PHOENIX NORTH CLUSTER PAPER

JUNE 2018

pp 7

GEOGRAPHY PAPER 1

GRADE 11

MARKS: 225 TIME: 3 hours

EXAMINERS: S. Balmahoon

S. Dulu

MODERATOR: A. Singh

INSTRUCTIONS

1. Answer all questions
2. Write neatly and legibly.

This paper consists of a question paper of 7 pages and an addendum of 7 pages

Question 1 [115]

1.1 **Complete each of the following statements by choosing a word/term from the list below. Write down the word/term next to the question number in your answer book.**

Planetary winds	Isobar	Climatic region	Front
Insolation	Atmospheric pressure	Cyclone	Equator
Geostrophic wind	Monsoons	Isotherm	Coriolis

1.1.1 Incoming solar radiation.

1.1.2 The force exerted against a surface by the weight of a column of air above that surface.

1.1.3 An area over which temperature and rainfall conditions are very similar but different from those in other areas.

1.1.4 Major winds that blow all year round over large expanses of the earth's surface.

1.1.5 The boundary between air that have different characteristics.

1.1.6 Theoretical wind that would result from an exact balance between the coriolis force and the pressure gradient force.

1.1.7 Lines joining places of equal pressure.

1.1.8 The force responsible for the deflection of wind. (8x1) 8

1.2 **Complete the following statements on droughts and desertification. Write down the numbers 1.2.1 to 1.2.7 in your answer book and next to each only the letter of the correct answer from Column B.**

	Column A		Column B
1.2.1	The drought currently being experienced in South Africa is caused by...	A	crop rotation
		B	deforestation
1.2.2	Dams constructed in deep narrow valleys	C	sahel
1.2.3	A sustainable measure to address the challenge of drought is to plant ... crops.	D	food security
		E	La Nina
1.2.4	A cause of desertification is	F	alien
1.2.5	_____ is threathened in areas undergoing desertification .	G	stores more water
		H	El Nino
1.2.6	The area most at risk of desertification in Africa is the _____.	I	indigenous
1.2.7	In order to prevent desertification the following must be practiced.	J	reduces evaporation

(7x1) 7

1.3 **Refer to diagram 1.3 showing Earth Movements and answer the following questions.**

1.3.1 Identify the earth movement represented by the diagram. (1x1) 1

1.3.2 Name the seasonal phenomenon experienced in the northern hemisphere on 21 March, as indicated on the diagram. (1x1) 1

1.3.3 a. In which position of the earth does the southern hemisphere experience summer? (1x1) 1

b. Provide reasons to support your answer to QUESTION 1.3.3a. (2x2) 4

(7x1) 7

1.4 **Read through the article on the Sahel Desert (figure 1.4) and answer the following questions:**

1.4.1 Define the term 'desertification'. (1x1) 1

1.4.2 List TWO causes of desertification mentioned in the article. (2x2) 4

1.4.3 Describe THREE negative effects of desertification on the environment mentioned in the article. (3x2) 6

1.4.4 Write a short paragraph of approximately 8 lines in which you explain sustainable strategies that can be implemented, to manage desertification . (4x2) 8

1.4.5 Evaluate why the implementation of these sustainable strategies mentioned in QUESTION 1.4.4 would be difficult in the Sahel Desert. (2x2) 4

(23)

1.5 **Read the article, on the effects of El Nino and La Nina (figure 1.5) and answer the following questions:**

1.5.1 Name the ocean over which El Nino occurs. (1x1) 1

1.5.2 Name the season in South Africa when El Nino strikes. (1x1) 1

1.5.3 Study the sequence of the El Nino occurrence. It is in the incorrect order. Rearrange the sequence in the correct order by rewriting only the letter of each sentence in the correct order of occurrence. (5x1) 5

A The warm water which is normally over the Western Pacific is now in the Central and Eastern Pacific.

B The tropical easterly winds weaken as a result of change in pressure conditions in the atmosphere.

C Rising air and rain occur over the central Pacific.

D There is subsiding air and dry conditions over Eastern Australia and South East Asia.

E The upwelling of cold water in the Eastern Pacific is reduced and the ocean is warmer.

1.5.4 Contrast the effect of El Nino and La Nina on the economy of South Africa. (4x2) 8

(15)

1.6 **Figure 1.6 shows the formation of a Fohn wind. Use the diagram to answer the following questions:**

1.6.1	Explain what is a Fohn wind.	(1x1) 1
1.6.2	Provide a name for a similar wind found in South Africa.	(1x2) 2
1.6.3	Explain why precipitation will occur on the windward side and not on the leeward side of the mountain.	(3X2) 6
1.6.4	State any THREE natural disasters that Fohn winds and other similar kinds of winds can cause.	(3x1) 3
		(12)

1.7 **Study the figure showing Distribution of Global Pressure Belts (Figure 1.7) and answer the following questions:**

1.7.1	Identify air circulation cells D, E and F.	(3x1) 3
1.7.2	State the pressure experienced at positions A and B.	(2x1) 2
1.7.3	Explain reasons for the pressure experienced at position B.	(2x2) 4
1.7.4	Why is a low pressure belt found at the ITCZ?	(1x2) 2
1.7.5	Explain why the wind at C does not blow directly from the area of high pressure to low pressure.	(2x2) 4
		(15)

1.8 **Study Figure 1.8, a Synoptic Weather Map and answer the following questions:**

1.8.1	Identify the season being represented by the map.	(1x2) 2
1.8.2	Provide one piece of evidence from the map to support your answer to QUESTION 1.8.1.	(1x2) 2
1.8.3	State the approximate pressure at the centre of pressure cell J.	(1x2) 2
1.8.4	a. Differentiate between the wind velocities at S and K.	(2X1) 2
	b. Use evidence from the map to support your answer to QUESTION 1.8.4 a.	(2x2) 4
1.8.5	Describe the weather conditions being experienced at Z.	(2x1) 2
1.8.6	a. What is the possibility of rainfall being experienced at A by the afternoon?	(1x2) 2
	b. Provide evidence from the map to support your answer to QUESTION 1.8.6.a.	(2x2) 4
1.8.7	A cold front is moving over the Western Cape. Explain the economic impact of the passage of this front on farming in the Western Cape. Suggest how farmers may respond to minimise the impact of this front on farming.	(4x2) 8
		(28)

Question 2 [110]

2.1 **Choose the correct word(s) from those given in brackets. Write 2.1.1 to 2.1.7 and next to each the correct answer.**

2.1.1 Tors are usually found in regions where there are (massive igneous/sedimentary) rocks.
2.1.2 (Weathering/exfoliation) is when layers of igneous rock peel off due to temperature changes causing expansion and contraction.
2.1.3 (Cuesta basins/Cuesta domes) are formed where layered sedimentary rocks from deep beneath the earth's surface are thrust upwards.
2.1.4 (Canyons/granite domes) develop where horizontal layers erode at different rates.
2.1.5 (Escarpment/Plateau) separates the high interior from the low lying coastal plain. **(5x1) 5**

2.2 **Match the terms in Column B with the statements in Column A. Write down the numbers 2.2.1 to 2.2.8 in your answer book and next to each only the correct letter from column B.**

