Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GEOGRAPHY

GRADE 11

07JUNE 2023

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of THREE questions.
   a. QUESTION 1: Atmosphere (60)
   b. QUESTION 2: Geomorphology (60)
   c. QUESTION 4: 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 the questions 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 QUESTION 4

14. A 1: 50 000 extract of the topographic map 3025AD PHILIPPOLIS and 1: 10 000 orthophoto map 3025 01 PHILIPPOLIS 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.

QUESTION 1 : WEATHER AND CLIMATE

1.1 Choose the correct term in COLUMN B that matches the description in COLUMN A. Write the letter (A–H) next to the question number (1.1.1–1.1.8) in your ANSWER BOOK, for example 1.1.9 J.

COLUMN A		COLUMN B	
1.1.1	Large body of air with uniform properties	A	Polar front
1.1.2	The zone where westerly winds and polar easterlies meet	B	Jet stream
1.1.3	Decrease of temperature in the atmosphere caused by changes in altitude.	C	Solar radiation
1.1.4	Very strong winds blowing 10 km above the earth's surface	D	Westerlies
1.1.5	The force which develops due to differences in air pressure	E	ITCZ
1.1.6	Convergence zone of north-easterly and south-easterly trade winds.	F	Earth's radiation
1.1.7	Upward vertical transference of heat.	G	Air mass
1.1.8	Winds that form in the Mid-latitude / Ferrell Cell	H	Adiabatic lapse rate
		I	Pressure gradient

(8 x 1) (8)

1.2 Refer to the extract below on concepts, causes and management of drought and desertification. Choose the correct word(s) in brackets to make the extract geographically correct. Write the correct word(s) next to the question number, for example 1.2.8 ITCZ.

Desertification in Namibia

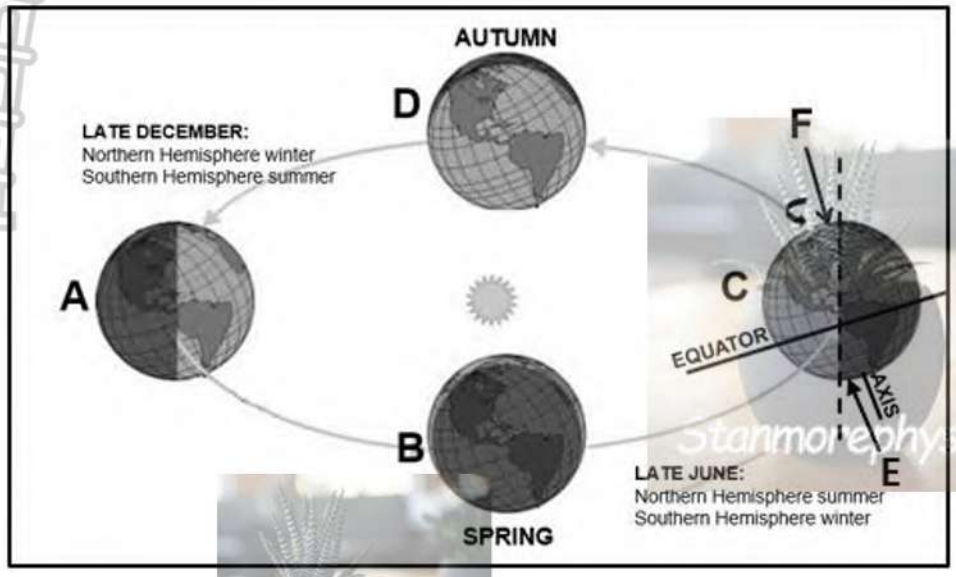
Namibia is one of the driest countries in Southern Africa. It is characterized by its arid conditions and droughts tend to occur now and then. Approximately 2,1 million people battling its vulnerability of desertification and droughts.

Desertification is known to be a type of land degradation in which a relatively **(1.2.1 wet / dry)** land region becomes increasingly **(1.2.2 fertile / arid)**, typically losing its bodies of water as well as vegetation and wildlife. It is caused by a variety of factors, such as **(1.2.3 heavy rain / climate change)** and human activities. Human activities that cause desertification include overgrazing, **(1.2.4 correct / incorrect)** farming methods and **(1.2.5 planting more / cutting down)** of trees.

