KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P1

MARKING GUIDELINES

SEPTEMBER 2021

PREPARATORY EXAMINATION

MARKS: 150

This marking guidelines consists of 12 pages.

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CLIMATE AND WEATHER

QUESTION 1

1.1

1.1.1 A✓

1.1.2 Cumulonimbus ✓

1.1.3 Warm front

1.1.4 X – heavy showers/torrential rainfall ✓ Y - moderate/light showers ✓

1.1.5 West to east / easterly ✓

1.1.6 Westerlies✓ (7 x 1) (7)

1.2

1.2.1 Isobars✓

1.2.2 1020 hPa/mb✓

1.2.3 Kalahari/ Continental High✓

1.2.4 Anticlockwise/Anticyclonic✓

1.2.5 South West✓

1.2.6 Coastal low✓

1.2.7 Winter✓

1.2.8 Berg winds✓ (8 x 1) (8)

1.3

1.3.1 3✓ (1 x 1) (1)

1.3.2 power lines were blown down ✓
roofs were ripped off homes and other buildings ✓ (2 x 1) (2)

1.3.3

(a) Eye✓ (1 x 1) (1)

(b) Anticlockwise/Counterclockwise✓ (1 x 1) (1)

(c) The upward spiralling movement of air creates an artifical wall around the centre✓✓ This prevents surface air from rising and cooling, therefore no condensation occurs to produce clouds or rain✓✓
As air descends in the eye it warms up adiabatically, no cloud formation ✓✓ (1 x 2) (2)
(Any ONE)

1.3.4 At category 4 wind speed was 270 km per hour very destructive ✓✓
Delta began to turn more north-northeastward into an area of cooler waters✓✓
Higher wind shear, and dry air, causing it to weaken back to Category 2 status
When it made landfall it was cut off from moisture source. ✓✓
Friction of air moving over land decreased windspeed. ✓✓
System slowed down, wind speed decreased to 155 km/h and finally classified as a tropical low ✓✓
Pressure increased to 970 mb ✓ (4 x 2) (8)
(Any FOUR)

1.4

1.4.1 Moisture front✓ (1 x 1) (1)

1.4.2
It extends from north west to south east ✓
Central part of South Africa ✓
(Any ONE) (1 x 1) (1)

1.4.3 B - south westerly wind ✓
C - north easterly wind ✓ (2 x 1) (2)

1.4.4 B✓ - south westerly wind (1 x 1) (1)

1.4.5 Wind B blows over the Atlantic Ocean which is colder/ South Atlantic High advects cold dry air✓✓
Due to cold Benguella current which brings cold dry weather conditions✓✓ (1 x 2) (2)
(ANY ONE)

1.4.6 The cold dry south westerly wind and the warm north easterly wind converge at the moisture front ✓✓
The cold, dry south air uplifts the warm, moist air along the east of the front ✓✓
Rising air will therefore cool and condenses forming cumulonimbus clouds which will result in line thunderstorms east of the moisture front ✓✓
(Any TWO) (2 x 2) (4)

1.4.7 Rains will fill dams and can be used for irrigation✓✓
Provide moisture for dry soil✓✓
Underground water reserves will increase causing water table to rise✓✓
Flood waters will clear pollution in rivers✓✓
Nitrogen fixing from lightning makes the soil fertile ✓✓ (2 x 2) (4)
(Any TWO)

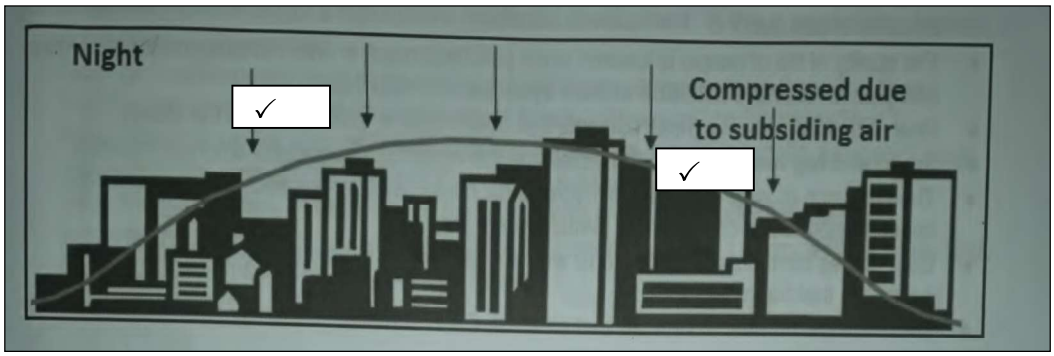
1.5

1.5.1 Heat Island - Refers a region of higher temperatures in an urban area surrounded by lower temperatures in the rural areas✓✓
[Concept] (1 x 2) (2)