COLUMN A		COLUMN B	
2.2.1	Large high lying area that is relatively flat.	A	Weathering
2.2.2	Breakdown of rocks due to chemical and mechanical processes.	B	Deforrestation
		C	Plateau
2.2.3	A deep narrow valley in an arid region.	D	Canyon
2.2.4	Removal of broken rock material by wind, water, ice.	E	Erosion
		F	Plateau
2.2.5	The process where land is left exposed due to removal of vegetation.	G	Abrasion

(5x1) 5

2.3 **Study Figure 2.3 showing a Slope Elements and answer the following questions:**

2.3.1 The process shown in the sketch is (vertical erosion/ backwasting). (1x1) 1
2.3.2 Identify the four slope elements shown on the sketch. (4x1) 4
2.3.3 In a paragraph discuss the significance of these slope elements to human activities. (4x2) 8

(13)

2.4 **Study Figure 2.4 showing features resulting from Volcanic Activity and answer the following questions:**

2.4.1 Refer to features D and E

a. Identify features D and E. (2x1) 2

b. Which type of volcanic activity do both these features result from, intrusive or extrusive volcanism? (1x1) 1

c. Give a reason for your answer to QUESTION 2.4.1 b. (1x2) 2

d. Explain the difference in the process of formation of each of the features D and E. (2x2)4

2.4.2 Answer with reference to **feature F:**

a. Identify feature F (1x1) 1

b. This feature is, over a period of time, exposed to the earth's surface. Explain how this takes place. (1x2) 2

c. What is this feature known as when it is exposed to the earth's surface? (1x1) 1

d. What type of rock is this feature(answer to QUESTION 2.4.2 c) formed from? (1x1) 1

e. State the drainage pattern associated with this feature (answer to QUESTION 2.4.2 c). (1x2) 2

(16)

2.5 **Refer to FIGURE 2.5 showing Structural Landforms and answer the following questions:**

2.5.1 Identify landforms P and Q respectively. (2x1) 2

2.5.2 What evidence in Figure 2.5 suggests that landforms P and Q developed from the same landform that existed earlier? (1x2) 2

2.5.3 What is the main agent of erosion responsible for the development of these features? (1x1) 1

2.5.4 Which rock type in Figure 2.5 is the most resistant to erosion? (1x1) 1

2.5.5 Give ONE reason for your answer to QUESTION 2.5.4. (1x2) 2

2.5.6 Briefly describe how landform Q will change into landform R. (2x2) 4

2.5.7 Discuss factors that limit the use of this landscape by humans. (3x2) 6

(18)

2.6 **Study Figure 2.6 showing Mass Movements and answer the following questions.**

2.6.1 Describe the concept of mass movement. (1x2) 2

2.6.2 What type of mass movement is represented by Figure 2.6? (1x2) 2

2.6.3 State how the building of the hotel could have caused the slope to slide. (3x2) 6

2.6.4 Human activity is one of the main causes of mass movement. Write a single paragraph (approximately 8 lines) suggesting possible solutions to prevent mass movement. (4x2) 8

(18)

2.7 **Refer to FIGURE 2.7 of a Cuesta and answer the following questions.**

2.7.1 What is a cuesta? (1x2) 2

2.7.2 Explain the difference in the formation of cuestas in diagrams **A** and **B**. (2x2) 4

2.7.3 Describe the difference between the dip slope and the scarp slope of a cuesta. (2x2) 4

2.7.4 Discuss how humans can use cuestas. (2x2) 4

2.7.5 a. Will a mesa form in this landscape? (1x1) 1

b. Give a reason for you answer to QUESTION 2.7.5.a. (1x2) 2

2.7.6 With the aid of diagrams explain the differences between a cuesta and a hogsback. (6x1) 6

(23)

2.8 **Study Figure 2.8A and 2.8B showing Hilly Landscapes and answer the following questions.**

2.8.1 Describe the rock structure that will allow for the type of landscape shown in Figures 2.8A and 2.8B to form. (2x2) 4

2.8.2 Describe the characteristics/appearance of each type of hill represented by Figures 2.8A and 2.8B, giving reasons for their differences and state which would be more conducive to human activity. (4x2) 8

(12)