In order to alleviate this situation and to offset desertification, it is up to us humans to intervene by implementing the following strategies: Good land management in semi-arid areas, **(1.2.6 save / waste)** water in our communities, the number of animals on the land must be **(1.2.7 reduced / increased)** etc

(7 x 1) (7)

1.3 Refer to the sketch below showing the earth's revolution around the sun to answer the following questions.



1.3.1 Define the concept *insolation*. (1 x 2) (2)

1.3.2 Choose the correct word from those given in brackets. The factor that determines the amount of insolation shown on sketch is (***latitude / seasons***). (1 x 1) (1)

1.3.3 Match the season labelled **A** to **D** in the sketch with the descriptions in numbers I to IV below. Write only the number and the correct letter from the sketch representing the season next to number in your answer book. E.g. III - F

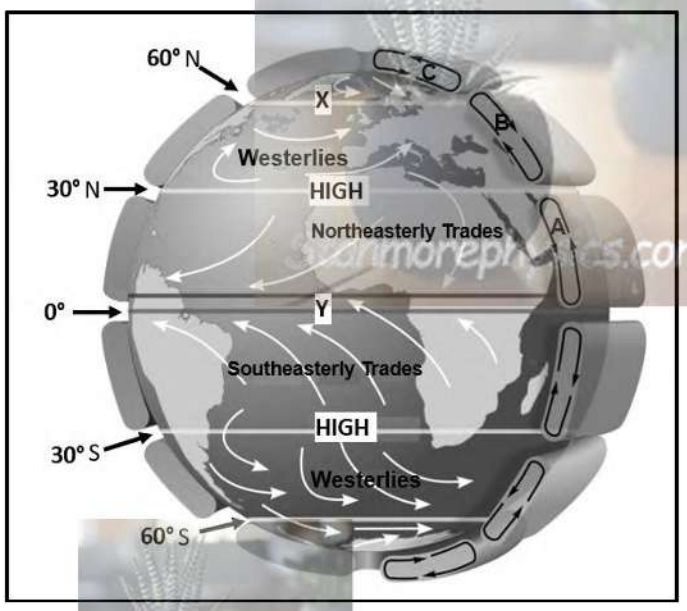
I	21 December – Southern Hemisphere tilts towards the sun.
II	22 June – Southern Hemisphere tilts away from the sun.
III	21 March – The sun directs insolation onto the equator.
IV	22 September – The sun directs insolation onto the equator. (4 x 1) (4)

1.3.4 Define the concept *parallelism*. (1 x 2) (2)

1.3.5 Describe the daylength during the dates of the equinox in letter **B** and **D**. (1 x 2) (2)

1.3.6 Explain the amount of radiation and daylength at point **E** and **F**. (2 x 2) (4)

1.4 Study the illustration of global air circulation below.



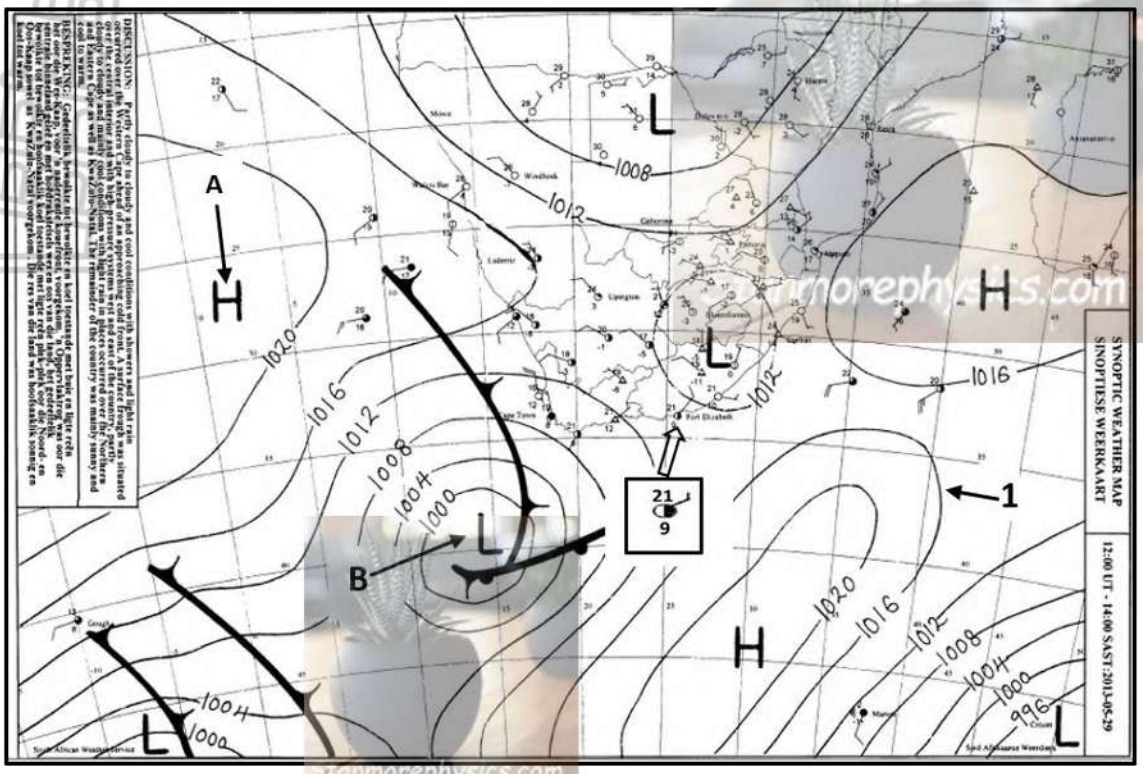
1.4.1 Name the atmospheric cells **A, B** and **C**. (3 x 1) (3)