1.5.2 5/4 degrees celsius✓ (1 x 1) (1)

1.5.3 Heat is trapped by the buildings due to closely spaced building✓✓
Reflective heat is transferred between the buildings✓✓
Limited air flow to disperse of heat✓✓
Heat is absorbed by building✓✓
(Any TWO) (2 x 2) (4)

1.5.4 (a)



Marks must be allocated for:
Subsidence ✓
Dome shape ✓

(2 x 1) (2)

(b) It traps more heat increasing the heat island effect✓✓ (1 x 2) (2)

1.5.5 Planting more trees in the urban areas to absorb carbon dioxide✓✓
Establishment of the roof gardens✓✓
The use of white reflective paints or surfaces to prevent heat from being absorbed✓✓
Commercial decentralization to move shoppers/workers to outlying areas industrial decentralization to prevent pollution in cities✓✓
Limit industrial activities to daytime only✓✓
Legislation to limit pollution✓✓
Chimney stacks tall enough to release smoke above inversion layer✓✓
Increase the number of water features✓✓
Promote public transport to reduce the number of vehicles in the CBD✓✓
Increase eco-friendly buildings ✓✓
Encourage park and ride facilities✓✓

(Any TWO) (2 x 2) (4)
[60]

QUESTION 2: GEOMORPHOLOGY

2.1

2.1.1 Precipitation/Rain✓

2.1.2 Source ✓

2.1.3 Infiltration/Percolation/Seepage ✓

2.1.4 Interfluve✓

2.1.5 Waterfall/Knickpoint ✓

2.1.6 Deposition✓

2.1.7 Sea level/Permanent base level/Ultimate base level/Base level of erosion✓

(7 x 1) (7)

2.2

2.2.1 delta ✓

2.2.2 graded ✓

2.2.3 antecedent ✓

2.2.4 rectangular ✓

2.2.5 confluence ✓

2.2.6 Periodic/Permanent ✓

2.2.7 levee ✓

2.2.8 Stream discharge ✓ (8 x 1) (8)

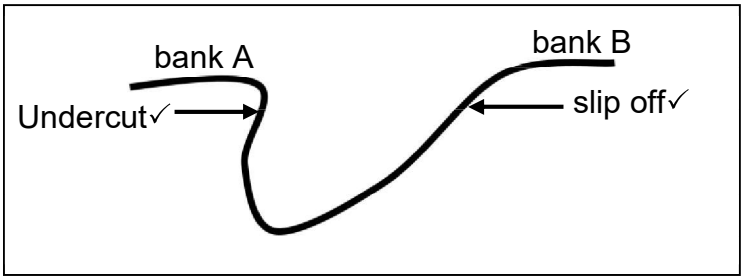
2.3

2.3.1 Meander✓ (1 x 1) (1)

2.3.2 Lower course ✓ (1 x 1) (1)

2.3.3 laminar flow – river has a smooth flow/ flows in sheets/layers
Flows without lateral mixing ✓✓ (1 x 2) (2)
(Any ONE)

2.3.4



✓ (3 x 1) (3)

(ONE MARK MUST BE GIVEN FOR THE SHAPE OF THE SLOPES)

2.3.5 River is fast flowing/flow has most energy due to greater friction ✓✓
Greater erosion ✓✓
The hydraulic force of the water is greater ✓✓ (2 x 2) (4)
(Any TWO)

2.3.6 Flow is slower, will reduce the speed of the boat ✓✓
Greater deposition will result in shallow waters and the accumulation of deposited material could damage the bottom surface of the canoe/ boat ✓✓
The slower water deposits its load on a series of point bars causing obstruction in the course of the flow ✓✓
Shallow water will make it difficult to paddle the boat ✓✓ (2 x 2) (4)
(Any TWO)

2.4.1 Occurs when a more energetic river captures or intercepts the headwaters of less energetic river ✓✓ (1 x 2) (2)
(Concept)