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GEOGRAPHY PAPER 1

GRADE 11

ADDENDUM

Figure 1.3 : Earth Movements

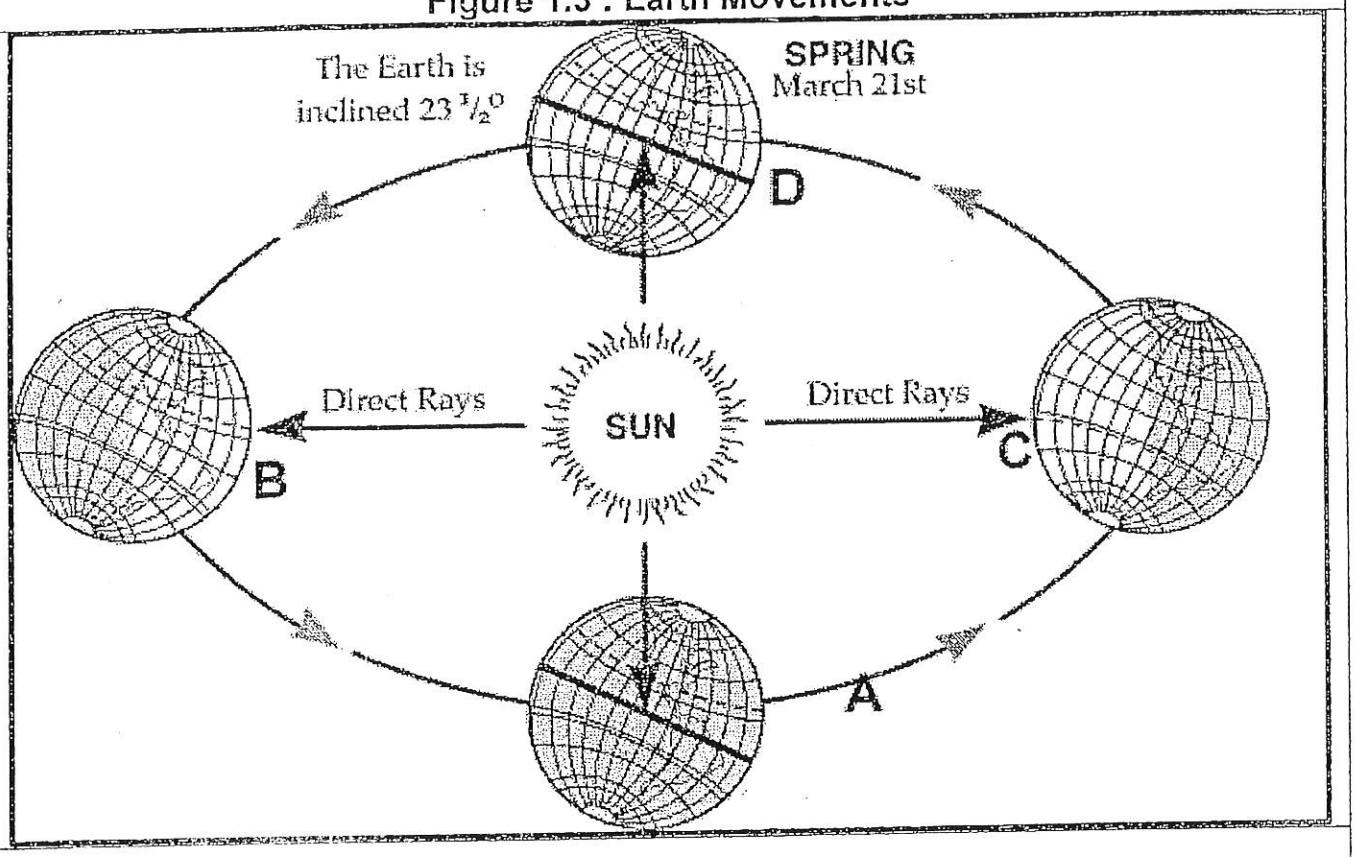

Figure 1.4

THE SAHEL DESERT

In the Sahel Desert, desertification is becoming a huge problem. Around the 1950's people settled into the Sahel region, in areas where there was water. This resulted in overgrazing, which is one of the greatest causes of deserlification. Eventually, the perennial shrubs were destroyed because of grazing, and they were replaced by annuals. Then the annuals were grazed out which left bare soil. A lot of the topsoil was washed away, and all that was left were rocks. Silt turned hard when it was hit by rain. Therefore, plants were not able to grow because their roots could not penetrate this hard layer. Now this region has turned to desert and it continues to expand. Records show that rainfall in the Sahel has decreased and sands have shifted about sixty miles south into the area. Sahel is expanding due to lack of vegetation in the area. Another reason desertiftcation is happening in the Sahel region is because people are using the slashing and burning method to clear land. This degrades the quality of soil just like overgrazing.

Figure 1.5

El Nino and La Nina: The boy child and his little sister

In Spanish, El Nino means 'The Christ child '.This is the name Peruvian fishermen gave to a warm current that sometimes arrived off the South American coast around Christmas time. The warm current was a tell-tale sign that fishing would be bad that season, because ElNino blocks the upwelling of nutrient rich water.

El Nino is responsible for drought in some parts of the world. Since 1525, there have been 113 El Nino's recorded. This is an average of about one El Nino in every four years. The catastrophic ElNino's are spaced roughly 15 years apart.