1.4.2 Identify air pressure belt at **X** and **Y** (2 x 1) (2)

1.4.3 Describe the influence of Coriolis force on the direction of westerly winds. (1 x 2) (2)

1.4.4 In a paragraph of approximately EIGHT lines, discuss how the air circulation cell at **A** developed. (4 x 2) (8)

1.5 Refer to the synoptic weather map of Southern Africa.



1.5.1 Identify the line marked no **1** in synoptic map. (1 x 1) (1)

1.5.2 State the atmospheric pressure recording in the line marked no **1**. (1 x 2) (2)

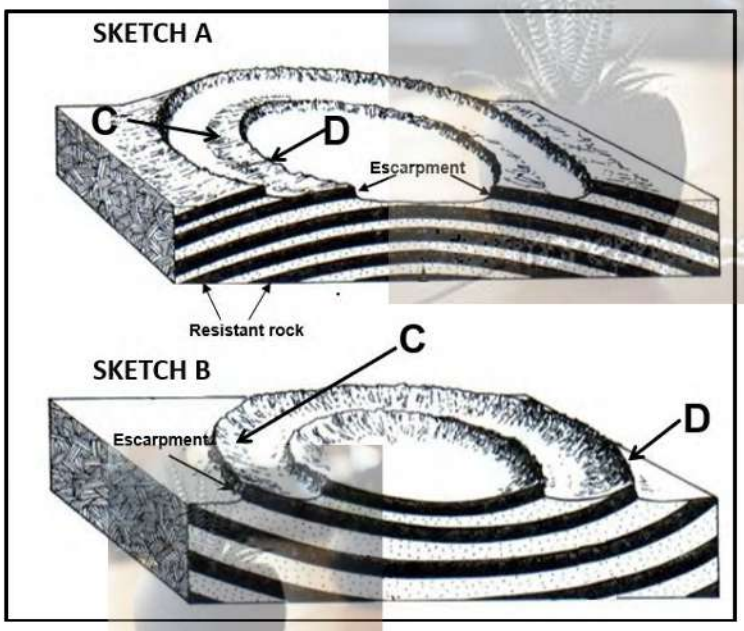
1.5.3 Why is the line marked no **1** important? (1 x 2) (2)

1.5.4 Differentiate between the weather conditions at atmospheric pressure cells **A** and **B**. (3 x 2) (6)

1.5.5 Refer to the enlarged weather station model and describe the weather conditions at Port Elizabeth. (4 x 1) (4)

QUESTION 2 : GEOMORPHOLOGY

2.1 Refer to the sketches below showing topography associated with layered rocks.



2.1.1 Identify the type of feature in Sketch **A** as Cuesta basin or Cuesta dome

2.1.2 Identify the type of feature in Sketch **B** as Cuesta dome or Cuesta basin

2.1.3 Do these features occur in inclined or horizontal strata?

2.1.4 Identify Slope **C** as the dip or scarp slope

2.1.5 Identify slope **D** as the dip or scarp slope

2.1.6 Is slope **C** steep or gentle?

2.1.7 Is slope **D** steep or gentle? (7 x 1) (7)

2.2 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 numbers (2.2.1 to 2.2.8) in the ANSWER BOOK, for example 2.2.9 A.