2.4.2 A – Wind gap✓ (1 x 1) (1)

2.4.3 Flowing over a steeper gradient✓✓
High drainage density due to high rainfall✓✓
Cuts through the watershed (headward erosion) ✓✓
Flows over softer rock✓✓ (1 x 2) (2)
(ANY ONE)

2.4.4 The increase in volume results in the drainge basin increasing its energy to erode downward ✓✓ (1 x 2) (2)

2.4.5 **Physical**

Stream will lose its water/headwater ✓✓
Beheaded stream ✓✓
Deposition increases ✓✓
The river becomes too small for its valley ✓✓
River becomes a misfit stream ✓✓
River start to dry up ✓✓

Environmental

The area surrounding the river will become drier ✓✓
The ecosystem will be distrupted /state of imbalance ✓✓
Affect aquatic life negatively ✓✓
Animals depending on the river will migrate ✓✓
Vegetation will dry up ✓✓
Ground water levels will drop ✓✓ (4 x 2) (8)
✓✓
(Any FOUR. Must mentioned both physical and environmental impact)

2.5.1 Department of Water and Sanitation ✓ (1 x 1 (1)

2.5.2 Sewage entering the river/
Dysfunctional wastewater treatment plants ✓
(Any ONE) (1 x 1) (1)

2.5.3 Lesotho ✓ (1 x 1) (1)

2.5.4 Free State ✓ Mpumalanga ✓ (2 x 1) (2)

2.5.5 **Natural ecosystem**

Algae starts to grow in the water/ Algae will poison fish ✓✓/
Fish/birds/insects and other species that depend on the river will die ✓✓
Eutrophication takes place ✓✓
Water becomes contaminated/toxic ✓✓
Contribute towards acid rain ✓✓
The chemicals in the waste can be harmful to the pH balance of the water and soils ✓✓
ground water will be affected ✓✓
Offensive odours ✓✓
Increase in viruses/bacteria ✓✓
River and surrounding areas will lose its aesthetic qualities ✓✓

Recreational Activities

Decrease in recreational activities ✓✓
Recreational activities rowing/swimming/canoeing/fishing may have to be suspended due to waterborne diseases✓✓
Decrease in tourism especially to resorts along the river ✓✓
(Any ONE) (2 x 2) (4)
(Candidates must mention one point from both, natural ecosystem and recreational activities)

2.5.6 Sewage need to be treated/Purified close to the source in septic tanks/ before it is disposed of ✓✓
Treat and use sewage waste since it contain nitrogen and phosphorous that can be used as fertilizers ✓✓
Fix/repair pipelines connecting sewage waste/ Implement effective maintenance and renovation of the sewerage pumps and waste water works ✓✓
Fines for not properly maintaining equipment ✓✓
Install low flow toilet systems ✓✓
Reduce the amount of fats, oils and grease down drains ✓✓
avoid planting trees close to sewage pipes ✓✓
Improve the infrastructure ✓✓
Reuse/Recycle water ✓✓
Education/awareness programmes on Waste disposal ✓✓
Legislation prohibiting pollution around the Vaal River ✓✓
Implementation and policing of the National Water Act ✓✓
Making municipalities accountable for high quality drinking water ✓✓
Consulting and creating public participation around water needs ✓✓
River health programmes ✓✓
Regular monitoring and testing of the water quality ✓✓
Long term plan for sustainable water usage✓✓
Preventing settlement development ✓✓
Introducing efficient waste removal ✓✓
Erect buffer zones ✓✓
Use eco-friendly products ✓✓ (3 x 2) (6)
(Any THREE) **[60]**

QUESTION: 3

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 Calculate the length of the dam wall in block **C4** in metres. Show all calculations.

0.8 ✓ cm **x 500 (Range: 0.7 cm – 0.9 cm)**
= 400m ✓ **(Range: 350 – 450m)** (2 x 1) (2)

3.1.2 Various options are provided as possible answers to the following question. Choose the answer and write only the letter (A–D).

The true bearing of the railway station **4** from the school **2** on the orthophoto map is …

B 120º ✓

(1 x 1) (1)

3.1.3 Calculate the magnetic bearing of the railway station (4) from the school (2) on the orthophoto map for the current year.