Figure 1.6 : Fohn Winds

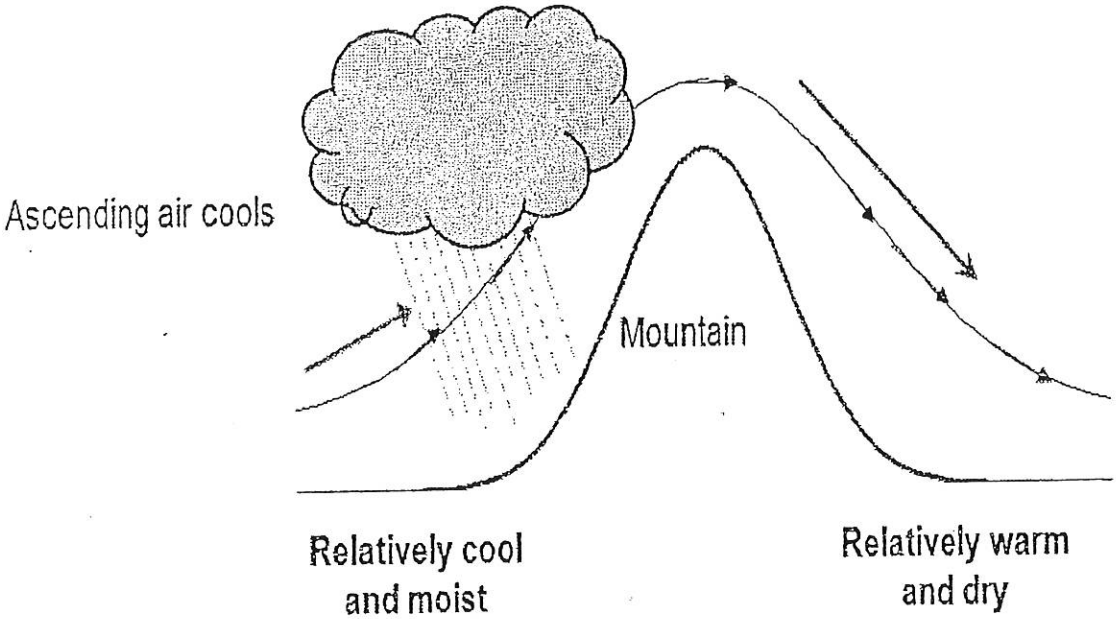

FIGURE 1.7 : Global Pressure Belts

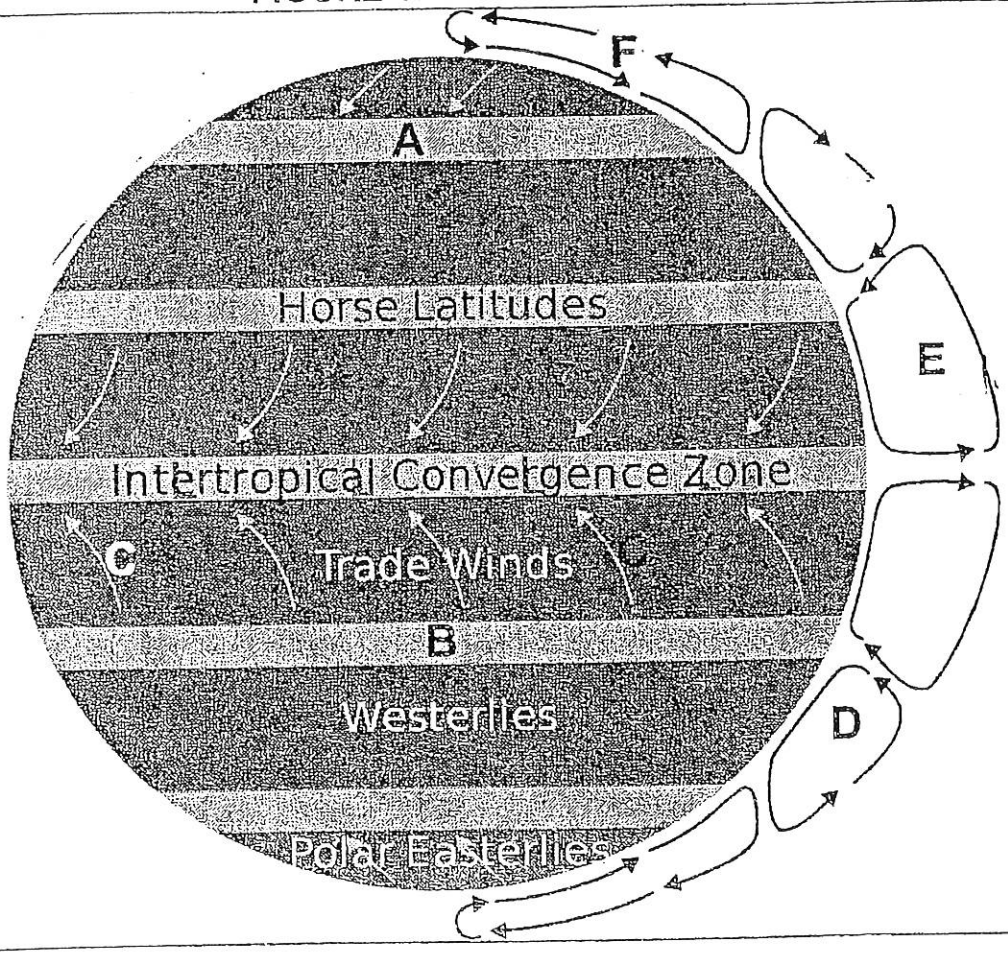

FIGURE 1.8 : Synoptic Weather Map

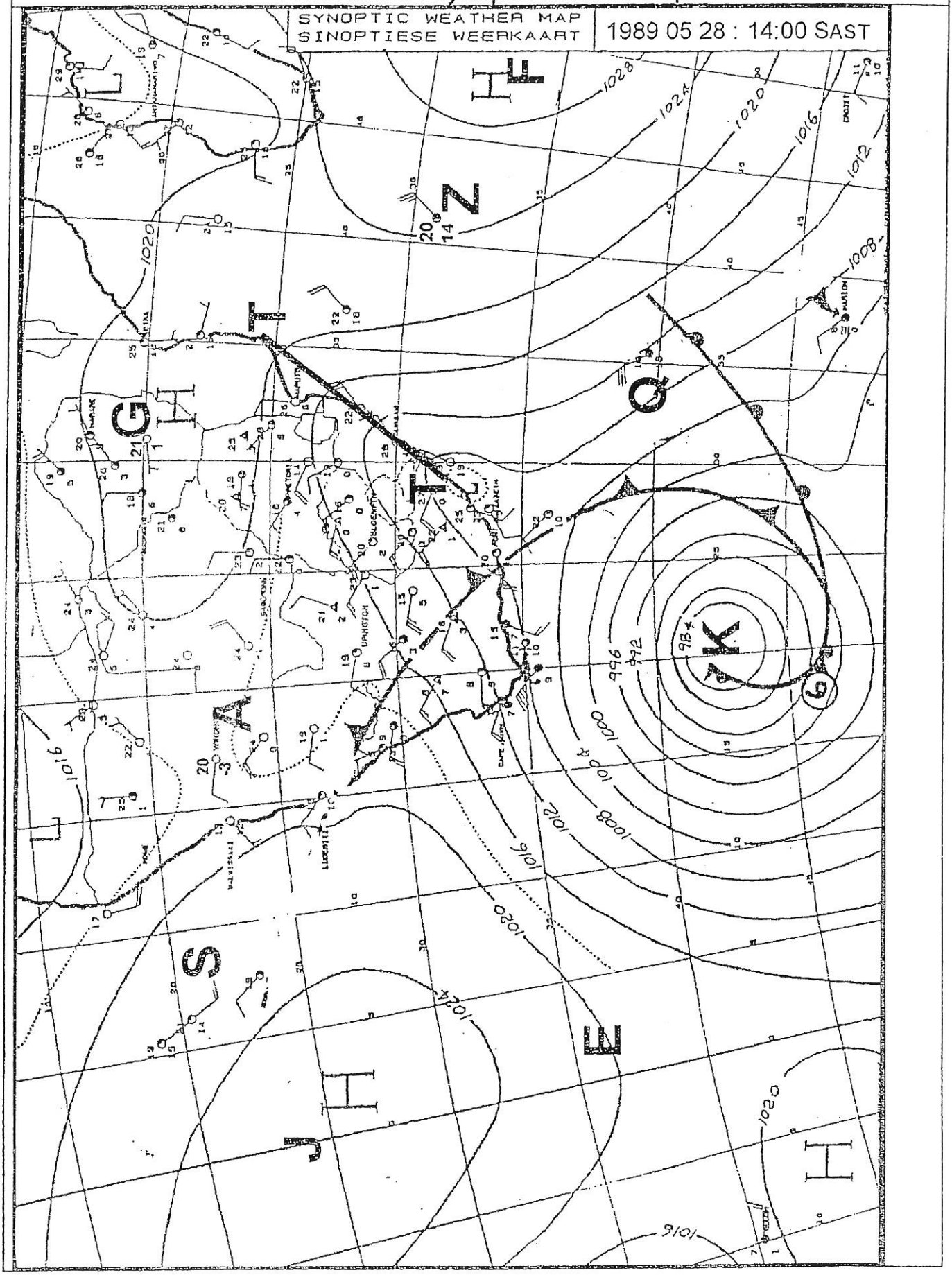

Figure 2.3 : Slope Elements

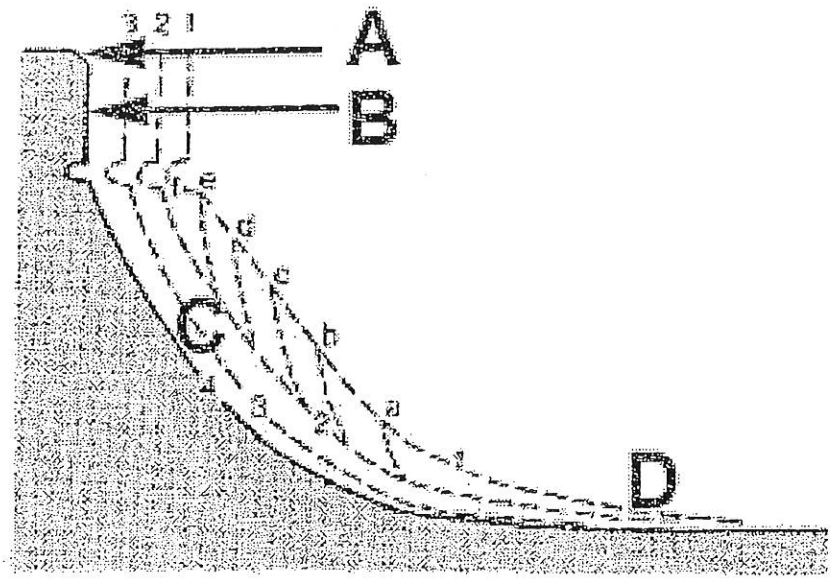

Figure 2.4 : Feature resulting from Volcanic Activity

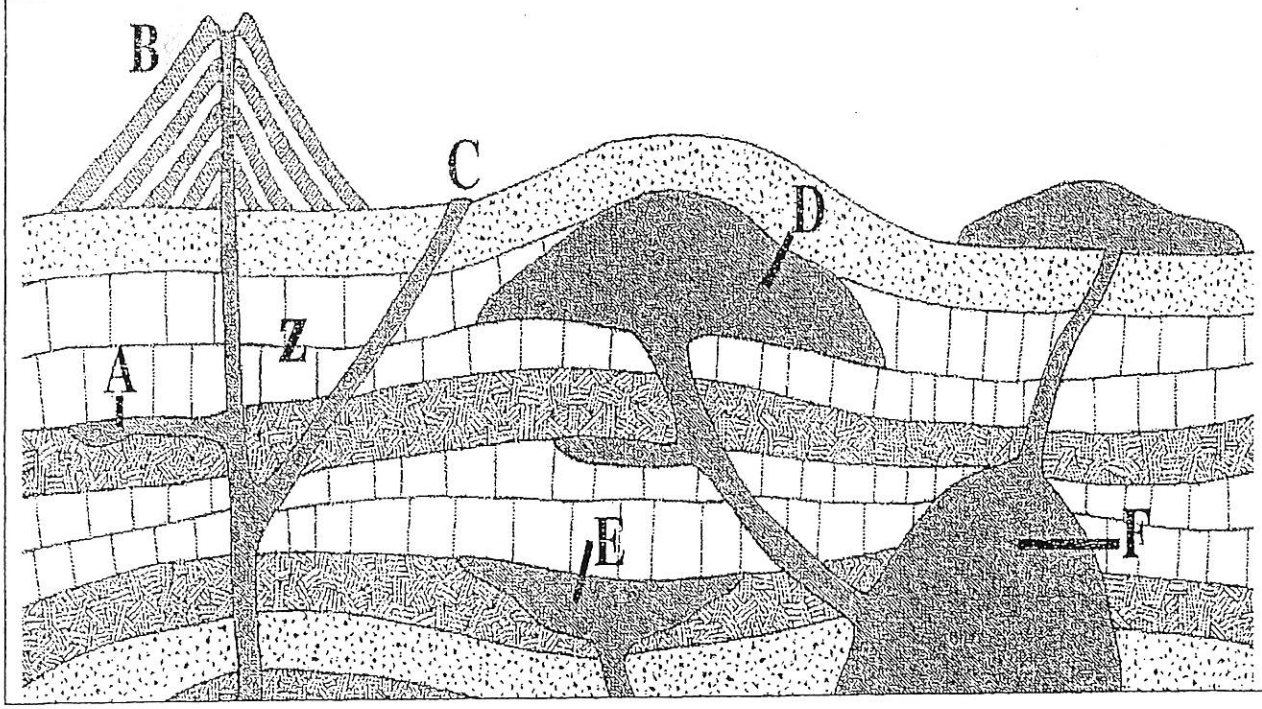

Figure 2.5 : Landforms in Horizontal Strata

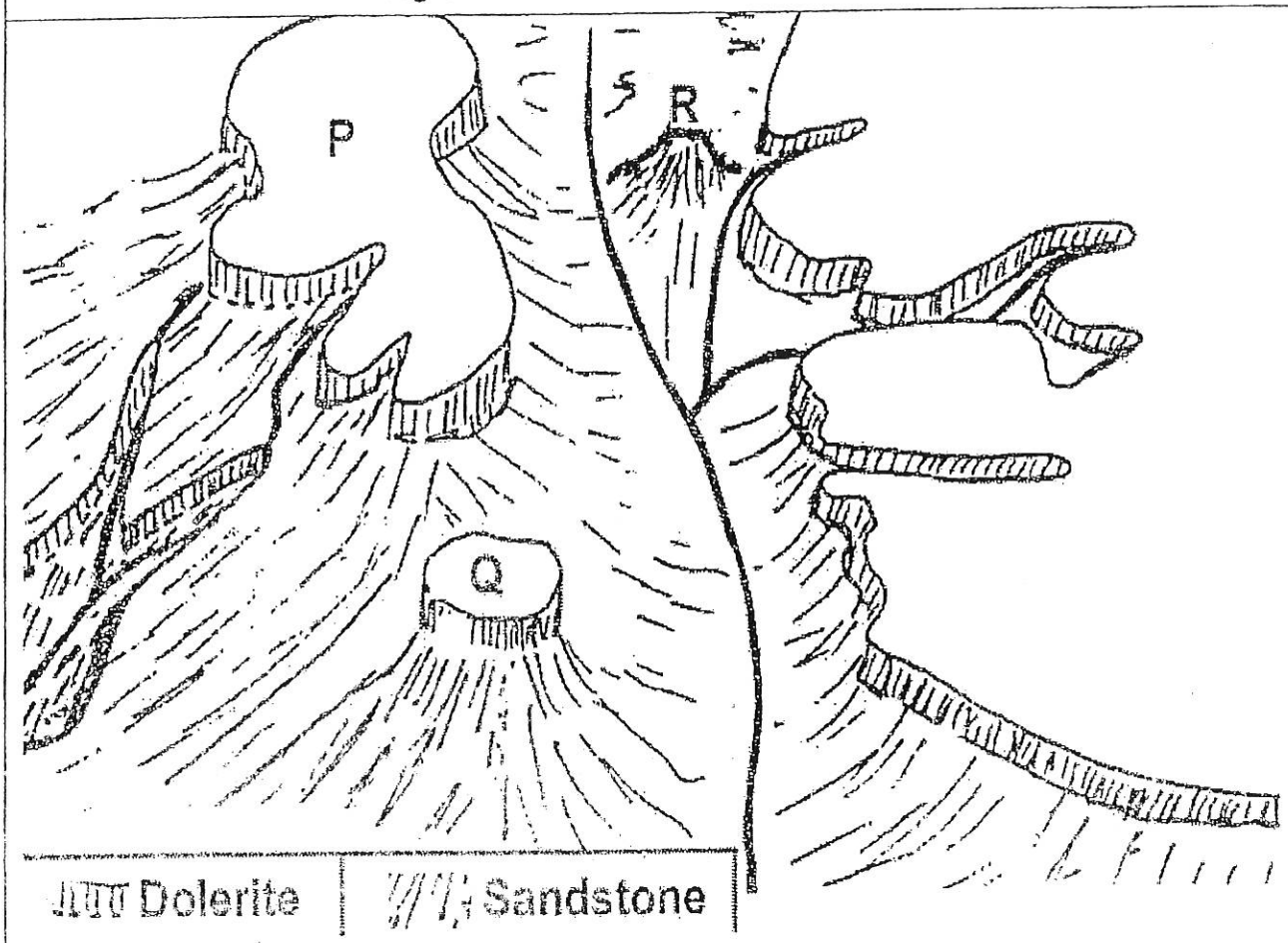

Figure 2.6 : Mass Wasting

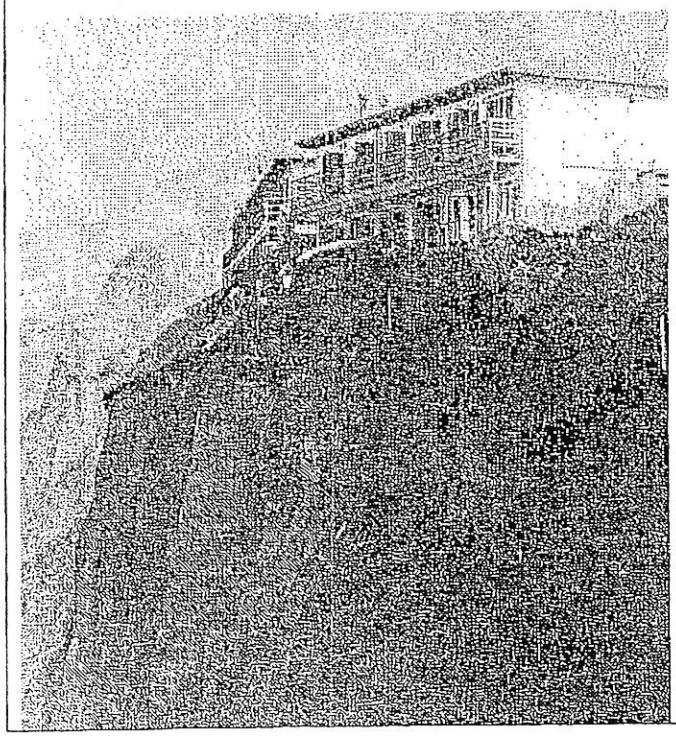

Figure 2.7 : Cuesta

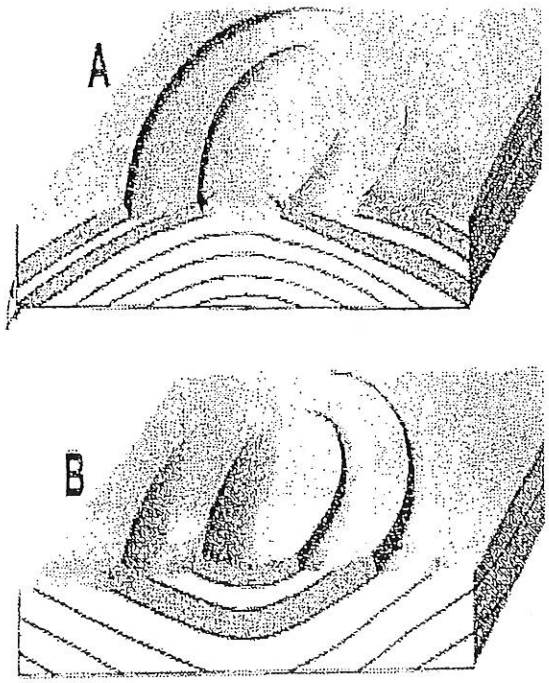

Figure 2.8A : Hilly Landscape

Figure 2.8B : Hilly Landscape

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PHOENIX NORTH CLUSTER PAPER

JUNE 2018

GRADE 11

GEOGRAPHY PAPER 1

MARKING MEMO

MAXIMUM MARKS : 225 **TIME : 3 HOURS**

EXAMINERS: S. Balmahoon

S. Dulu

MODERATOR: A. Singh

INSTRUCTIONS TO CANDIDATES

1 Answer all questions.

2 Write neatly and legibly.

3 Use the numbering system used in the question paper.

Question 1 [115]

1.1 **Complete each of the following statements by choosing a word/term from the list below. Write down the word/term next to the question number in your answer book.** (8)

Planetary winds	Isobar	Climatic region	Front
Insolation	Atmospheric pressure	Cyclone	Equator
Geostrophic wind	Monsoons	Isotherm	Coriolis

1.1.1 Incoming solar radiation . 1

- ***Insolation***

1.1.2 The force exerted against a surface by the weight of a column of air above that surface 1

- ***Atmospheric pressure***

1.1.3 An area over which temperature and rainfall conditions are very similar l but different from those in other areas. 1

- ***Climatic region***

1.1.4 Major winds that blow all year round over large expanses of the earths surface. 1

- ***Planetary winds***

1.1.5 The boundary between air that have different characteristics. 1

- ***Front***

1.1.6 Theoretical wind that would result from an exact balance between the coriolis force and the pressure gradient force. 1

- ***Geostrophic wind***

1.1.7 Lines joining places of equal pressure 1

- ***Isobar***