2.2.1 … form when rivers incise into joints in rocks.

A. Canyons
B. Domes
C. Mountains
D. Hills

2.2.2 The extensive flat surface of a Karoo landscape is called a …

A. knickpoint.
B. pediment.
C. pediplain.
D. peneplain.

2.2.3 A … is a vertical intrusion of igneous rock.

A. dyke
B. pipe
C. volcano
D. sill

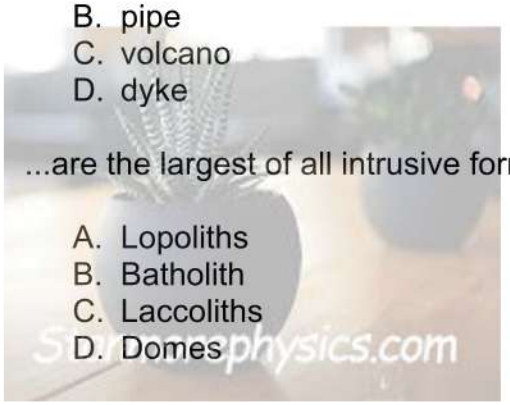
2.2.4 An asymmetrical ridge with a steep dip slope of more than 45° is a …

A. canyon.
B. hogsback.
C. butte.
D. mesa.

2.2.5 A … is a horizontal intrusion of igneous rock.

A. sill
B. pipe
C. volcano
D. dyke

2.2.6 ...are the largest of all intrusive forms.



A. Lopoliths
B. Batholith
C. Laccoliths
D. Domes

2.2.7 Table Mountain is an example of a …

A. canyon.
B. hogsback.
C. butte.
D. mesa.

2.2.8 The type of topography associated with a basaltic plateau is ...

A. horizontally layered rocks
B. vertically layered rocks
C. massive igneous rocks
D. Cuestas

(8 x 1) (8)

2.3 Different types of mass movements are illustrated in the photos below.

2.3.1 Define the term *mass movement*. (1 x 1) (1)

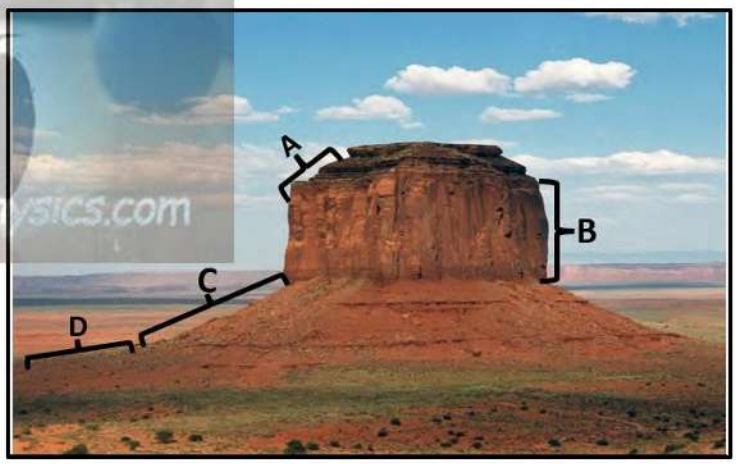
2.3.2 Comment on the possible cause of the type of mass movement at **A**. (1 x 2) (2)

2.3.3 Explain how the deforestation at **B** increased the mass movement illustrated on the sketch. (1 x 2) (2)

2.3.4 Comment on the dangers that the type of mass movement at **C** has for the people using the base of the slope. (1 x 2) (2)

2.3.5 In a paragraph of approximately EIGHT lines, discuss strategies you would implement to stabilise the area at **C**. (4 x 2) (8)