1. Difference in years: **2021- 2014 = 7 years** ✓
2. Mean annual change: **4'**
3. Total anual change: **4' x 7 years = 28 '**✓
4. Magnetic declination for the current year: **17º 16' + 28' = 17º 44'** ✓

Formula for magnetic bearing:
MB = 120º + 17º 44'✓
= 137º 44' west of True North ✓✓ (6 x 1) (6)

3.1.4 Why it is important to correct the magnetic declination when using a topographical map and a magnetic compass on a hike on the Magaliesberg.

To obtain the precise direction ✓
To maintain a correct path during the hike ✓ (1 x 1) (1)
(Any One)

[10]

3.2 APPLICATION AND INTERPRETATION

3.2.1 There are sections of greenery within and surrounding the area of Rustenberg West. With reference to climate explain the importance of these green areas to the city.

Helps reduce the temperature within the town ✓✓
Provides oxygen✓✓
Reduces carbon dioxide✓✓
Filters pollution within the town ✓✓
(Any ONE) (1 x 2) (2)

3.2.2 Refer to the orchards (fruit farms) at Rietvlei in block **G6** on the topographic map, located in a valley and give reasons why it regularly experiences frost during winter nights.

Katabatic winds cause cold air to descend from surrounding hills down the slopes and as the dew point temperature falls below 0°C frost develops ✓✓ (1 x 2) (2)

3.2.3 Refer to the orthophoto map topographic map. Suggest how the Townlands Platinum Mines can severely impact on the health of the people of the area of Tlhabane, especially if the prevailing wind is blowing from a north easterly direction.

(**North easterly winds) will carry dust and harmful gases towards the area of Tlhabane**✓✓
Air quality will decrease✓✓
People will suffer from respiratory problems ✓✓
(Any ONE) (1 x 2) (2)

3.2.4 Refer to the drainage basin in blocks **D1** and **D2** on the topographic map.

(a) The drainage pattern formed by the river system in blocks **D1** and **D2** is**…**

C Dendritic ✓ (1 x 1) (1)

(b) State the underlying rock structure of the area found in blocks **D1** and **D2**.

Rock of uniform resistance/Homogenous rocks ✓
Horizontal sedimentary rocks/massive igneous rocks✓ (1 x 1) (1)

(c) In which fluvial stage is the river?
Youth stage/initial stage (upper course) ✓ (1 x 1) (1)

(d) The dominant river flow that one can expect in this stage of the river course is (laminar/ turbulent).

turbulent✓ (1 x 1) (1)

(e) Give a reason for your answer to QUESTION 3.2.4 (d).

Uneven river channel ✓✓ (1 x 2) (2)

[12]

3.3 GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

3.3.1 Define the concept *attribute data*.

Descriptive data/describes the spatial objects or features ✓✓ (1 x 2) (2)

3.3.2 Refer to river marked **R** (block **C7**) on the topographic map. Choose the correct word from those given in brackets. Write only the correct word next to the question number in the ANSWER BOOK. Example 3.3.2 (b) raster data

(a) What type of vector data is used to represent the river R in block C7?

lines✓ (1 x 1) (1)

(b) Give ONE attribute of river **R**.

Non-perennial ✓
Flows in a north easterly direction ✓
Dendritic stream pattern ✓
Tributaries join the main stream at acute angle ✓
Flowing over a gentle gradient ✓
Low drainage density ✓ (1 x 1) (1)
(Any ONE)

(c) Explain the importance of using vector data on topographic maps.

Symbols make the topographic map easier to read ✓✓ (1 x 2) (2)

3.3.3 Remote sensing refers to getting information about the earth's surface from a vertical distance e.g. satellite images. How would remote sensing assist environmentalists to evaluate the impact of the Townlands Platinium mines (block **F9**) on the environment?

Analyse, process and find solutions to the impact of air pollution caused by the mines ✓✓
Analyse, process and find solutions to the impact of water pollution caused by the mines ✓✓
Analyse, process and find solutions to the impact of the mines on the quality of water in the rivers/ground water/dams ✓✓
Analyse, process and find solutions to the impact of noise pollution created by the mines ✓✓
Analyse the need for buffer zones ✓✓
Analyse, process and find solutions on the impact of mining on the biodiversity/flora and fauna ✓✓
Analyse the impact of mining on the soil/rocks ✓✓ **(1 x 2) (2)**
(Any TWO)

[8]

TOTAL FOR SECTION B: [30]

GRAND TOTAL: 150