1.1.8 The force responsible for the deflection of wind. 1

- ***Coriolis***

1.2 **Complete the following statements on droughts and desertification. Write down the numbers 1.2.1 to 1.2.7 in your** (7)

answer book and next to each only the letter of the correct answer from Column B.

	Column A	Ans		Column B	
1.2.1	The drought currently being experienced in South Africa is caused by...	*H*	A	crop rotation	
			B	deforestation	1
1.2.2	Dams constructed in deep narrow valleys	*J*	C	Sahel	1
1.2.3	A sustainable measure to address the challenge of drought is to plant ... crops	*I*	D	food security	
			E	La Nina	1
1.2.4	A cause of desertification is ...	*B*	F	Alien	1
1.2.5	_____ is threathened in areas undergoing desertification.	*D*	G	stores more water	
			H	El Nino	1
1.2.6	The area most at risk of desertification in Africa is the _____.	*C*	I	Indigenous	1
1.2.7	In order to prevent desertification the following must be practiced.	*A*	J	reduces evaporation	1

1.3 Refer to diagram 1.3 showing earth movements and select the correct answer from within brackets. **7**

1.3.1 Identify the earth movement represented by the diagram. (1x1) 1

- ***Revolution***

1.3.2 Name the seasonal phenomenon experienced in the northern hemisphere on 21 March, as indicated on the diagram. (1x1) 1

- ***spring equinox***

1.3.3 a. In which position of the earth does the southern hemisphere experience summer? (1x1) 1

- **C**

b. Provide reasons to support your answer to QUESTION 1.3.3a. (2x2) 4

- ***Rays of the sun are directly over the tropic of Capricorn***
- ***The southern hemisphere is tilted towards the sun.***
- ***The southern hemisphere experiences long days and short nights.***

1.4 **Read through the article on the Sahel Desert (figure 1.4) and** (23)

answer the following questions:

1.4.1 Define the term 'desertification'. 1

- ***the processes by which an area becomes a desert.***
- ***the process by which fertile land becomes desert, typically as a result of drought, deforestation, or inappropriate agriculture.***

1.4.2 List TWO causes of desertification mentioned in the article 2x2

- ***overgrazing***