2.4 The sketch below illustrates typical slope elements associated with horizontal layered rocks



2.4.1 State the kind of landscape where the landform in the sketch is found. (1 x 1) (1)

2.4.2 Name the slope elements labelled **A**, **B**, **C** and **D** (4 x 1) (4)

2.4.3 Why would tourists use slope element **B** for rock climbing and abseiling purposes? (1 x 2) (2)

2.4.4 Why will vegetation grow better on slope element **D** than on the slope element at **C**? (1 x 2) (2)

2.4.5 Discuss ONE characteristic of the slope elements **A, B** and **D**. (3 x 2) (6)

2.5 Study the photo below, which illustrate tors.

2.5.1 What are *tors*? (1 x 2) (2)

2.5.2 Name the massive igneous rock from which tors develop. (1 x 1) (1)

2.5.3 Describe the shape of the present-day core stones of the tors. (1 x 2) (2)

2.5.4 Why is it possible for the core stones to remain in place although they seem very loose? (2 x 2) (4)

2.5.5 Describe the development of tors. (2 x 3) (6)

[60]

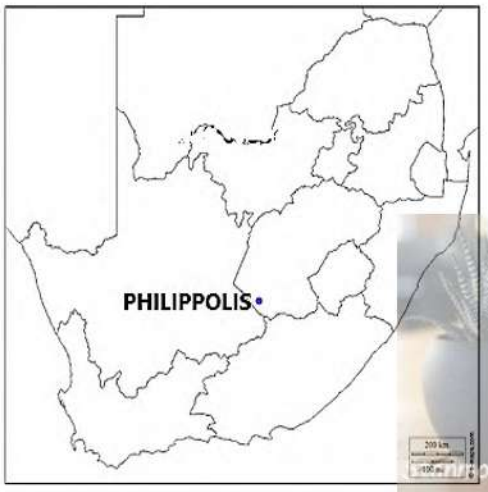
TOTAL FOR SECTION A [120]

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

The questions below are based on the 1: 50 000 topographical map 3025AD PHILIPPOLIS, as well as the orthophoto map of a part of the mapped area.

GENERAL INFORMATION ON PHILIPPOLIS



Coordinates: 30° 15' S 25° 16' E

Philippolis is a small town situated in the Motheo and Xhariep region of the Free State Province in South Africa. In 1823 it served as a missionary outpost for the Bushman. This makes Philippolis the oldest settlement in the Free State Province.
Seventy-five of Philippolis's buildings have been declared as national monuments.
Philippolis's climate is characterised by warm to hot summers and cool to cold winters. This semi-desert area also brings fluctuations of temperature from day to night with an average amount of annual precipitation of 353,0 mm.

The following English terms and their translations are shown on the topographic map:

ENGLISH	AFRIKAANS
Diggings	Delwery
Furrow	Voor
Sewerage works	Rioolwerke

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 A human feature found at 30°19' 24" S and 25° 17' 17" E is a …

A. Monument
B. Communication tower
C. Wind pump
D. Grave (1 x 1) (1)

3.1.2 Refer to the trigonometrical station 275 at **M** in block **D4**, and spot height 1404 at **N** in block **C4** on the topographical map

(a) Identify the landform marked with letter **M** in block **D4**. (1 x 1) (1)

(b) Calculate the difference in height between trig station 275, **M** and spot height 1404, at **N** (2 x 1) (2)

3.1.3 Refer to the trigonometrical station 275, **M** in block D4, and bench-mark 1326,7 **P** in block **C3** on the topographical map

(a) Calculate the gradient between bench-mark 1326,7 at **P** and trigonometrical station 275 at **M**. Show ALL calculations. Marks will be awarded for calculations. (5 x 1) (5)

(b) Is the gradient calculated in QUESTION 3.1.3 (a) STEEP or GENTLE? (1 x 1) (1)

3.2 MAP INTERPRETATION

3.2.1 The direction of the wind pump in Block **C1** from spot height 1468 in block **C1** is …

A. north east.
B. south east.
C. south west.
D. north west. (1 x 1) (1)

3.2.2 The human-made feature labelled **K** in block **B5** on the orthophoto map is a …

A. hiking trail.
B. school.
C. place of worship.
D. post office. (1 x 1) (1)

3.2.3 Refer to landforms **1** in block **B3** and **2** in block **B4** on the orthophoto map.

(a) Identify any ONE type of mass movement that could possibly affect Poding-Tse-Rolo settlement found in block **B3** and **B3** at the base these landforms on the orthophoto map. (1 x 2) (2)

