8 The feature in grid H7 between the hills is:
- A. a valley
- B. a spur
- C. a ridge 2
- 1.9 In which direction is the stream flowing between H7 and G8? State a reason for your answer. 4
- 1.10 If you stood on top of Groot-Berg, in which direction would you be facing if you were looking towards Droekloof farm house in grid F6? 2
- 1.11 Measure the true bearing of the buildings on Droekloof from the trig beacon on Grootberg. 3
- 1.12 Magnetic declination is not shown on this map but would have to be used to calculate a magnetic bearing.

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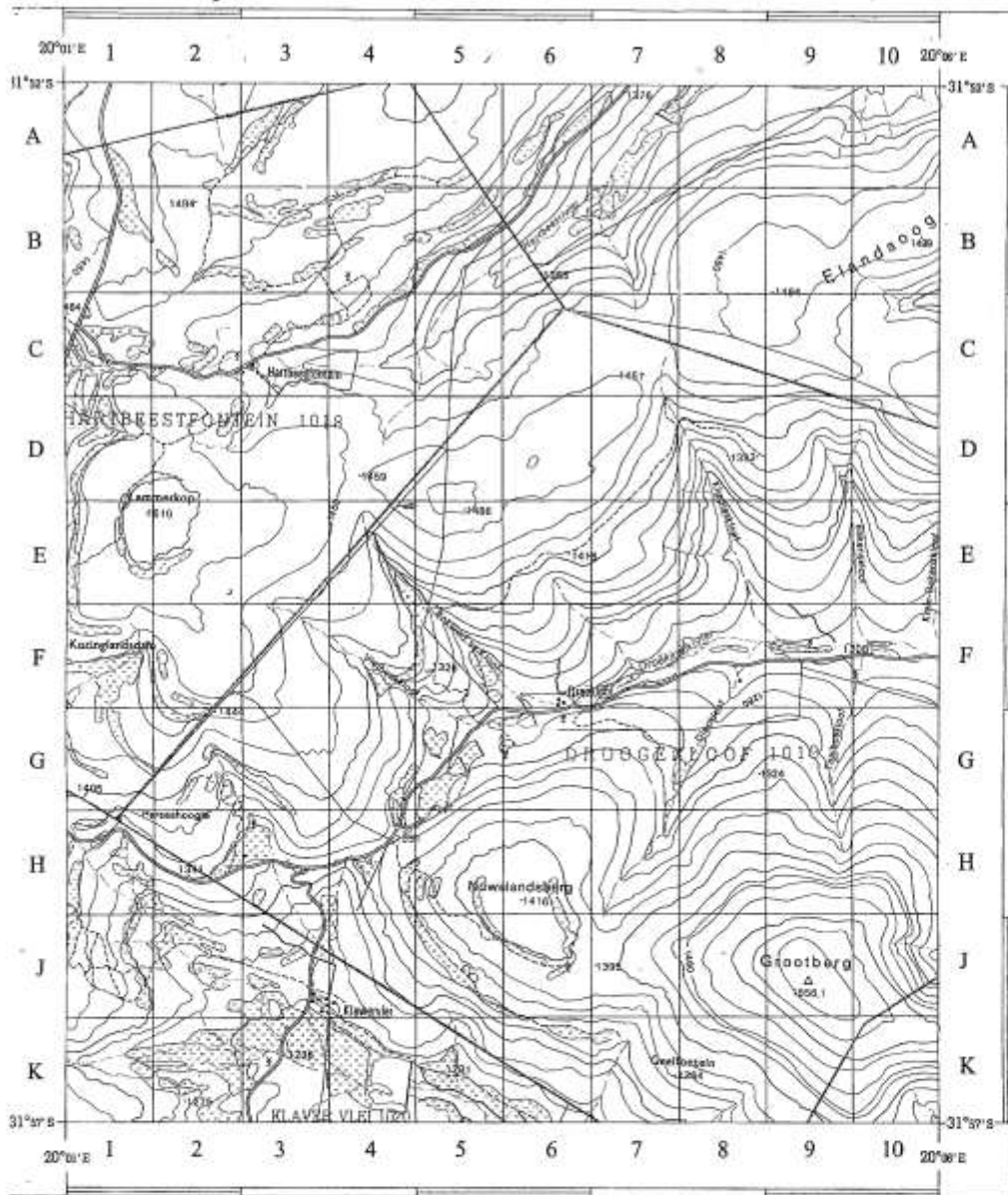
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- a. Define magnetic declination. 2
- 1.13 The **slope** between H3 (where the secondary road is) and G3 is:
- a. concave
- b. convex
- c. uniform 2
- 1.14 Calculate the approximate area in square kilometres of the entire mapped area. 3
- 1.15 Calculate the average gradient of the slope between the spot height in grid K7 at Geelfontein and the top of Grootberg. 4
- Gradient = VI/HE
- 1.16 State the coordinates in degrees minutes and seconds of the wind pump in grid H3. 4
- 1.17 What is a geographical information system? 2
- 1.18 List two components of a GIS. 2
- 1.19 Name two layers of data from the Middelpoos map that could be displayed on a GIS. 4
- 1.20 The farm boundaries on this map would be displayed as: (choose the correct answer)
- a. vector data
- b. raster data 2
- 1.2.1 Suggest two ways in which a GIS could assist in planning a new transport route such as a railway line through the area. 4

Total section B – [55]



CONTOUR INTERVAL 20 METRES REFERENCE

<ul style="list-style-type: none"> Highway; National Route Dist Road; Bench Mark Bridge Hiking Trail Station or Staging Way; Tunnel ore; Cutting ree Ruin x Police Station; Store foreship; School; Hotel 	<ul style="list-style-type: none"> International Boundary and Beacon Provincial Boundary Dams, Nature Reserve & State Forest Boundary Perennial River Perennial Water Non-perennial River Non-Perennial Water Dry Water Course Dry Pan Marsh and Vlei Pipeline (above ground) Water Tower; Reservoir; Water Point Coastal Rocks Prominent Rock Outcrop 	<ul style="list-style-type: none"> Fence; Wall Windpump; Monument Communication Tower Mine Dump; Excavation Trigonometrical Station; Marine Beacon Lighthouse and Marine Light Cemetery; Grave Erosion; Sand Woodland Cultivated Land Orchard or Vineyard Recreation Ground Row of Trees Original Farms
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