- ***rainfall in the Sahel has decreased***
- ***people are using the slashing and burning method to clear land***

1.4.3 Describe THREE negative effects of desertification on the environment mentioned in the article. 3x2

- ***the topsoil was washed away this degrades the quality of soil***
- ***the perennial shrubs were destroyed***
- ***plants were not able to grow because their roots could not penetrate this hard layer***
- ***sands have shifted about sixty miles south into the area***

1.4.4. Write a short paragraph of approximately 8 lines in which you explain sustainable strategies that can be implemented, to manage desertification . 4x2

- ***Practice crop rotation***
- ***Use organic fertilisers***
- ***Practice contour ploughing***
- ***Plant ground cover***
- ***Planting of trees***
- ***Allowing land to lie fallow for a period of time to allow it to renew itself.***

1.4.5 Evaluate why the implementation of these sustainable strategies would be difficult in the Sahel Desert. 2x2

- *People are using the slashing and burning method to clear land.*
- *This degrades the quality of soil just like overgrazing.*
- *A lot of the topsoil was washed away, and all that was left were rocks.*

1.5 **Read the article, on the effects of El Nino and La Nina (figure 1.5) and answer the following questions:** **(15)**

1.5.1 Name the ocean over which El Nino occurs 1

- ***Pacific***

1.5.2 Name the season in South Africa when El Nino strikes 1

- ***Summer***

1.5.3 Study the sequence of the El Nino occurrence. It is in the incorrect 5x1

order. Rearrange the sequence in the correct order by rewriting each sentence in the correct order of occurrence.

- *B,E,A,D,C*

A The warm water which is normally over the Western Pacific is now in the Central and Eastern Pacific.

B The tropical easterly winds weaken as a result of change in pressure conditions in the atmosphere.

C Rising air and rain occur over the central Pacific.

D There is subsiding air and dry conditions over Eastern Australia and South East Asia.

E The upwelling of cold water in the Eastern Pacific is reduced and the ocean is warmer.