(b) Explain TWO human activities that can contribute to any type of mass movement. (2 x 2) (4)

3.2.4 Philipolis generally receives low rainfall. Mention TWO measures evident in blocks **C5** and **D5** on the topographical map that farmers have adopted to overcome water shortages. (2 x 2) (4)

3.3 GEOGRAPHICAL INFORMATION SYSTEMS

3.3.1 Setting an area to demarcate one area from another is known as ... (1 x 1) (1)

A. Remote sensing
B. Data layering
C. Buffering
D. Spatial resolution

3.3.2 Classify the following statements as ***spatial data*** or ***attribute data***.

(a) Main road between **O** and **P** on the topographical map is a tar road with two lanes. (1 x 2) (2)

(b) The wind pump in block **E3** on the topographical map is found at 30° 19' 24" S and 25° 17' 17" E. (1 x 2) (2)

3.3.3 Refer to the photo of a golf course in Block **A3**.

(a) Classify the type of data in the image as *vector* or *raster* data. (1 x 1) (1)

(b) Explain how GIS assisted the developers in the location of this golf course. (1 x 2) (2)

TOTAL FOR SECTION B [30]
TOTAL FOR THE QUESTION PAPER [150]

Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

JUNE 2023

GEOGRAPHY MARKING GUIDELINE

MARKS :150

This marking guideline consists of 9 pages.

PRINCIPLES FOR MARKING GEOGRAPHY – JUNE 2023

The following marking principles have been developed to standardise the marking process .

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 *M* 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 ✓
  - o If TWO marks are allocated, TWO ticks must be used ✓✓
  - o The tick must be place 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: ×
  - ○ 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.

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 sub-section and underlined.
  - ○ Sub-totals must be written legibly.
  - ○ Leave space to write in moderated marks on different levels.
- Total sub-totals and transfer total to 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 total must be written down. 36 26

QUESTION 1 : WEATHER AND CLIMATE

1.1

1.1.1 G – Air Mass √

1.1.2 A – Polar Front √

1.1.3 H – Adiabatic Lapse Rate √

1.1.4 B – Jet Stream √

1.1.5 I – Pressure Gradient √

1.1.6 E- ITCZ √

1.1.7 F – Earth's Radiation √

1.1.8 D – Westerlies √ (8)

1.2 1.2.1 Dry √

1.2.2 Arid √

1.2.3 Climate change √

1.2.4 Incorrect √

1.2.5 Cutting down √

1.2.6 Save √

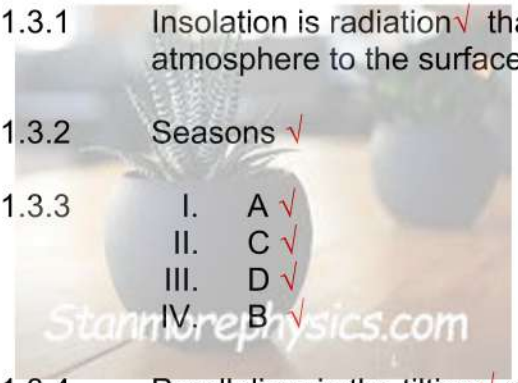
1.2.7 Reduced √ (7)

1.3

1.3.1 Insolation is radiation√ that is emmitted by the sun √ through the atmosphere to the surface of the earth (Concept) (1 x 2) (2)

1.3.2 Seasons √ (1 x 1) (1)

1.3.3
I. A √
II. C √
III. D √
IV. B √ (4 x 1) (4)



1.3.4 Parallelism is the tilting√ of the earth throughout is revolution, causing variation√ in the distribution of heat energy on the earth's surface. (1 x 2) (2)

1.3.5 Equaly length of the day and Night / Daylenght is 12 hours. √√ (1 x 2) (2)

1.3.6 Point E has shorter √day length and recieves less amount of insolation √, because the Southern Hemisphere is tilted away from the sun√.
Point F has longer √ daylength and recieve greater amount of insolation√ because Northern Hemisphere is tilted towards the sun. √
[***Any two must be answered for both points E and point F***] (2 x 2) (4)

[15]

1.4 1.4.1
A. Hadley cell √
B. Ferrel cell √
C. Polar cell √ (3 x 1) (3)

1.4.2 X – Sub-polar low pressure belt √
Y - Equatoral low pressure belt √ (2 x 1) (2)

1.4.3 Coriolis force causes westerly winds to be deflected. √√ (1 x 2) (2)
Deflection is to the right in the Southern Hemisphere and to the left in the Northern Hemisphere. √√
There is greater deflection because of the higher latitudes √√
[Any one correct answer]

1.4.4 The confluence of the sub-tropical easterlies, results in the convection of warm air √√ (4 x 2) (8)
As the air rises it cools and divergence of the cooler air in the upper air takes place √√
Cooling air subsides at 30°N & S latitudes √√
On the surface the air diverts to the equator where it heats up√√
Intensive heating around the equator (0º) causes vertical rise of air. √√
The air reaches the top part of the troposphere and diverge towards the poles. √√
At 30º north and south the air starts to descend because it cooled off. High pressure zone develops. √√
The air diverges at the surface, where some air flows back to the equator. √√
[Any four logically discussed points that show a complete cell of circulation]

[15]

1.5 1.5.1 Isobar √ (1 x 1) (1)

1.5.2 1016 mb √ (1 x 1) (1)

1.5.3 Isobar joins places with same atmospheric pressure on the synoptic weather map. √√ (2 x 1) (2)

1.5.4 A – has descending √ air whilst B has ascending air√ (3 x 2) (6)
A – is associated with dry weather√ whilst B is associated with unstable weather. √
A – has divergeance√ of surface winds whilst B has convergeance √ of surface winds

1.5.5 Air temperature – 21√ (4 x 1) (4)
Dew point temperature – 9 √

Wind direction – North Easterly √
Wind Speed - 10 knots √
Cloud cover – Overcast √
[Any four weather conditions shown in the enlarged station model]

[15]

QUESTION 2 : GEOMORPHOLOGY

2.1 2.1.1 Cuesta dome √

2.1.2 Cuesta basin √

2.1.3 Inclined strata √

2.1.4 Dip √

2.1.5 scarp slope √

2.1.6 Gentle √

2.1.7 Steep √ (7 x 1) (7)

2.2 2.2.1 A – Canyons √

2.2.2 C – pediplain √

2.2.3 A – dyke √

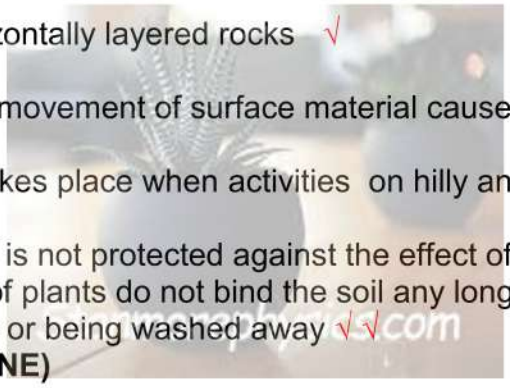
2.2.4 B – Hogsback √

2.2.5 A – Sill √

2.2.6 B – Batholiths √

2.2.7 D – mesa √

2.2.8 A - horizontally layered rocks √ (8 x 1) (8)



2.3 2.3.1 It is the movement of surface material caused by gravity. √ (1 x 1) (1)

2.3.2 Often takes place when activities on hilly and steep slopes. √√ (1 x 2) (2)

2.3.3 The soil is not protected against the effect of rain anymore √√ (1 x 2) (2)
Roots of plants do not bind the soil any longer, therefore becoming easier to move or being washed away √√
(ANY ONE)

2.3.4 Can cause blockages on the road √√ (1 x 2) (2)
Can cause accidents to road users √√
Can cause serious injury or even death √√
Rockfallss may bury the houses √√

Can cause damages to the property√√
[ANY TWO]

2.3.5 Use netting or caging to keep loose material intact √√ (
Building of rock walls or walls at the base of the slope to capture loose falling rocks √√
Spraying of cement on the side of the slope to stabilise the rock √√
Drilling of bolts and nuts into the slope to help stabilise it √√
Channelling of water out of the soil to help keep it drier √√
(ANY FOUR) 4 x 2) (8)
[15]

2.4 2.4.1 Canyon landscape / Karoo landscape √ (1 x 1) (1)