1.5.4 Contrast the effect of El Nino and La Nina on the economy of South Africa. 4X2

- ***El Nino results in drought conditions.***
  - ***Reduced water supply , crop failure or reduced production resulting in food insecurity.***
  - ***Loss of income by companies and from export***
  - ***Loss of jobs***
- ***La Nina results in increased rainfall.***
  - ***Break droughts***
  - ***More water for various economic activities***
  - ***Fill dams***
  - ***Increase water for irrigation and for industrial activities***
  - ***Flooding when excessive rainfall takes place.***

1.6 **Figure 1.6 shows the formation of a Fohn wind. Use the diagram to answer the following questions:** **(12)**

1.6.1 Explain what is a Fohn wind. 1

- ***A föhn is a type of dry, warm, down-slope wind that occurs in the lee of a mountain range. Usually forms in Europe.***

1.6.2 Provide a name for a similar wind found in South Africa. 2

- ***Berg wind***

1.6.3 Explain why precipitation will occur on the windward side and not on the leeward side of the mountain. 3X2

- ***Warm moist air reaches the windward slope.***
- ***This wind rises along the windward slope.***
- ***The air cool, reaching dew point temperature.***
- ***This results in condensation and the formation of clouds.***
- ***This results in the formation of rainfall.***

1.6.4 State any THREE natural disasters that Fohn winds and other similar 3

kinds of winds can cause.

- ***They bring droughts, dry up plants and farmlands.***
- ***They exacerbate forest fires.***
- ***They also melt snow:***
  - ***causing avalanche and***
  - ***floods.***

1.7 **Study the figure showing distribution of global pressure belts (Figure 1.7) and answer the following questions:** **(15)**

1.7.1 Identify air circulation cells D, E and F. 3x1

- ***D – Ferrel***
- ***E – Hadley***
- ***F - Polar***

1.7.2 State the pressure experienced at positions A and B. 2x1

- ***A – Low pressure***
- ***B – High pressure***

1.7.3 Explain reasons for the pressure experienced at position B. 2x2

- ***air in the upper atmosphere moves away from the equator and reaches the 30° line of latitude (position B)***
- ***it cools and sinks resulting in high pressure cells at 30° line of latitude.***

1.7.4 Why is a low pressure belt found at the ITCZ? 2

- ***High temperature along the equator results in the warm rising air with resultant low pressure cell development.***

1.7.5 Explain why the wind at C does not blow directly from the area of high pressure to low pressure. 2x2

- ***Air begins to move from an area oh high pressure towards low pressure.***
- ***The moving air is affected by coriolis force resulting in it being deflected and blowing diagonally from high to low pressure.***

1.8 **Study Figure 1.8, a synoptic weather map and answer the following questions:** **(28)**

1.8.1 Identify the season being represented by the map. 2

- ***Winter***

1.8.2 Provide one piece of evidence from the map to support your answer to question 1.8.1 2

- ***The map is dated 28 May.***
- ***Cold front passing over land.***
- ***High pressure cells in a northerly position.***
- ***Generally lower temperatures over land.***
- ***Clear skies over most of South Africa indicates low possibility of rainfall.***

1.8.3 State the approximate pressure at the centre of pressure cell J. 2

- *1025hp to 1027hpa*

1.8.4 a. Differentiate between the wind velocities at S and K. 2 3

- *S - low wind velocity*
- *K – high wind velocity*

b. Use evidence from the map to support your answer to question 4 3

- *S - isobars are spaced far apart indicating a gentle pressure gradient resulting in low velocity wind.*
- *K – isobars are closely spaced indicating a steep pressure gradient resulting in high wind velocity.*

1.8.5 Describe the weather conditions being experienced at Z. 2 2

- *Air temperature – 20°C*
- *Dew point temperature – 14°C*
- *Cloud cover – partially cloudy*
- *Wind direction – north east*
- *Wind velocity – 25knots*
- *Air pressure - 1024hpa*

1.8.6 a. What is the possibility of rainfall being experienced at A by the afternoon? 2 3

- *Very low possibility of rainfall being experienced.*

b. Provide evidence from the map to support your answer to question 1.8.6 b 4 2

- *No cloud cover.*
- *Large difference (23°C)between air temperature and dew point temperature.*
- *Presence on a high pressure cell in the area resulting in subsidence.*

1.8.7 A cold front is moving over the Western Cape. Explain the economic impact of the passage of this front on farming in the Western Cape? Suggest how farmers may respond to minimise the impact of this front on farming. 4X2 3

- *Resultant rainfall can break droughts, supply water for crops.*
- *Very heavy rain may result in flooding and crop loss.*
- *It also brings very low temperatures, resulting in frost which damage crops.*
- *Frost will eventually melt to form soil water.*
- *Farmers must plant frost resistant crops, tubers.*
- *Use heaters to minimise effect of frost on crops that are not frost resistant such as grapes.*
- *Construct dams to store water and minimise the chance of flooding.*

Question 2 [110]

2.1 **Choose the correct word(s) from those given in brackets. Write 2.1.1 to 2.1.7 and next to each the correct answer.** **(5)**

2.1.1 Tors are usually found in regions where there are (***massive igneous***/sedimentary) rocks.

2.1.2 (Weathering/***exfoliation***) is when layers of igneous rock peel off due to temperature changes causing expansion and contraction.

2.1.3 (Cuesta basins/***Cuesta domes***) are formed where layered sedimentary rocks from deep beneath the earths surface are thrust upwards.

2.1.4 (***Canyons***/granite domes) develop where horizontal layers erode at different rates.

2.1.5 (***Escarpment***/Plateau) separates the high interior from the low lying coastal plain.

2.2 **Match the terms in Column B with the statements in Column A. Write down the numbers 2.2.1 to 2.2.8 in you answer book and next to each only the correct letter from column B.** **(5)**

	COLUMN A	Ans		COLUMN B
2.2.1	Large high lying area that is relatively flat.	*F*	A	Weathering
2.2.2	Breakdown of rocks due to chemical and mechanical processes.	*A*	B	Deforrestation
			C	Plateau
2.2.3	A deep narrow valley in an arid region.	*D*	D	Canyon
2.2.4	Removal of broken rock material by wind, water, ice.	*E*	E	Erosion
			F	Plateau
2.2.5	The process where land is left exposed due to removal of vegetation.	*B*	G	Abrasion

2.1.1 ***massive igneous***
2.1.2 ***exfoliation***

2.2.1 *F*
2.2.2 *A*

2.1.3	*Cuesta domes*	2.2.3	*D*
2.1.4	*Canyons*	2.2.4	*E*
2.1.5	*Escarpment*	2.2.5	*B*

B

2.3 **Study Figure 2.3 showing a slope and answer the following questions:**

2.3.1 The process shown in the sketch is (vertical erosion/ ***backwasting***). 1

2.3.2 Identify the four slope elements shown on the sketch. 4

- A : ***Crest***
- B : ***Cliff***
- C : ***Talus***
- D : ***Pediment***

2.3.3 In a paragraph discuss the significance of these slope elements to human activities. (4x2) 8

CLIFF

- ✓ ***Vertical cliff attract adventure tourists***
- ✓ ***Rock climbing and abseiling activities***

THE PEDIMENT

- ✓ ***Gentle/low angle slope ideal for human settlement***
- ✓ ***Easy to construct roads and other infrastructure***
- ✓ ***Farming activities on pediment***
- ✓ ***Low rainfall and thin soil layer in Karoo only suitable for sheep/goat***
- ✓ ***farming***

CREST

- ✓ ***Resistant layer not suitable for human use***

TALUS

- ✓ ***Little human use due to steep angle and unweathered material***

LANDSCAPE IN GENERAL

- ✓ ***Ideal for photography***
- ✓ ***Survey for water trapped between sedimentary layers***
- ✓ ***Karoo ideal for satellite dishes due to clear skies***

2.4 **Study Figure 2.4 showing features resulting from volcanic activity and answer the following questions:** **(16)**