2.4.2 A – crest/waxing slope √ (4 x 1) (4)
B – cliff/free face/scarp √
C – T alus/scree/debris/constant slope √
D – pediment √

2.4.3 Enough height of the slope. √ (1 x 2) (2)
Steepness of the slope makes it suitable for such activities. √

2.4.4 D has more stable soil than E√√. Thick deposit of soil at D and more erosion at E√√. More deposit of nutrients on slope D and more runoff of nutrients at E √√. (1 x 2) (2)

2.4.5 A - convex √√ (3 x 2) (6)
soil creep √√
top of slope √√

B – Nearly vertical slope √√
Exposed rock √√

D – Bottom of slope √√
Concave shape √√
Gentle slope √√
Covered with soil layer √√
fertile soil √√
[ANY THREE. ONE FROM EACH SLOPE ELEMENT]

[15]

2.5 2.5.1 Pile of rounded core stones balancing on top of one another √√ (1 x 2) (2)
(Concept)

2.5.2 Batholith √ (1 x 1) (1)
Laccolith √
[ANY ONE]

2.5.3 The core stones are well rounded √√ (1 x 2) (2)

2.5.4 The base of the tor is still joined to the original granite rock √√ (2 x 2) (4)
Tors develop from igneous rocks, which are not easy to erode √√
During the development of tors, the core stones were joined when rain water seeped into the cracks and joints √√
(ANY TWO)

2.5.5 Igneous rocks cool down below the surface. √√ (2 x 3) (6)
Cooling magma results in cracks and joints in the rock. √√
Chemical weathering occurs as ground water seeps into the cracks and joints. √√
Joints and cracks are widened through erosion. √√
The eventual removal of overlying rock layers, exposes the core stones. √√
The joints and cracks are further widened through mechanical weathering and erosion. √√
(ANY FOUR)

[15]

SECTION B

QUESTION 3: MAP SKILLS AND CALCULATIONS

3.1 3.1.1 C – wind pump √ (1 x 1) (1)

3.1.2 a) Butte √ (1 x 1) (1)

b) 1406,9 m – 1404 m √
= 2,9 m √ (2 x 1) (2)

3.1.3 a) Formula: Gradient = $\frac{\text{Vertical Interval (VI)}}{\text{Horizontal Equivalent (HE)}}$ (5 x 1) (5)

..

Gradient = $\frac{1406,9 \text{ m} - 1\,326,7 \text{ m}}{3,2 \text{ cm} \times 500}$ ✓ ✓ ✓ (range 3,1cm – 3,3cm)

$\frac{80,2 \text{ m}}{1600 \text{ m}}$ ✓ (range 1550 m – 1650 m)

$\frac{1}{19,95}$

1: 19,95 ✓ (range 1:19,33 – 1:20,57)

(b) Gentle √ (1 x 1) (1)

[10]

3.2 MAP INTERPRETATION

3.2.1 D – South West √ (1 x 1) (1)

3.2.2 C – Place of Worship √ (1 x 1) (1)

3.2.3 (a) Rockfalls √√ (1 x 2) (2)
Mudflows √√
Soil creep √√
[ANY ONE]

(b) Excavation of slope√√ (2 x 2) (4)
Loading of slope or its crest. √√
Drawdown (of reservoirs) √√
Deforestation√√
Too much Irrigation √√
Mining takes place in the area √√
Artificial vibration √√
Water leakage from utilities√√
[ANY TWO]

3.2.4 Presence of furrows √√ (2 x 2) (4)
Presence of dams √√
Presence of windpumps √√
Presence of reservoirs √√
[ANY TWO]

3.3 GEOGRAPHICAL INFORMATION SYSTEM

3.3.1 C – Buffering √ (1 x 1) (1)

3.3.2 (a) Spatial Data √√ (1 x 2) (2)

(b) Attribute Data √√ (1 x 2) (2)

3.3.3 (a) Raster data √ (1 x 1) (1)

(b) Data layering to determine relief layers with flat land for golf course. √√
Data manipulation to determine suitable and unsuitable areas for location of golf course. √√
Buffering to demarcate suitable area for golf from unsuitable areas. √√
Overlay analysis to determine ownership land-use. √√
Using satellite images to identify used land and unused land that is suitable for golf course. √√
[ANY ONE] (1 x 2) (2)