2.4.1 Refer to features D and E

a. Identify features D and E. 2

D – laccolith ***E – Lopolith***

b. Which type of volcanic activity do both these features result from, intrusive or extrusive volcanism? 1

- ***Intrusive***

c. Give a reason for your answer to **QUESTION 2.4.1 b.** 2

- ***Both feature originate beneath the surface of the earth***

d. Explain the difference in the process of formation of each of the features D and E. 2X2

- ***D – the magma forces the layers of rock to bend upwards resulting in a dome shape***
- ***E – the magma is too heavy for the underlying rock structure to support resulting in it sagging.***

2.4.2 Answer with reference to **feature F:**

a. Identify feature F 1

- ***Batholith***

b. This feature is, over a period of time, exposed to the earth's surface. Explain how this takes place. 2

- ***Continuous erosion of the earth's surface results in it lowering itself, however, the batholiths being very resistant does not erode at the same rate, resulting in it being left intact and exposed to the surface.***

c. What is this feature known as when it is exposed to the earth's surface? 1

- ***Dome***

d. What type of rock is this feature(answer to **QUESTION 2.4.2 c**) formed from? 1

- ***Igneous***

e. State the drainage pattern associated with this feature (answer to **QUESTION 2.4.2 c**). 2

- ***radial / radial centrifugal***

2.5 **Refer to FIGURE 2.5 and answer the following questions:** **(18)**

2.5.1 Identify landforms P and Q respectively. 2X1

P - Mesa *Q – Butte*

2.5.2 What evidence in FIGURE 2.5 suggests that landforms P and Q developed from the same landform that existed earlier? 2

- *hey are joined at the base with shale rock*
- *They have same rock layers*
- *They have the same height and depth*
- *Both have same original height/cap rock*

2.5.3 What is the main agent of erosion responsible for the development of these features? 1

- *Water*

2.5.4 Which rock type in FIGURE 2.5 is the most resistant to erosion? 1

- *Dolerite*

2.5.5 Give ONE reason for your answer to **QUESTION 2.5.4.** 2

- *Back-wasting is taking place not downward wasting/downward erosion*
- *It is a hard layer of rock that caps (protects) P and Q*
- *Original height maintained*

2.5.6 Briefly describe how landform Q will change into landform R. 2X2

- *Cap rock/igneous sill/dolorite reduced from the sides*
- *Q reduces in size due to erosion by running water*
- *Q reduces through rockfalls*
- *Parallel retreat of slopes*
- *Eventually the cap rock is completely eroded away resulting in this feature reducing in height.*
- *Without the cap rock this feature continues to reduce in height forming a conical shape of a hill or koppie.*

2.5.7 Discuss factors that limit the use of this landscape by humans. 3X2

- *The landscape is arid Coarse grained infertile soil*
- *Narrow floodplain*
- *River flows in deep, steep sided valley*
- *Not suited for agriculture*
- *Not suited for settlement*
- *Development of infrastructure is limited*
- *Only suitable for adventure tourism*

2.6 **Study Figure 2.6 and answer the following questions** **(18)**

2.6.1 Describe the concept of mass movement. 2

- *It is the down slope movement of all weathered material under the influence of gravity.*

2.6.2 What type of mass movement is represented by Figure 2.6? 2

- *Landslide*

2.6.3 State how the building of the hotel could have caused the slope to slide. 3X2

- *Slope became unstable as a result of construction*
- *The weight of the hotel overloaded the slope and caused it to slide*
- *Removal of vegetation during construction*

2.6.4 Human activity is one of the main causes of mass movement.

Write a single paragraph (approximately 8 lines) suggesting possible solutions to prevent mass movement. 4X2

- *Constructing concrete walls, cables, buttresses, etc. at steep road cuttings*
- *Plant vegetation to prevent erosion*
- *Re-grade the slopes by unloading the top*
- *Provide adequate drainage so that parts of the slope do not get washed away by water*
- *Remove loose rock particles that could fall down slope*
- *Place concrete layers over the slope*
- *Mesh wiring to contain slope movements*
- *Drill metal staves into rock to stabilise*
- *Proper engineering when constructing on slopes*
- *Terracing of the slope*
- *Avoid developing settlements on steep slopes*
- *Proper environmental impact studies*

2.7 **Refer to FIGURE 2.7 of a cuesta and answer the following questions.** **(23)**

2.7.1 What is a cuesta? 2

- ***A ridge that develop in tilted sedimentary rock characterised by a gentle slope and a steep slope***

2.7.2 Explain the difference in the formation of cuestas in diagrams **A** and **B**. 2X2

- ***A forms when the rock strata in the centre are pushed upward***
- ***B forms when the rock strata in the centre are pushed downward***

2.7.3 Describe the difference between the dip slope and the scarp slope of a cuesta. 4

- ***Dip slope is gentle***
- ***Scarp slope is steep***

2.7.4 Discuss how humans can use cuestas. 2X2

- ***Farming takes place in the cuesta valleys situated between the ridges, as the flat surface is covered in fertile soil***
- ***Where cuesta basins form, artesian wells, which are sources of groundwater, are found***
- ***These basins can also form oil traps***
- ***These ridges are of strategic importance, as they can protect settlements on the cuesta valley floors during times of war***
- ***The ridges form excellent lookout points***
- ***Many outdoor activities are concentrated in these landscaping e.g. hang gliding and hot air ballooning***

2.7.5. a. Will a mesa form in this landscape? 1

- ***No***

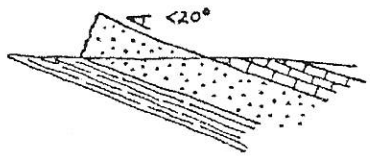
b. Give a reason for you answer to 2.7.5.a 2

- ***Mesas for in horizontally layered sedimentary rock capped with a layer of resistant igneous rock.***
- ***This landscape is made up of inclined strata of alternating resistant and less resistant rock.***

2.7.6 With the aid of diagrams explain the differences between a cuesta and a hogsback.. 6

Cuestas

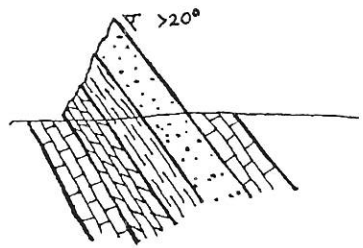
CUESTA



Forms from rock structure inclined at approximately 25° resulting in a gentle dip slope

Hogsbacks

HOGBACK



Forms from rock structure inclined at +45° resulting in a steep dip slope

2.8 **Study Figure 2.8A and 2.8B and answer the following questions.** **(12)**

2.8.1 Describe the rock structure that will allow for the type of landscape shown in Figures 2.8A and 2.8B to form. 2X2

- ***Layered horizontal sedimentary rock***
- ***This rock must be uniformly resistant to erosion.***

2.8.2 Describe the characteristics/appearance of each type of hill represented by Figures 2.8A and 2.8B, giving reasons for their differences and state which would be more conducive to human activity. 4X2

- ***2.8B – Hills with narrow bullies and sharp ridges. Slopes are steep and eleven with little rounding.***
- ***This landscape is a result of arid climate.***

- ***2.8A – A series steep hills with rounded slopes.***
- ***Form in humid climate as result of sheetwash and chemical weathering. Rainfall run over the surface removing surface material.***

- ***Slope 2.8A would be more conducive to human activity due to the availability of moisture which facilitates the growing of vegetation.***